Paramedical guideline on Frail Older Adults

Justification

Koninklijk Nederlands Genootschap voor Fysiotherapie
De fysiotherapeuten van Nederland

VvOCM
Vereniging van Oefentherapeuten

ergotherapie nederland

NVH
Nederlandse Vereniging van Huidtherapeuten

Nederlandse Vereniging van Diëtisten

NVLF
Nederlandse Vereniging voor Logopedie en Foniatrie

All parts of the guideline, including the summary, are available on the websites of the initiating parties: Ergotherapie Nederland, Koninklijk Nederlands Genootschap voor Fysiotherapie, Nederlandse Vereniging van Diëtisten, Nederlandse Vereniging van Huidtherapeuten, Nederlandse Vereniging voor Logopedie en Foniatrie, Vereniging van Oefentherapeuten Cesar en Mensendieck.

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A General information

Reading guide

The current document, the justification, contains the search strategy, a summary of results, an assessment of evidentiary value and description of considerations, in support of the practice guideline, in which the recommendations and explanation can be found.

The guideline includes the following parts:

- **A** introduction
- **B** generic part (3 modules);
- **C** physical and exercise therapy (5 modules);
- **D** occupational therapy (3 modules);
- **E** skin therapy (3 modules);
- **F** dietetics (3 modules);
- **G** speech therapy (3 modules).

Methodology

The Paramedical Guideline on Frail Older Adults was developed according to the 'AQUA guideline of 2021' (AQUA advisory and expert group 2021) and the KNGF Guideline Methodology of 2022' (KNGF 2022). Below is a description of how the methodology was implemented in each phase, as well as of how stakeholders were involved, including safeguarding of the patient perspective.

Preparation phase

In a previous project, 'Knelpuntenanalyse Paramedische Zorg bij Kwetsbare Ouderen' ('barrier analysis of paramedical care for frail older adults'), an extensive barrier analysis was performed (ZonMw 2021), for which subject-matter experts, literature, stakeholders, clients and professionals were consulted. Information was gathered and analysed by means of:

- Orienting literature review
- Interviews with subject-matter experts
- Patient consultation with interviews and focus groups
- Broad stakeholder consultation (invitational conference) with the medical and paramedical professionals, patient representatives, managers, health insurance companies and other stakeholders involved
- Consultation of the paramedics involved via focus groups and surveys
- guideline-panel meetings

Using the aforementioned methods, barriers were listed for each discipline and prioritised with regard to care for frail older adults. Each professional group prioritised 3 barriers and translated them into clinical questions.
As a first step a core group was set up consisting of a general project leader and six sub-project leaders from the various professional groups. The general project leader was responsible for the overall process and the sub-project leaders were each in charge of the development of three to six modules. Due to the overlap in barriers between physical therapy and exercise therapy, it was decided to jointly work out six clinical questions for these professional groups.
For every sub-project a guideline panel was set up, consisting of subject-matter expert scientists, representatives from the professional field of the paramedical disciplines and representatives from professional groups with which cooperation is conducted (see A.1 'Module A.1'). The generic guideline panel consists of a delegation of the six aforementioned paramedical disciplines. Each guideline panel formulated three clinical questions based on the most important barriers. These clinical questions are described in a framework and formed the basis for the development of the guideline.
An overreaching review panel was formed in which patients and other professional groups (also outside the paramedical disciplines) were represented.

Development phase

The various sub-projects were conducted in parallel under the guidance of the sub-project leaders in cooperation with the guideline panels. For each clinical question, literature was systematically sought and, where possible, the evidentiary value of this literature was assessed according to the GRADE methodology (GRADE). The results were discussed with the guideline panels of the sub-projects, after which the recommendations were drawn up by means of the GRADE evidence-to-decision process. The rationale for the recommendations can be found in the modules.
The concept modules were submitted to the review panel in three rounds, after which the guideline panels incorporated the external reviews where possible. All modules were then combined into a draft guideline.

External review and authorisation phase

In the external review phase, the draft guideline was sent to the paramedics concerned and to all parties that contributed to the development of the guideline or that indicated before or during the process that they would like to become involved in the external review phase. In addition, a trial implementation was carried out for a number of profession-specific sub-projects (physical therapy, exercise therapy and occupational therapy) to test the practical applicability. All the external reviews from the parties involved were combined into an external review table, which was submitted to the five guideline panels of the sub-project. The guideline panels of the sub-projects determined which changes and/or additions to the draft guideline were necessary or desirable. The review panel advised on this as well. After being adopted by the guideline panels and the review panel, the guideline was submitted for authorisation to all parties involved.

Dissemination and implementation phase

After publication of the guideline, various implementation products were delivered, including:

- Patient information
- (e-)Training
- Summary card

Involvement of stakeholders

Paramedical healthcare providers

The primary users of the guideline are physical therapists, exercise therapists, occupational therapists, skin therapists, dietitians and speech therapists. They made an important contribution to the guideline in all phases of its development. These healthcare providers supplied input on barriers in the preparatory phase, took part in the different guideline panels and the review panel in the development phase, commented on the draft guideline in the external review phase via a work-field round and collaborated on the implementation products in the implementation phase.

Patients

To ensure that the patient perspective was taken into account, input from Patiëntenfederatie Nederland (Netherlands Patient Federation) was used in the preparatory phase. This organisation organised focus groups and conducted interviews with patients and informal caregivers, and the results thereof were used to formulate and prioritise the barriers. The barriers experienced by patients, combined with the barriers of healthcare providers and other stakeholders, served as basis for the clinical questions. Representatives of Patiëntenfederatie Nederland and Alzheimer Nederland participated in the development process as part of the review panel. The original intention was to ensure the inclusion of the patient perspective in the various guideline panels, but this proved impracticable. Finally, Patiëntenfederatie Nederland and Alzheimer Nederland also participated in the external review phase.

Other stakeholders

A number of other stakeholders sat on the guideline panel or review panel and/or were involved in the guideline during the external review phase and contributed to the creation of the guideline in this way. For example, clinical geriatricians, specialists in geriatric medicine, (supervising) general practitioners and nurses were represented on the review panel, and the guideline was submitted for external review to Zorgverzekeraars Nederland (Healthcare Insurers Netherlands).

Conflict of interest

Prior to and upon completion of the project, all project members provided a declaration of interest. The declarations of interest were assessed by the guideline advisers and, where necessary during the guideline project, measures were taken to limit (the impression of) inappropriate influence through conflict of interest as much as possible (for example, by not participating in the process of 'from evidence to recommendation' in the guideline panel) in accordance with the 'KNGF guideline methodology 2022' Gehring 2020; Koninklijk Nederlands Genootschap voor Fysiotherapie (Royal Dutch Society for Physical Therapy) 2022).

Sources

- AQUA Advies- en expertgroep (2021). AQUA Leidraad 2021.
- GRADE. Grading Recommendations Assessment, Development and Evaluation. GRADE working group, consulted in November 2023; Available at: http://www.gradeworkinggroup.org.
- Koninklijk Nederlands Genootschap voor Fysiotherapie, Vreeken H, Van Doormaal MCM, Conijn D, Meerhoff G, Swart N. KNGF-richtlijnenmethodiek: ontwikkeling en implementatie van KNGF-richtlijnen, versie 3. Amersfoort: Koninklijk Nederlands Genootschap voor Fysiotherapie (KNGF); 2022. Available at: https://www.kngf.nl/binaries/content/assets/kennisplatform/onbeveiligd/richtlijnen/richtlijnenmethodiek/kngf-richtlijnenmethodiek_2022.pdf.

B Generic part

B.1 Measurement instrument for identifying frailty

Literature: search and select

Research question

To answer the clinical question, a systematic review was carried out for the following research question (PICO): Which instruments are suited to identify frailty in older adults, for the purpose of diagnosis and evaluation?

P (Population)	frail older adults or suspicion of frailty in older adults
I (Index test)	use of a measurement instrument to identify frailty
C (Comparator test)	see 'I'
O (Outcome)	clinimetric characteristics of the measurement instruments, user-friendliness and duration of test

Relevant outcome measures

Clinimetric characteristics of measurement instruments are looked for that chart frailty, such as reliability, validity, sensitivity, specificity, area under the curve (AUC) and discriminatory capacities.
If studies also report other features of measurement instruments, such as user-friendliness (feasibility) or duration of test, these will also be included.

Search

Systematic reviews, cross-sectional search and validity studies will be looked for. If a suitable existing systematic review is found that meets the PICO requirements, the literature review will consist of a summary and quality assessment of this review. A review meets the requirements of the PICO if it presents a (practically) complete overview of measurements that identify frailty, supplemented with clinimetric characteristics. An existing systematic review will be judged by methodological quality using the ROBINS tool (University of Bristol 2022).

On 19 July 2022 an information specialist (H.W.J. Deurenberg, independent information specialist) conducted a systematic search in Medline and Cinahl (see Appendix B.1.1a and B1.1b for the search justification). This systematic search produced 621 unique hits. After the title and abstract were screened by WG, HH, CD and BM based on the inclusion criteria (see table below), 105 articles were excluded for the time being. Of these, 19 studies were (systematic) reviews and 86 non-reviews. For the inclusion of reviews, it was decided to include 1) the most relevant review (most in line with the PICO requirements); and 2) the most recent review (literature review). Of the 19 systematic reviews, the full articles were then screened. Seeing that two recent reviews could be included (1 review and 1 umbrella review), the 86 non-reviews were no longer screened in full-text.

Included reviews: Huang (2021) and Gilardi (2018).

See Appendix B.1.2 for the flowchart of the inclusion process. The (systematic) reviews that were excluded based on the complete text and the reasons for the exclusion are listed in Appendix B.1.3.
(Alkadri 2021; Ambagtsheer 2017; Ambagtsheer 2020; Apostolo 2017; Aucoin 2020; Bessa 2018; Casanova-Munoz 2022; Clegg 2014; Clegg 2015; Galvin 2017; Hamaker 2012; Hendry 2015; Jorgensen 2017; Liau 2021; McDonagh 2018; Parker 2018; Warnier 2016).

Inclusion criteria

Types of studies	(systematic) reviews, cross-sectional search, validation studies
Types of patients	frail older adults or older adults with a suspicion of frailty, where frailty has been identified with a measurement instrument
Type of index test	use of a measurement instrument to identify frailty
Type of comparison	see 'Type of index test'
Type of outcome	clinimetric characteristics of the measurement instruments, such as reliability, validity, sensitivity, specificity, area under the curve (AUC), discriminatory capacities (user-friendliness (feasibility) or duration of test)
Type of timeline	n/a

Characteristics of the reviews

Huang 2021

In the narrative review by Huang (2021) a study was made of measurement instruments to identify frailty in older adults (≥ 65 years). Definitions of frailty, psychosometric characteristics and the diagnostic accuracy of the measurement instrument, were central here.

Inclusion criteria were 1) population ≥ 65 years, 2) quantitative assessment of frailty by using the measurement instrument, 3) the measurement preferably gives a classification and/or prediction of the frailty status , 4) English-language studies.

In total, 69 of the 5,144 studies were included by two researchers independently of each other (search between 2001 and 2021). In these, 42 measurement instruments were identified. For each measurement instrument, an overview was given of:

1 general characteristics, theoretical framework, target group
2 domains covered (physical, social, cognitive, psychological, (environment))
3 number of items and way of scoring the instrument
4 psychometric characteristics (reliability, validity, cut-off values, sensitivity and specificity)
5 user-friendliness, duration of taking the test of the instrument, setting/context

Gilardi 2018

This is an umbrella review. The review meets the PICO requirements and aims to give an overview of procedures and measurement instruments to identify frailty in older adults.

Inclusion criteria were 1) population ≥ 65 years, 2) setting: living at home or in a primary care setting.

Exclusion criteria were 1) theoretical focus, 2) design: observational, cross-sectional or RCT, 3) focus on frailty in combination with a specific condition, 4) setting: hospital or intramural, 5) reviews with a focus on a single measurement instrument.

In total, ten reviews of the 164 studies were included by two researchers, independently of each other (search between January 2010 and December 2016). Five of these reviews recommended one or more measurement instruments based on the domains covered (physical, psychological and social), clinimetric characteristics, goal/setting/context and discriminatory capacities.

Quality of study (ROBIS)

The risk of bias in the reviews has been rated by WG using the ROBIS tool (University of Bristol 2022). An overview of the evaluation of study quality (risk of bias; RoB) for each study is shown in Table B.1.1.

Table B.1.1 | **Risk-of-bias table: evaluation of the risk of bias for systematic reviews with the ROBIS tool**

	suitability of studies	identification and selection of studies	data collection and evaluation of studies	data synthesis and findings	risk of bias
Huang & Lam (2021)	⊕	⊕	⊖	⊖	⊕
Gilardi et al. (2018)	⊕	⊕	⊕	⊖	⊕

⊕Low risk; ⊖High risk

Individual study quality (RoB)

The two selected reviews contain no risk-of-bias evaluation of the included studies. This is one of the shortcomings for which the reviews are downgraded on quality in ROBIS. It was decided not to make a separate quality evaluation of the 79 studies.

Effectiveness and evidentiary value

Due to the lack of RoB of individual studies, the diversity and the amount of outcome measures with regard to clinimetric characteristics of measurement instruments (inter-rater reliability, test-retest reliability, construct validity, sensitivity, specificity, discriminatory capacities/AUC, responsiveness, etc.) it is impossible to determine the evidentiary value for each outcome measure.

Results of the literature review

Huang 2021

In this review, three types of measurement instruments were identified, namely:

Self-reporting | These are measurement instruments that consist exclusively of self-reporting (*n*=17). These are widely deployable and suitable, for example, for researching the prevalence of frailty within the older adult population. The test does not need to be taken by a healthcare professional for these instruments.

Clinical observation | These are measurement instruments where an evaluation is based on clinical observation (*n*=19), mostly done by a healthcare professional. These measurement instruments are used in particular in a clinical and intramural (nursing- and care-home) setting.

Combination of self-reporting and clinical observation | These are measurement instruments that involve both self-reporting and evaluation based on clinical observation (*n*=6). These measurement instruments are used in particular in a clinical and intramural setting and are specifically suited for making a (comprehensive) diagnosis.

Reliability as well as validity were evaluated with only 12 measurement instruments. As regards diagnostic accuracy: cut-off values were known for 35 measurement instruments. However, sensitivity and specificity varied considerably with a range of respectively 56%-89.5% and 52%-91.3%. The number of test items per measurement instrument also varied greatly (from 1 to 90).

A modified version of this overview table (Table B.1.2) is included below with the main characteristics for each measurement instrument.

Table B.1.2 | **modified table with characteristics of measurement instruments for identifying frailty. Source: Huang (2021)**

Instrument	domain	score format and method		psychometric characteristics				measurement method
		reaction and format	score	# items	reliability	validity	duration of test	score, requires specific material or training, setting
Carriere's Instrument	F	predictive score of 0-1	sum of 6 items, range 25-165	6	No	No	>30 min	combination of performance test and self-reporting; requires specific material and training; population-wide
Chin's instrument	F	yes/no	sum of 2 items, range 0-2	2	No	No	<10 min	self-reporting; none; population-wide
Clinical Frailty Scale (CFS)	F	visual and written figure for frailty in 9 gradations	total score, range 1-9	1	Yes	Yes	<5 min	assessor test; requires training; clinical setting
Clinical Global Impression of Change in Physical Frailty (CGIC-PF)	F, S, P	score 1-7	total score	13	Yes	Yes	<10 min	assessor tests; requires training; clinical setting
Comprehensive Frailty Assessment Instrument (CFAI)	F, S, E	yes/no	total score 23 items	23	Yes	Yes	<30 min	assessor tests; requires training; population-wide
Edmonton Frailty Scale (EFS)	F, S, C, P	yes/new & score	total score	9	Yes	Yes	<5 min	assessor tests; requires training; clinical setting
Fatigue, Resistance, Ambulation, Illness and Loss of Weight (FRAIL) Index	F	yes/no	total of 5 items	5	No	Yes	<10 min	assessor test; requires training; clinical setting and population-wide
Frail Elderly Functional Assessment (FEFA) Questionnaire	F	yes/no with 4 choices	total score	19	Yes	Yes	10-20 min	self-reporting; none; population-wide
Frail Non-Disabled (FiND) Instrument	F, P	yes/no with 2 choices	total score	5	No	Yes	<5 min	self-reporting; none; clinical setting and population-wide
Frailty Index derived from Comprehensive Geriatric Assessment (FO-CGA)	F, P, C, S	continuous score	total score	52	Yes	Yes	<15 min	assessor tests; requires training; clinical setting

Instrument	domain	score format and method		psychometric characteristics				measurement method
		reaction and format	score	# items	reliability	validity	duration of test	score, requires specific material or training, setting
Frailty Index of Accumulative Deficits (FI-CD)	F, P, S	continuous score	health issues: score 0-1.0	90	No	Yes	<30 min	assessor tests; requires training; clinical setting
Frailty Risk Score (FRS)	F, C, S	continuous score	total score	5	No	Yes	>30 min	assessor test; special material and training required; clinical setting
Frailty Trail Scale (FTS)	F	continuous score	total score	12	No	Yes	>30 min	assessor test; requires specific material and training; clinical setting and population-wide
Fried's Frailty Phenotype-Cardiovascular Health Study Index (CHS)	F, P	yes/no with choices	total of 5 items	5	Yes	Yes	<10 min	assessor test; requires specific material and training; clinical setting and population-wide
Functional Independence Measure (FIM)	F, C	score on a 7-point scale	total score	6	Yes	Yes	<20 min	self-reporting; none; population-wide
G8	F	possible answers	total score	7	No	Yes	<10 min	performance test; requires training; specifically for cancer patients
Gait Speed	F	performance test	time	1	No	Yes	<5 min	performance test; requires specific material and training; clinical setting and population-wide
Gealey's Instrument	F	possible answers	total of items	10 or 14	No	No	<20 min	self-reporting; none; population-wide
Geriatric Functional Evaluation (GFE)	F, P, S	continuous score	total score	7	No	No	<20 min	self-reporting; none; population-wide
Gerontopole Frailty Screening Tool (GFST)	F, C, S	yes/no & performance test	total of items & total score	6	No	No	<5 min	Self-reporting & clinical evaluation; requires training; clinical setting
Groningen Frailty Indicator (GFI)	F, C, S, P	yes/no	total of 15 items	15	Yes	Yes	<15 min	self-reporting; none; screening of population
Guilley's Instrument	F, C	yes/no with choices	total score	5	No	No	<10 min	self-reporting; none; population-wide

Instrument	domain	score format and method		psychometric characteristics				measurement method
		reaction and format	score	# items	reliability	validity	duration of test	score, requires specific material or training, setting
Handgrip Strength (HS)	F	performance test	weight (kg)	1	Yes	Yes	<5 min	performance test; requires specific material and training; clinical setting and population-wide screening
Hospital Admission Risk Profile (HARP)	F, C	possible answers	total score	3	No	Yes	<20 min	assessor test; special material and training needed; clinical setting
Identification of Seniors at Risk (ISAR) Score	F, P, C, S	yes/no with choices	total of items and scores	6	Yes	Yes	<5 min	self-reporting; none; clinical setting, in particular ICU
Kihon Checklist (KCL)	F, C, S, P	continuous score	total score 0-1.0	25	No	Yes	<10 min	assessor tests; requires training; screening population-wide
Multidimensional Prognostic Instrument (MPI)	F, C	continuous score	total score 0-1.0	8	No	Yes	<15 min	assessor tests; requires training; clinical setting and population-wide
PRISMA-7 questionnaire	F, S	continuous score	total score	7	No	Yes	<10 min	self-reporting; none; clinical setting, in particular ICU
Puts' Instrument	F, C	continuous score	total score	9	No	No	>30 min	combination of performance test and self-reporting; requires specific material and training; clinical setting and population-wide
Ravaglia's Instrument	F	performance test/ possible answers	check record & total of items	9	No	No	<30 min	combination of performance test and self-reporting; requires specific material and training; population-wide
Rothman's Instrument	F, P, C	performance test/ possible answers	check record & total score	7	No	No	<15 min	combination of performance test and self-reporting; requires specific material and training; clinical setting and population-wide
Score Hospitalier d'Evaluation du Risque de Perte d'Autonomie (SHERPA)	F, C	continuous score	total score	5	Yes	Yes	<10 min	assessor test; requires specific material and training, clinical setting

Instrument	domain	score format and method		psychometric characteristics				measurement method
		reaction and format	score	# items	reliability	validity	duration of test	score, requires specific material or training, setting
Self-rated Health Deficits Index (SRHDI)	F	possible answers	total score	4	No	Yes	<5 min	self-rated health; none; population-wide
Self-report Screening Instrument	F	possible answers	total of percentages	16	No	Yes	<20 min	self-reporting; none; population-wide
Sherbrooke Postal Questionnaire (SPQ)	F, C, S	continuous score	total score	6	Yes	Yes	<20 min	self-reporting; none; population-wide
Short Physical Performance Battery (SPPB)	F	performance test and possible answers	total score	2	Yes	No	<15 min	performance test & self-reporting; requires specific material and training; clinical setting
Strawbridge Frailty Questionnaire	F, C	yes/no	total of items	16	Yes	No	<20 min	self-reporting; none; population-wide
Study of Osteoporotic Fracture (SOF) Index	F, P	possible answers	total of items	3	Yes	Yes	<5 min	self-reporting; none; population-wide
Tilburg Frailty Indicator (TFI)	F, P, S	yes/no & possible answers	total score	15	Yes	Yes	<15 min	self-reporting; none; clinical setting and population-wide screening
Triage Risk Screening Tool (TRST)	F, C, S	possible answers	total score	5	No	Yes	<15 min	assessor tests; requires training; clinical setting
Vulnerable Elders Survey (VES-13)	F	yes/no & possible answers	total score	3	No	No	<5 min	self-reporting; none; screening population-wide
Winograd's Instrument	F, P, S	possible answers	total of items	15	No	Yes	<15 min	assessor tests; requires specific material and training; clinical setting particularly older adults in hospital

F: physical; P: psychological; S: Social; C: Cognitive; E: environment

Gilardi 2018

Five of the ten reviews included recommended one or more measurement instruments based on the domains covered (physical, psychological and social), clinimetric characteristics, goal/setting/context and discriminatory capacities. The following measurement instruments are recommended:

Fried's Frailty Phenotype | This measurement instrument is often used in a clinical and research setting.

Vulnerable Elders Survey | This is a short, user-friendly instrument, making it easily applicable in the general older-adult population.

Frailty Index (FI) | Regularly used in a clinical setting and in research. This instrument is presented as the gold standard and describes three domains of frailty (physical, psychological and social). However, the Frailty Index is less user-friendly.

Tilburg Frailty Indicator (TFI) | This instrument covers three domains (physical, social and psychological), can be applied relatively quickly in 14 minutes, and is, moreover, considered reliable and valid in several studies.

SHARE Frailty Instrument | This instrument was developed in Ireland for the purpose of screening in a primary healthcare setting.

An overview table from the study by Gilardi (2018), in which the main characteristics of these measurement instruments are shown, is reproduced below (see Table B.1.3).

Conditions that can be laid down for measurement instruments that identify frailty in a primary care setting are: 1) multidimensional nature (covers several domains), 2) can be done quickly and is user-friendly, 3) high discriminatory capacities.

The setting/context is mostly decisive for the choice of the most suitable instrument. Different settings are distinguished:

Research setting | for defining frailty (when including studies)

Clinical setting | for the choice of a treatment plan

Therapeutic setting | for organising and setting up a treatment plan/intervention

Public-health setting | for making policy choices, for example, with regard to allocating funds

Preventive context | has to do with choosing a preventive intervention

Recent studies on frailty increasingly underline the multidimensional nature of frailty and the importance of measurement instruments that can explore various domains of frailty (physical, psychological and socio-economic).

Table B.1.3 | **Description of recommended (screening) measurement instruments that identify frailty. Source: Gilardi (2018)**

	Frailty Phenotype	Vulnerable Elders Survey	Frailty Index	Tilburg Frailty Indicator	SHARE Frailty Instrument
Multi-dimensional instrument	no	no	yes	yes	no
Validated	yes	unknown construct validity	yes	yes	yes
Domains	F	F	F, P, S	F, P, S	F
Type of scale	ordinal (robust, pre-frail, frailty phenotype	dichotomous	30 and more, ongoing score with no limit value	15, ongoing score with limit value	ordinal, (not frail, pre-frail, frail)

	Frailty Phenotype	Vulnerable Elders Survey	Frailty Index	Tilburg Frailty Indicator	SHARE Frailty Instrument
Reporting	combination of performance test and self-reporting	self-reporting	combination of performance test and self-reporting	self-completed questionnaire	combination of cognitive and physical tests, non-medical-staff questionnaire and self-completed questionnaire
Special material needed?	yes/no (possibly a hand-grip dynamometer)	no	no	no	yes, 5 items and a hand-grip dynamometer

F: physical; P: psychological; S: social

From evidence to recommendation

Additional literature (EFIP)

The measurement instrument Evaluative Frailty Index for Physical Activity (EFIP) of De Vries (2013) was submitted by the guideline panel (de Vries 2011). It is a Dutch measurement instrument for identifying frailty that was not identified in the review by Huang (2021) and Gilardi (2018). In view of the guideline panel's wish to include this measurement instrument in the further evidence-to-decision (EtD) process, a brief description of this instrument is given below.
The EFIP identifies the physical, psychological and social domains of frailty as well as a number of healthcare domains. The EFIP consists of 50 items divided over the four domains 'Physical functioning'
(19 items), 'Psychological functioning' (8 items), 'Social functioning' (7 items) and 'Health' (16 items). The time it takes to complete is estimated at 15 to 20 minutes (Measurement instruments in healthcare 2013). The measurement instrument is available free of charge and can be downloaded on www.meetinstrumentenzorg.nl.
De Vries (2013) developed the EFIP and studied it on various clinimetric characteristics. The results showed good inter-rater reliability (Cohen kappa=0.72, ICC=0.96) and test-retest reliability (Cohen kappa=0.77 and 0.80; ICC=0.93 and 0.98). In terms of the construct validity, a moderate/fair correlation was found with the TUG (0.61), POMA (-0.70) and CIRS-G (0.66). It was concluded that the EFIP is a reliable and valid instrument for identifying changes in frailty (for example physical activity interventions).

In a more recent systematic review carried out by Sutton (2016), the EFIP is evaluated according to the Consensus-based Standards for the selection of health Measurement INstruments (COSMIN) checklist (Mokkink 2016), and the reliability of the EFIP is assessed as 'poor' and the validity as 'fair'.

Patient journey

The clinimetric characteristics of measurement instruments are one of the aspects within the 'patient journey' Tuut (24). As such, it is important during the EtD process to also consider other aspects in the patient journey, such as user-friendliness, burden on the patient, impact of the choice of an instrument on the choice of a follow-up path (treatment/intervention) and the (expected) changes in patient-relevant outcomes. These aspects were included in the EtD process based on clinical expertise and expert opinion.

The component 'from evidence to recommendation' contains nineteen criteria that are listed below.

Prerequisites for measurement instruments

Since the measurement instruments are going to be used in the Dutch context, one condition is that the measurement instrument and the user instructions with explanations must be available in Dutch. It is also highly desirable that the use of the instrument does not entail any purchasing costs or cost of use and that the instrument identifies the four domains of frailty (physical, psychological, social and cognitive).
The guideline panel was therefore able to narrow the 43 instruments highlighted in the literature search down to a selection of three potentially suitable measurement instruments.
The EtD process subsequently continued with these three measurement instruments:

- Groningen Frailty Indicator (GFI)
- Tilburg Frailty Indicator (TFI)
- Evaluative Frailty Index for Physical Activity (EFIP)

Criteria

Quality of evidence

Clinimetric quality

From the review by Huang 2021 and the study by De Vries (2013), the GFI, TFI, as well as EFIP appear to be adequately reliable and valid (see Table B.1.4). Of all 42 measurement instruments included in the review by Huang 2021, the GFI and TFI are recommended. The GFI and TFI have comparable clinimetric characteristics (in terms of reliability and viability). Some frailty domains, such as cognitive functioning, are addressed with only one question in the TFI or GFI. The guideline panel indicates that although these two instruments can be seen as reliable and valid, they give very little information and nuance on some frailty domains.
The guideline panel indicates that the EFIP gives a more complete picture of a person's frailty status. The EFIP is a more comprehensive instrument in which various questions are asked for each frailty domain.

Due to the lack of RoB of individual studies and the diversity of and the amount of outcome measures with regard to clinimetric characteristics of measurement instruments, no evidentiary value is determined for each outcome measure.

Table B.1.4 | **Clinimetric characteristics of GFI, TFI and EFIP**

instrument	clinimetric characteristics	source
GFI	• reliability: α = 0.68-0.77; • convergent validity = 0.45-0.61; discriminatory validity = 0.08-0.50; construct validity known-group method (significant difference between older adults living at home and those living in an institution); • construct validity via factor analysis (3-factor model explained variance = 50.6%); • frailty = scores > 4	Huang (2021)
TFI	• reliability α = 0.73; • construct validity: r = 0.42, 0.19, 0.18 (frailty between respectively the physical and psychological domain, the physical and social domain and the psychological and social domain); frailty score ≥ 5 (84%, 76%)	Huang (2021)
EFIP	• inter-rater reliability: Cohen kappa = 0.72, ICC = 0.96) • test-retest reliability: Cohen kappa = 0.77 and 0.80; ICC = 0.93 and 0.98); • construct validity: ICC = 0.61 (TUG), ICC = -0.70 (POMA), ICC = 0.66 (CIRS-G); • frailty = score > 0.20	De Vries (2013)

Standard values
The GFI and TFI as well as the EFIP apply Dutch standard values and cut-off values.

Balance of desirable and undesirable effects
N/a

Values and preferences of patients and professionals regarding outcomes and direct-consequences test relative to frail older adults

Feasibility (frail older adult and care-giver)
In the review by Huang 2021, the GFI and TFI are classified as screening instruments and require up to 15 minutes each to complete. The guideline panel indicates that this duration is an underestimation. This is also true for the completion time indicated for the EFIP (15-20 min) (Measurement instruments in healthcare 2013). The guideline panel indicates that in practice these tests take longer to complete, namely, GFI: 15-20 min, TFI: 25 min, EFIP: 30-40 min Although the review by Huang (2021) reports that GFI and TFI are based on self-reporting, the guideline panel indicates that the questions are mostly asked by the therapist or that the questions are filled in together. The frail older adult never completes the questionnaire on their own.

The GFI, TFI and EFIP questionnaires are free of charge and are available in Dutch. No specific instruments are needed to do the tests. It is desirable to choose a measurement instrument for which no specific instruments (such as a hand-grip dynamometer or bio-impedance meter) are needed, seeing that the recommendations apply to six paramedical disciplines that are involved in this guideline.

The guideline panel indicates that, as far as the language level is concerned, the TFI is somewhat more complex than the GFI. The TFI therefore seems to be more appropriate for frail older adults with low health literacy or with cognitive problems. For very frail older adults in particular, taking the TFI is therefore more complicated.
The EFIP is a questionnaire with 50 questions, which makes it longer to take the test than with GFI and TFI. Each frailty domain is studied more comprehensively than with the TFI and GFI and the guideline panel indicates that this gives a more accurate picture of a person's frailty. However, the longer duration of the test could be an obstacle for some paramedical professionals. In addition, a decreasing attention and concentration span in older adults could play a role if the test takes more time.

Considering the shorter time it takes to complete the GFI compared to the TFI, the focus will mainly be on the TFI in the rest of the EtD process. The EFIP is also included in the rest of the EtD process, since it gives a better picture of a person's frailty.

Economic considerations and cost-effectiveness
The guideline panel considers the financial resources needed for the GFI and EFIP as negligible. Both instruments are questionnaires and the guideline panel is not aware of any copyright or other costs involved in the use of these tests.
The fact that the GFI or EFIP test is done together with the frail older adult requires more time during the medical history taking. This extra time entails higher social costs. However, the guideline panel indicates that the information regarding the frailty status that is obtained with the GFI and/or EFIP compensates for this in several ways. Both instruments can, for instance, contribute to an early observation of (a risk of) frailty, allowing early intervention. This can slow down the deterioration of frailty or can even lead to improvement. In addition, the therapist gets a clearer picture of a person's frailty, which helps them make a good estimate and set up a more targeted and effective treatment plan. When referring the patient, up-to-date information can also be passed on, obviating the need to have another (paramedical) professional administer a new test.

The guideline panel considers the (financial) resources needed for this measurement instrument as negligible and sees the use of both the GFI and the EFIP as being cost-effective.

Equality

The guideline panel does not expect the use of the GFI and/or EFIP to lead to an increase or decrease in health differences for various groups of frail older adults (neutral). Self-completing the questionnaire might be difficult for low-literacy users or frail older adults with low health literacy, but the questionnaire is often filled in with the therapist. This does therefore not create inequality in access to an intervention or treatment.

Acceptability

The guideline panel expects the implementation and use of the GFI and/or EFIP to be accepted by most paramedical professionals and key stakeholders. There may, however, be certain paramedical professionals who will see the identification of all four domains of frailty as lying far beyond the scope of their own professional field. Speech therapists sometimes regard physical frailty as less relevant than cognitive frailty (or communication frailty), and cognitive frailty is addressed to a very limited extent in the GFI and EFIP. However, paramedical professional associations will probably accept the use of the GFI and/or EFIP. In all (six) paramedical professional associations there is a desire for more multidisciplinary collaboration. A 'communal' instrument, where frailty domains are identified on the edge of a specific professional field, forms part of this. Considering the short time it takes to complete the GFI, the latter will be accepted more easily by all paramedical professionals than the EFIP.
As far as acceptability is concerned outside the six participating professional groups: it is important that the measurement instrument should be sufficiently reliable and valid.

Feasibility

Implementation of the GFI and/or EFIP is certainly feasible. The guideline panel indicates that the time it takes to complete the test plays an important role here. This makes the implementation of the GFI more feasible than that of the EFIP.
The EFIP gives a more comprehensive picture of a person's frailty and general health, and fits in well with the usual medical history taking (questions) regarding exercise and physical therapy in particular. This is important when setting up the therapeutic treatment plan. In addition, the EFIP is also recommended for this purpose in C.1 'Identifying protective and risk factors for frailty'.

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B.2 Communication with frail older adults

Literature: search and select

To answer the research question and clinical question, literature was searched in two different, parallel ways. The research question to be answered in this module is a very widely formulated question. What is important is not necessarily what the effect or result of the provided care or treatment intervention is, but what role communication played in the patient experience and (successful) information transfer. For this reason, the guideline panel indicated that, in addition to a systematic review that is limited to comparative studies, they also intended to gather supporting literature. The resulting conclusions from this literature will be the starting point for the evidence-to-decision (EtD) process.

Two literature search strategies:

1 A (narrow) systematic search based on a PICO and strict requirements with regard to the research design (RCTs or other comparable research). This search corresponds closely with the formulated research question.
2 Through literature, reports and other documents provided by the guideline panel. This search corresponds better with the clinical question. To this end, adjusted inclusion criteria were formulated.

Motivation for supporting literature search

The guideline panel indicates that the search for literature gives a broader view of communication with frail older adults in two ways. A systematic (narrow) search is expected to yield few studies and little information on this topic. Studies on communication tools, aids and strategies frequently have other study designs than RCTs and are often of a non-comparative nature. Qualitative research is often conducted to study this topic.
Two different search methods, moreover, provide different sources, such as scientific articles, books, research reports and other (online) sources, which increases the chances of finding relevant information that might otherwise have been overlooked. A broad yet targeted search provides a better overview of the existing research on communication with frail older adults. The guideline panel is of the opinion that the chosen strategy is a worthwhile approach and that it will contribute to obtaining stronger and more substantiated results. It will, moreover, benefit the EtD process.

Systematic review

Research question

To answer the clinical question, a systematic review was carried out for the following research question (PICO):

What is the effect of the use of communication techniques, tools and strategies compared to conventional conversation strategies on patient satisfaction among frail older adults?

P | frail older adults
I* | communication techniques, communication tools, communication aids and communication strategies
C | conventional conversation and communication techniques
O | PREMS: patient-reported experience measures, such as patient satisfaction, working alliance and patient-therapist relationship, appreciation, understanding, (successful) information transfer, motivation

* With regard to the definition of the term communication: choices that can be made by the healthcare provider or frail older adult (one of the communicating parties) about the way in which information is shared. This could, for example, include: 1) the use of certain aids, such as pictures, visualisations, beamer; 2) the use of motivational interviewing techniques 3) taking more time 4) a patient who brings someone to a consultation

Relevant outcome measures

The guideline panel sees patient satisfaction as a crucial outcome for decision-making; and working alliance, patient-therapist relationship, appreciation, understanding, (successful) information transfer and motivation as important outcome measures for decision-making. At the same time, the undesirable effects of communication strategies will be identified.

Search

On 20 April 2023 an information specialist (H.W.J. Deurenberg, independent information specialist) completed a systematic search in Medline and Cinahl (see Appendix B.2.2a and B.2.2b for the search justification). This systematic search produced 271 unique hits. After screening the title and abstract based on the inclusion criteria (see the overview below), 265 articles were excluded. For 6 articles, the full article was then screened; eventually the search yielded 2 systematic reviews.

Included reviews: Kfrerer 2023

See Appendix B.2.3 for the flowchart of the inclusion process. The systematic reviews that were excluded based on the complete text and the reasons for the exclusion are listed in Appendix B.2.4. (Dallimore 2017; Dwinger 2020; Lakke 2019; Salisbury 2013).

Inclusion criteria

Types of studies	systematic reviews, randomised control trials
Types of patients	frail older adults
Type of intervention	communication techniques, communication tools, communication aids and communication strategies (Interventions are searched for (in the context of physical, exercise, occupational, skin and speech therapy, as well as dietetics) where the intervention is adjusted to the older patient and where explicit use is made of communication strategies, aids, tools or techniques)
Type of comparison	conventional conversation and communication techniques (a comparison is made with conventional communication strategies (usual care) in the way that these are generally used with patients)
Type of outcome	PREMS (patient-reported experience measures) crucial: patient satisfaction important: working alliance, understanding, (successful) information transfer, motivation

Characteristics of included studies

Kfrerer 2023

The study by Kfrerer (2023) is a scoping review that aims to investigate the effect of the use of humour in the rehabilitation process on health and wellbeing. It focuses on rehabilitation under the supervision of rehabilitation professionals.
Important inclusion criteria: 1) empirical studies; 2) context: the professional fields of audiology, speech therapy, physical therapy and occupational therapy; 3) humour is identified as a key concept.
A broad definition of humour is used: 'Broad and multifaceted term that represents anything that people say or do that is perceived as funny and tends to make them laugh, as well as the mental processes that go into both creating and perceiving such an amusing stimulus and also the emotional response of mirth involved in the enjoyment of it' (Martin 2018).
From 4,922 studies that resulted from the search, 57 empirical studies were included, summarised and presented as narrative.

Lawless 2021

The study by Lawless (2021) is a systematic review that aims to get an overview of communication strategies (in the communication between the healthcare professional, the older patient and carers/informal caregivers) with regard to patient involvement and self-management goals and actions. Key inclusion criteria: 1) 60 years and older; 2) audio and/or audiovisual recordings of the therapy session in the presence of the patient, carer and healthcare provider; 3) use of conversation analysis or a conversation analysis-related methodology (for example discursive psychology) as primary analytical approach; 4) focus research question and analysis on the communication process with regard to health-related (self-management) goals and actions. Besides self-management, this review focuses heavily on shared decision-making (SDM) (Lawless 2021).

From 990 studies that resulted from the search, 8 studies were included for a qualitative analysis. The settings within the included studies consisted of: primary healthcare (*n*=2), hospital (*n*=2), physical therapy (*n*=1), rehabilitation centres (*n*=1) and community/home setting (*n*=3).

Quality of study (ROBIS)

The risk of bias in the reviews has been rated by WG using the ROBIS tool (University of Bristol 2022). An overview of the assessment of study quality (RoB) for each study is shown in Table B.2.1.

Table B.2.1 | **Risk-of-bias table: evaluation of the risk of bias for systematic reviews with the ROBIS tool**

	suitability of studies	identification and selection of studies	data collection and evaluation of studies	data synthesis and findings	risk of bias
Kfrerer (2023)	+	+	+	?	?
Lawless (2021)	+	+	+	?	+

+ Low risk; ? Unclear risk

Evidentiary value

The confidence in the evidence was assessed using the GRADE CERQual method.

This is the GRADE tool, which is used to assess the quality of qualitative studies in terms of methodological quality, coherence, adequacy and relevance. The final assessment indicates how much confidence there is in the impact of the communication strategy on the outcome measures that were found. A fair evidentiary value was found for 'patient-centred communication strategies that focus on personalised care' in terms of patient participation and self-management. On the other hand, a low evidentiary value was found for the use of humour in the therapist-patient relationship and group cohesion in the rehabilitation setting (see Appendix B.2.5).

Results and conclusions based on the systematic review

Kfrerer 2023

In 5 of the 57 studies the population consisted of 'older adults'. These older adults mostly had an underlying condition. See Table B.2.2 for the key findings of these 5 studies.

Table B.2.2 | **Key findings in 5 of the 57 studies from the scoping review of Kfrerer (2023)**

Sample size (*n*)	Discipline	Sample characteristics	Key findings
2	speech therapy	older women with a CVA (intramural)	Both patients showed considerable progress compared to the baseline level when humour/laughter was introduced into the therapy. After humour/laughter was removed from the therapy, there was a reverse trend towards the baseline level.
3	speech therapy	older adult (Australia) with aphasia. (F: 2, M: 1)	For people with aphasia, the value of humour in social interactions was important in social communication.
5	occupational therapy	Age 68-78 who in the past 14 years have had a stroke (M: 3, F: 2)	For people who had experienced a stroke, the use of humour was identified as an effective part of a coping strategy in professional communication.
4	speech therapy	adults with aphasia (74, 48 and 80 years old) and a speech therapist (M: 3)	Humour was part of the informal aspects of (intake) conversations. This emphasises that there is a need for personalised sessions in speech therapy.
4	speech therapy	79-year-old patient with dysphagia, his 70-year-old partner, a counsellor and a speech therapist	Playful (and non-relevant) 'small talk' formed part of a good therapist-patient relationship and helped to achieve cooperation and reach goals.

It was concluded that the results underlined the importance of using humour in rehabilitation professions. Humour can be used in various ways in this regard.

General implications for practice:

- The use of humour by professionals in audiology, speech therapy, physical therapy and occupational therapy contribute to a feeling of 'bonding'.
- Humour can be an effective way to improve the relationship between patient and healthcare provider.
- Humour can lead to an improved group cohesion in rehabilitation settings.
- In audiology, speech therapy, physical therapy and occupational therapy, non-verbal humour can be used with patients who have communication problems.

Lawless 2021

It can be concluded that patient-centred communication strategies that focus on personalised care, patient participation and 'joint decision-making' are effective (in terms of patient participation) with older patients. There are various strategies for reaching self-management goals (Lawless 2021).

Implications in practice:
Healthcare providers are advised to use 'joint decision-making' and patient-participation communication strategies (see Table B.2.3). These strategies contribute to the identification of various goals that are, moreover, feasible and relevant for the patient. The column 'recommended strategy' in Table B.2.3 is based on the primary outcome of the study.

Table B.2.3 | **Overview of communication strategies. Source Lawless 2021**

consultation phase	strategy	explanation of strategy	goal or consequence of strategy	studies	setting:	recom-mended strategy?
intake / medical history taking	draw up an agenda: ask questions	the therapist works on the trust relationship, starting with open and personal questions (such as 'How are you?') to more specific (medical-care) topics	a good patient-therapy relationship for discussing specific (medical) topics	1	outpatients	?
	the therapist introduc-es the agenda/ treatment plan	the therapist makes few assessments of the pa-tient. E.g. ('I understand that your main problem is...'; the therapist shifts the focus and draws up the agenda with minimal patient participation	limit patient participation by determining the conversation topics (mostly related to specific biomedical or behavioural problems)	3	outpatients, primary care, physical therapy	No
	broad perspective: ask open questions	the therapist uses open questions to get information on complaints ('What is the main problem?') Explore the perspectives, identify potential goals and reflect on progress and achievements	invite the patient to help explore capabilities (joint decision-making), identify potential solutions and assess progress	4	occupational therapy, outpatient, rehabilitation, physical therapy	Yes
	patient's reactions to problems	the patient reacts to problems that the therapist raises; this shows the patient's personal capabilities and competencies	provision of information on possible goals in combination with relevant personal capabilities and impairments	2	occupational therapy, outpatient	?
draw up a treatment plan	the therapist proposes a treatment plan	the therapist gives advice on goals without asking about the patient's views	the patient is given a passive role and their view is not heard	2	home visit	No
	the patient proposes a treatment plan	the patient presents a potential goal (often careful to determine the therapist's acceptance)	1) agrees with patient's goal; 2) after closer consultation, agreement with patient's goal; 3) discussion continued on other goals	1	occupational therapy	?
	jointly propose a goal and treatment plan	the therapist uses active syntax ('have you tried...?'), asks open questions, adopts the patient's way of talking anddownplays own authority	give the patient an active role in setting goals and drawing up a treatment plan	2	home visit, primary care	Yes

consultation phase	strategy	explanation of strategy	goal or consequence of strategy	studies	setting:	recom-mended strategy?
draw up a treatment plan *(continued)*	strive for acceptance of the goal	strive to harmonise the goal by discussing the current problematic situation and formulating specific actions to solve it	through patient participation in the treatment plan and progress evaluation, the 'decision-making power' is given to the patient	2	home visit, rehabilitation	?
commitment and completion: commitment (or no commitment) to the treatment plan	commitment to the treatment plan	the therapist agrees with the patient's proposal (immediately/after patient's insistence/following further information); the patient agrees with the proposal (immediately/after encouragement from therapist)	when the therapist asks for further information about the goal, this gives the patient room to adjust the desired goal; the patient indicates that they agree completely/ partly/minimally with the treatment plan	5	home visit, occupational therapy, physical therapy, primary care, rehabilitation	?
	no commitment from therapist	the therapist is not committed to the patient's goals and proposed treatment plan; gives reasons from own clinical experience for adjusting the goals; asks more questions (series of)	acknowledge the patient's proposed goal, but steer the discussion towards other possible goals	2	occupational therapy, primary care	?
	no commitment from patient	no commitment on the part of the patient and the patient does not agree with the therapist's proposal	if the therapist does not look at the reasons behind the rejection of the treatment plan, the treatment plan will not start (conclusion)	2	home visit	?
	patient rejects therapist's proposal	patient rejects the proposal, question and advice; e.g. 'I don't want to know.'	the patient undermines the role of the therapist, does not act constructively and causes problems in the interaction	1	home visit	?
	the therapist strives for agreement/ consent without adjusting the goal/ of the treatment plan	the therapist strives for agreement following resistance from patient by asking further questions or reformulating the goal	the therapist examines the reasons for lack of commitment from patient through patient participation; original goal remains unchanged	4	home visit, occupational therapy, physical therapy	?

Literature supplied by the guideline panel (non-systematic)

Characteristics of the included studies

Besides the systematic review, the guideline panel supplied literature, reports or other documents. This non-systematic search is more in line with the clinical question and thus provides a worthwhile starting point for the EtD process. The following adjusted inclusion criteria were established for these additional sources:

- The language is English or Dutch.
- They focus on frail older adults.
- Communication techniques, tools, strategies and characteristics are discussed that can be used by physical therapists, exercise therapists, occupational therapists, speech therapists, dietitians and skin therapists (all 6 paramedical disciplines within the current guideline).
- The communication techniques, tools, strategies and characteristics that were found are to be linked to patient-reported experience measures (PREMS), such as patient satisfaction, understanding, (successful) information transfer or motivation.
- Study design: all designs. Qualitative studies and other non-comparative research are included.

The guideline panel provided 11 studies and other sources. These sources were gone through full-text by a guideline-panel member (CD). CD then proceeded with data extraction, where the communication goals, relevance and strategy description from 4 sources were put into a table (see Table B.2.4). The remaining 7 sources gave the same information and insights and did therefore not add anything to the 4 sources included.

The four sources were the following: De Haes (2009), Murugesu (2018), Pel-Littel (2018) and Robben (2012) (see Table B.2.4).

Table B.2.4 | **Characteristics of the sources provided by the guideline panel**

De Haes (2009)	
country	The Netherlands
title	Endpoints in medical communication research, proposing a framework of functions and outcomes
type of research	Framework development
objective	To propose a framework for outcomes (endpoints) regarding communication between doctors and patients.
method	The development of the framework was based on literature about outcomes surrounding communication and 4 existing modules regarding communication.
Murugesu 2018	
country	The Netherlands
title	Beter omgaan met beperkte gezondheidsvaardigheden in de curatieve zorg - kennis, methoden en tools (Dealing more effectively with health literacy in curative care – knowledge, methods and tools)
type of research	Qualitative research supplemented with a literature review
objective	How can healthcare providers in curative care deal and communicate more effectively with people whose health literacy is limited?
method	Data collection based on: 1) quick scan of the literature, 2) online survey among healthcare providers from GP practices and hospitals (response: 396), 3) in-depth interviews with healthcare providers (*n*=7) and a focus group with healthcare requesters with limited health literacy (*n*=9).

participants	Healthcare providers from general practices and hospitals and healthcare requesters with limited health literacy.
Robben 2012	
country	The Netherlands
title	Preferences for receiving information among frail older adults and their informal caregivers: a qualitative study.
type of research	Qualitative research
objective	Explore the experiences of frail older adults and informal caregivers regarding the receipt of information from healthcare professionals an their preferences in this respect.
method	Semi-structured interviews with frail older adults (*n*=11, 65-90 years) and informal caregivers (*n*=11, 55-87 years). The interviews were transcribed verbatim and analysed by means of a 'grounded-theory approach'.
participants	Frail older adults (> 65 years) and informal caregivers. Frailty is defined as having one or more of the following problems: cognitive impairments, disabilities, psychosocial problems, multimorbidity, polypharmacy or social isolation. People who did not understand any Dutch, who had speech impairments or severe loss of hearing or had a live expectancy of < 6 months were excluded. People with severe cognitive impairments that impeded their ability to make an informed decision or to express their viewpoint were also excluded.
Pel-Little 2018	
country	The Netherlands
title	Joint decision-making with frail older adults
type of research	infographic based on previous research
objective	The purpose of the infographic is to give information on the process of joint decision-making with frail older adults. It is based on research by RadboudUMC to find a suitable conversation model for older adults with multiple chronic diseases.

Results and conclusions based on the non-systematic literature review (literature provided by the guideline panel)

Table B.2.5 pertains to communication in a broader sense. Aspects that pertain to communication with frail older adults are brought together in the infographic of Pel-Littel (2018; 2019).
These steps are:

1 **Preparation** | Previous arrangements and problem analysis: Look at the history of the frail older adult and any acute issues. Check previously made arrangements, which could be useful for opening and steering the conversation.
2 **Goals** | 'Life goals and values' and the role of the partner in decision-making: talk with the frail older adult about the fact that there is a health issue and that there are various options for treatment and care. Tell them that it is good first of all to talk about general matters.
3 **Choices** | Summarise the previous steps and formulate the treatment goal: summarise what has been discussed so far and explain to the frail older adult that they have a choice. Clarify what the choice entails and formulate the main treatment goal.
4 **Options** | Advantages and disadvantages of the options and discussing patient preferences: determine, based on the treatment goal, what the options are and discuss the pros and cons of each option.

5 **Decision-making** | Make a decision and attune to the values and goals of the frail older adult: ask whether the frail older adult is ready to make a decision. Perhaps the frail older adult needs more time and has more questions. Formulate the decision together. It may be that the frail older adult prefers the doctor to make the decision. In this case, state it explicitly and adjust to the frail older adult's values and goals.
6 **Evaluation** | Evaluate the decision-making process and establish a treatment plan: talk with the frail older adult about whether they are satisfied with the discussion and the decision that was made.

Additional resources: Pel-Littel (2018); Pel-Littel (2019); Vilans (2021); Vilans (2018)

Most older adults always want to decide together (67%) and this has a positive impact in terms of patient satisfaction, better informed patients (who are therefore less anxious), compliance, better relationships between the healthcare professional, the patient, and loved ones, a sense of autonomy for the patient, identification with actual problems of the older adult and a sense of added value for healthcare professionals.
According to a Delphi study by Pel-Littel (2018) among older adults and their loved ones, older adults raised the following conversation topics:

- Day-to-day functioning
- Mental health
- Social functioning
- Quality of life
- Stress
- Coping with disease

Their loved ones found the following topics important:

- The burden of care
- Possibilities to find help

Table B.2.5 | **Compressed findings organised according to the communication goal on the basis of literature provided by the guideline panel**

	Communication goal	Why relevant?	What can you as a professional do with regard to this communication goal?	Sources
1	Build up a good relationship with the patient.	An essential basis for delivering good care and working effectively and efficiently towards treatment goals. Contribute to increased patient satisfaction, better patient health and less stress and burnout among professionals.	Through eye contact and participation from the patient during treatment, work on gaining the patient's trust and respect. Frail older adults specifically mention: • Listen to the patient. • Take the patient seriously. • Have respect for the patient. • Be friendly. • Show sincere interest. • Take time for the patient (don't appear to be in hurry). • Have the same professional for a longer period. • Open attitude and broad outlook. • Be aware of own standards and values.	De Haes (2009) Robben (2012) Pel-Littel (2018)

	Communication goal	Why relevant?	What can you as a professional do with regard to this communication goal?	Sources
2	Collect information from the patient.	To arrive at a correct 'diagnosis' and treatment plan and hence effective care, which will avoid unnecessary care and mistakes.	Specifically for people with low health literacy: advise to bring someone along.	De Haes (2009) Murugesu (2018)
3	Provide clear information to the patient.	Patients need information to understand their disease and treatment, make decisions and cope.	• Do not use jargon • Check whether the patient understands you and can repeat the information. • Find out what prior information and capabilities the patient has or does not have (use an information sheet/checklist). Frail older adults specifically indicate the following as valuable: • Make information visual e.g. with a sketch or scale model. • Ask them to repeat the received information to check if they have understood it. • Have them bring someone along, for instance a child. Specifically mentioned with low health literacy: • Before the consultation, have them make a list of questions. • Explanatory brochure. • Use the teach-back method (letting the patient tell in their own words what was explained). • Make communication simpler and put it in writing. • Make oral communication more accessible. • Speak more slowly. • Repeat and recap information. • Use visual aids. • Use short, active sentences.	De Haes (2009) Murugesu (2018) Robben (2012) Pel-Littel (2018)
4	Involve the patient when making decisions.	This helps to reach the right decision that will lead to better adherence by the patient and better treatment outcomes. It will also increase the patient's autonomy.	• Check the patient's values and preferences. • Is the older adult fit and lucid enough to make a decision? • Give the older adult time to think about it. Specific to low health literacy: • React to the patient's ideas, concerns and expectations. • Determine the patient's preferences for their role in decision-making. • Use decision aids to discuss treatment options together with the patient.	De Haes (2009) Murugesu (2018) Pel-Littel (2018)

	Communication goal	Why relevant?	What can you as a professional do with regard to this communication goal?	Sources
5	Behaviour that will improve health and enable treatment.	Improve the patient's health by stimulating desirable behaviour through communication strategies.	Motivating discussions	De Haes (2009) Murugesu (2018)
6	React to the patient's emotions.	More is needed, for example identifying emotional problems, to improve the patient's health; solving these could be a prerequisite for working towards treatment goals.		De Haes (2009)

From evidence to recommendation

From the literature that was found, it is obvious that various communication goals must be defined. Based on the data extraction from the literature provided by the guideline panel, six communication goals were defined with matching focus areas and strategies.

1 Build up a good relationship with the frail older adult.
2 Gather information from the frail older adult. If necessary, ask permission for collateral medical history taking.
3 Provide clear information. In this regard, be aware of frail older adults with low health literacy.
4 Involve the frail older adult in making decisions
5 Stimulate desirable behaviour through communication strategies.
6 React to emotions.

The use of humour study by Kfrerer (2023) found in the systematic review fits in with this and applies to step 1, the therapist-patient relationship in a rehabilitation setting.

It also emerges from the literature that communication aimed at patient participation and 'deciding together' is much appreciated by older adults and that it, moreover, leads to treatment goals that are better suited to the situation and expectations of the frail older adult. The study by Pel-Littel (2019) and the infographic based on it (Pel-Littel 2018) indicate in six steps how to achieve optimal patient participation and 'deciding together', with dos and don'ts.
This includes the following six steps, which are explained in more detail in the paragraph above on 'Results and conclusions based on the non-systematic review (literature provided by the guideline panel)': 1) Preparation; 2) Goals; 3) Choices; 4) Options; 5) Decision-making; 6) Evaluation.

The study by Lawless (2021) confirms the importance of communication aimed at joint decision-making, involving the patient in choices that have to be made, looking at the options together and, if necessary, assigning an active role to the patient in this process.

Perspective of the guideline panel:
The guideline panel, based on the literature found as well as the expert opinion, indicates that two important aspects are key to communicating with frail older adults, namely:

1 Deciding together → What do you as healthcare provider (together with the frail older adult) hope to achieve?
2 Effective communication → How does the healthcare provider go about the process of 'deciding together'?

Effective communication is seen here as a prerequisite for actively involving the frail older adult in the decision-making process when establishing treatment goals and plans (deciding together).

The guideline panel further indicates that it is satisfied with the outcome of humour (as a tool) from the systematic search. It is, however, pointed out that humour is a narrow construct and that it can be seen as an effective method that can contribute to a good therapist-patient relationship. The guideline panel also questions the use of humour. Not everyone has the same sense of humour. Humour may therefore not be acceptable to every patient. It is thus all the more important when using humour that the healthcare provider should adapt to the patient. Moreover, humour does not come naturally to every professional.

The presence approach of Prof. Andries Baart fits in well with a good therapist-patient relationship and offers advice for the attitude a therapist can adopt with regard to the patient. The presence philosophy and the practice that goes with it are aimed at creating fair, loving human relationships. Instead of commercialised, market- and product-oriented healthcare, the healthcare provider strives towards 'being with' and 'being there for' the patient. A good healthcare provider is attentive and dedicated to frail people and offers them support, help and care, so that the patient feels seen and heard.

The guideline panel indicates that it approves of the six steps and six communication goals that emerge from the found literature. Furthermore, additional focus areas have been formulated that are of importance in communication with frail older adults:

1 Written communication. A guideline was developed for this purpose by Hogeschool Zuyd (Dalemans 2021). It is also important to communicate in writing at level B1. Various websites with tips and checklists can be consulted in this regard. The healthcare provider can make use of pictograms, smileys or other visualisation tools. This can be a suitable aid when messages are sent (by, for example, the healthcare provider). Pictograms or smileys can be helpful in certain situations, but should be geared to the older adult's environment.
2 Providing, or in another way giving access to, tailored information is very valuable to the frail older adult. The frail older adult can then review the information at home or at a later stage.
3 Discuss all options. Discuss all possible options with the frail older adult, with the associated advantages and disadvantages. Do this in a progress- and solution-oriented way.
4 As regards involving the partner or others (counsellor, informal caregiver) in collecting information, discussing life goals and values and making decisions: there is a risk that the older adult will be talked *about* too much.
5 As regards the therapist-patient relationship: leave room for emotions and articulate what you as healthcare provider observe.

Criteria

Desirable effects

Various communication strategies are found to have positive effects on the therapist-patient relationship, patient satisfaction, successful information transfer (better informed patients), sense of autonomy of the patient, addressing the actual problems of the frail older adult and a sense of added value for healthcare professionals. The included literature does not allow the effect size to be quantified for the outcome measures.

Undesirable effects

The literature did not reveal any undesirable effects associated with the use of communication-improvement strategies for frail older adults. The guideline panel indicates that these communication-improvement strategies do not have any undesirable effects.

Quality of evidence

A fair evidentiary value was found for 'patient-centred communication strategies that focus on personalised care' in terms of patient participation and self-management. On the other hand, a low evidentiary value was found for the use of humour in the therapist-patient relationship and group cohesion in the rehabilitation setting (see Appendix B.2.5). Additional sources provided by the guideline panel that were not assessed on quality give the same impression with regard to 'patient-centred communication strategies'. Experience and expertise from the guideline panel also underline these outcomes. Hence the guideline panel assesses the evidentiary value of the desirable effects as high.
The guideline panel assesses the evidentiary value of the desirable effects as absent.

Patient values and preferences

The guideline panel assesses that frail older adults attach great value to communication-improvement strategies and that there is no variation among frail older adults in this regard. Personalised communication leads to better suited treatment goals and higher patient satisfaction among frail older adults.

Balance between desirable and undesirable effects

The guideline panel came to the following assessment: the desirable effects definitely outweigh the undesirable effects.

Economic considerations and cost-effectiveness

The guideline panel indicates that the aforementioned six communication steps and communication tools with the accompanying communication strategies do not take up more time for the healthcare provider. Particularly in the initial period of an implementation phase, where healthcare providers must invest in adapted, tailored communication material. However, this time investment pays for itself in several ways on a social level. A good therapist-patient relationship and getting a good, complete picture of the frail older adult and their situation leads to better, more effective treatment.
From the literature it appears that effective communication ensures treatment goals that are more suited to the personal situation of the older adult. A lack of clarity in communication can lead to suboptimal treatment plans and decisions that could require extra time investment at a later stage, both for the healthcare provider and for the frail older adult.

The guideline panel assesses that the resources needed for using communication strategies are moderate and considers that these communication strategies are cost-effective for society.

Equality

Effective, tailored information, with the healthcare provider adapting to the world and experience of the frail older adult, will lead to treatment plans and goals that are more suited to the patient. In particular for frail older adults with a cognitive impairment or low health literacy, the introduction of customised information will be a desirable development. The guideline panel therefore expects that the intervention will help to reduce health inequalities.

Acceptability

The guideline panel expects that all key stakeholders will accept the intervention. The time invested by healthcare providers themselves, working non-billable hours to tailor, visualise or otherwise improve the communication strategy, is a focus area.

Feasibility

The guideline panel expects the implementation of the discussed communication strategies to be realistic.
It is expected that this implementation cannot be completed at once, go, but must be done in stages. Training for paramedical healthcare professionals could play a role here. Knowledge of the communication strategies is perhaps insufficient. Changing the communication behaviour (old communication patterns) of professionals may therefore require additional training. As a side note, not all healthcare providers will need training for this.

Knowledge gaps

There is a reasonable body of knowledge with regard to effective communication on various outcome measures. However, little if any comparative research has been done in the frail older adults population on the effect of communication strategies in terms of 'patient-reported experience measures'.

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B.3 Organisation of healthcare

Multidisciplinary collaboration

Frail older adults frequently have multi-area problems. Accordingly, (para)medical treatment of frail older adults requires coordination and cooperation between a large number of relevant healthcare and assistance providers at a local and/or regional level. To be able to achieve good collaboration, it is important for the relevant healthcare and assistance providers to be aware of one another's role, expertise, competencies and (added) value. This knowledge is not only limited to one's own profession.
It is important for the paramedic to have knowledge and an understanding of the expertise of and treatment by not only healthcare and assistance providers involved in the treatment of frail older adults, but also healthcare and assistance providers with specialist knowledge (such as specialisation or registration). It is based on this knowledge and insight that the paramedic can assess whether they feel competent and authorised to provide an individual patient with paramedical care. If not, there will be a referral (back) to the referrer or to another paramedical healthcare professional or the frail older adult will be advised to contact a colleague with specialised knowledge.

Healthcare and assistance providers who focus on the treatment of frail older adults (in alphabetical order/not exhaustive) are:

- Activity counsellor
- Pharmacist
- Audiologist
- Pelvic physical or exercise therapist*
- Dementia case manager
- Palliative Care Consultation Team
- Dietitian
- Occupational therapist
- (Geriatric) physical therapist*
- (Geriatric) exercise therapist*
- Spiritual counsellor
- (Geriatric) nurse
- Specialised nurse
- Mental healthcare professionals (e.g. psychologist, psychiatrist, psychotherapist)
- Skin therapist
- General practitioner (and general practice-based nurse)
- Clinical geriatrician
- Speech therapist
- Informal care consultant/broker
- Oral healthcare provider (geriatric dentist), dental hygienist, denturist and the supporting team)
- Optician, optometrist and other eye specialist
- Old-age advisers
- Podiatrists*
- Mental healthcare practice-based nurse
- Social worker (see The social worker)
- Specialist in geriatric medicine (see specialist in geriatric medicine)
- Welfare organisations (including debt counselling)
  Policeman on the beat in municipal district team
- District nurse
- WMO service desk

Source: (Verlee 2017)

* added based on expert opinion

The process of cardiac rehabilitation in particular is a multidisciplinary matter. Many healthcare providing experts are involved in cardiac rehabilitation, such as the cardiologist, cardiothoracic surgeon, (supervising) general practitioner, rehabilitation specialist, sports doctor, company physician, insurance company's medical adviser, psychiatrist, (neuro) psychologist, psychotherapist, exercise physiologist, cardiac rehabilitation coordinator, general practice-based nurse,

social worker, dietitian, occupational therapist, lifestyle coach, (cardiovascular) nurse and ergonomist. The composition of the multidisciplinary treatment team varies and also depends on the individual rehabilitation goals of the frail older adult.

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C Physical and exercise therapy

C.1 Identifying protective and risk factors for frailty

Module C.1 was developed in two different phases. In C.1a a literature review was conducted in response to clinical question 1a. In C.1b, clinical question 1b was then answered with the use of the Clinimetrics Framework. Measurement instruments were thus identified and, based on this information, recommended and optional measurement instruments were chosen for identifying protective and risk factors for frailty. C.1a and C.1b have therefore been worked out and presented separately.

Literature C.1a: search and select

Research question under clinical question 1a

What are the risk factors for (physical) frailty in older adults?

PEO:

P (Population) | frail older adults
E (Exposure) | potentially predictive factors (physical, cognitive, social, mental, environmental)
O (Outcome) | frailty

Relevant outcome measures

Prognostic factors for frailty in older adults are sought in the physical, cognitive, social, mental and environmental domains. In view of the inclusion criterion that there must, for instance, be a (logistic) regression analysis, a prediction model or 'latent growth modelling' (LGM) in which determinants were analysed in relation to each other, plus the fact that frailty is identified if there is an enumeration or accumulation of determinants, the guideline panel chose to consider all odds ratios ≠ 1 and that are significant (α =0.05) as clinically relevant.
For the classification of the size of the associations (effect size), the following limit values were applied: small effect (OR < 1.5), moderate effect (1.5 ≤ OR ≤ 2), large effect (OR > 2). These limit values are based – albeit adapted – on Hartvigsen (2004) and Hemingway (1999) (Hartvigsen 2004; Hemingway 1999).

Search

On 19 July 2022 an information specialist (H.W.J. Deurenberg, independent information specialist) finalised a systematic search in Medline, Cinahl and PsycInfo (see Appendices C.1.1a, C.1.1b and C.1.1c respectively for the search justification). This systematic search produced 863 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 793 articles were excluded. For 73 articles, the full article was then screened; eventually the search yielded 11 studies, one systematic review (Welstead 2021) and 10 RCTs: (Asmar Alencar 2015; Doi 2018; Fustinoni 2022; Hoogendijk 2018; Hwang 2021; Kim 2021; Lorenzo-Lopez 2019; Park 2019; Pollack 2017; Yu 2022).
Considering the possibility that there might only be a small number of determinants due to the strict inclusion criteria for individual studies ((logistic) regression analysis or LGM), it was decided in addition to include a systematic review as well. The search yielded four systematic reviews (SR) (Feng 2017; He 2019; Mello Ade 2014; Welstead 2021). Of these, the systematic review of (Welstead 2021) came the closest to the research question and was also the most recent SR and of sufficient quality. See Appendix C.1.2 for the flowchart of the inclusion process. The articles that were excluded based on the complete text and the reasons for the exclusion are listed in Appendix C.1.3.

Inclusion criteria

Types of studies	observational study: cohort study or cross-sectional study In the analysis, prognostic factors were analysed together (e.g. by means of a prediction model, multiple (logistic) regression analysis, latent growth modelling (LGM) or GEE analysis)
Types of patients	(frail) older adults for which frailty was identified with a measurement instrument.
Type of intervention	n/a
Type of comparison	n/a
Type of outcome	frailty
Type of timeline	n/a

Characteristics of the included studies

Of the 10 RCTs included, 9 had a longitudinal design and 1 a cross-sectional design. In total, the studies included 23,118 patients in whom frailty or a change in frailty was identified. The average age of the patients varied between the studies from 63.4 to 79.8 years. The percentage of female patients varied from 0% to 76.8%. In all the studies, frailty had been identified with a validated measurement instrument.The characteristics of the included studies are provided in appendix C.1.4.

Characteristics of the systematic reviews

The systematic review by Welstead (2021) studied the change in frailty in adults aged ≥50 over time and the factors that play a role in this. Studies were included if frailty was identified longitudinally, with a measurement instrument and as a continuous measure (Welstead 2021). In total,
25 observational studies were included (up to 30 March 2020) with a total sample size of 322,692. (see Appendix C.1.4).The results are presented descriptively.

Individual study quality (RoB)

The design and execution of the individual studies (RoB) was assessed by WG with the help of the QUIPS tool (Hayden 2006; Hayden 2013). The risk of bias in the systematic review was rated by WG using the ROBIS tool (University of Bristol 2022). An overview of the study quality assessment (RoB) per study is provided in Appendix C.1.5a and C.1.5b Risk-of-bias table.

Effectiveness and evidentiary value

An overview table of the effect size and evidentiary value (GRADE evidence profile) of the prognostic factors found is shown in Appendix C.1.6 and C.1.7 (compact version) and is explained below.
Due to the small number of studies for each prognostic factor, no meta-analysis was done on the basis of the pooled results. There are also mutual differences between the studies in terms of the effect measures used (OR, RR, ß) and the way in which factors are identified and dichotomised. The extracted data furthermore contain effect measures of analyses in which factors were analysed in relation to each other, for example, in a (multivariate) regression analysis. The remaining set of factors in the definitive model differs considerably between studies. Instead of a meta-analysis, it was therefore decided to do a descriptive, narrative synthesis.
In the following section the findings from the literature are discussed separately for each factor found and in random order. However, the guideline panel did make a distinction between factors that – in the context of physical therapy and exercise therapy – can be identified with or without measurement instruments.

Prognostic factors

Determinants that can be identified without a measurement instrument:

Age | The 'age' determinant was included in 7 studies as an investigated factor. Two studies included age as a covariate, which means that it does not follow as a determinant from the analysis. In 5 of the 7 studies age remained in the definitive model (or final analysis). All 5 of these studies showed that a higher age was a significant risk factor with a small impact and ORs ranging from 1.00 to 1.31. The systematic review by Welstead (2021) also concludes on the basis of 3 other studies that a higher age is a risk factor (Welstead 2021).

The evidentiary value was lowered by one level from high to 'fair' based on the risk of bias of the individual studies.

Gender | The 'gender' determinant was included in 7 studies as an investigated factor. In 1 study, results were adjusted according to gender, which means that it does not follow as a determinant from the analysis. In 5 of the 7 studies, gender remained in the definitive model (or final analysis). All 5 of these studies show that 'being female' is a risk factor with a small to moderate effect size and ORs ranging from 1.11 to 1.9. The evidentiary value is regarded as 'low'. The systematic review by Welstead (2021) also concludes on the basis of three studies that 'being female' is a risk factor while 'being male' is a protective factor (Welstead 2021).

The evidentiary value was lowered by 2 levels from high to 'low' based on 1) the risk of bias of the individual studies and 2) inconsistency in the outcome measure.

Feelings of depression | The determinant 'feelings of depression' was included in 6 studies as an investigated factor. In these studies, 'feelings of depression' remained in the definitive model (or final analysis). All 6 of these studies show that feelings of depression are a risk factor (5x significant, 1x not significant) with a small to large effect size and ORs ranging from 1.14 to 34.2.

The evidentiary value was lowered by 3 levels to 'very low' based on 1) the risk of bias of the individual studies, 2) inconsistency in the outcome measure and 3) inaccuracy in the effect on the outcome measure.

Smoking behaviour | The determinant 'smoking behaviour' was included in 4 studies as an investigated factor. In 3 of the 4 remaining studies, 'smoking behaviour' remained in the definitive model (or final analysis). All 3 of these studies show that (currently) smoking is a risk factor (2x significant, 1x not significant) with a small to large effect size and ORs ranging from 1.04 to 2.3 and an RR of 2.53. One study showed that there is no significant link between 'former smoker' and frailty (OR (95%CI): 1.00 (0.62; 1.62)).

The evidentiary value was lowered by 2 levels from high to low based on 1) the risk of bias of the individual studies and 2) inaccuracy in the effect on the outcome measure; the reliability interval of the OR overlaps by 1.

Co-morbidities | 9 of the 10 studies revealed 12 conditions that are linked to frailty. These were: diabetes mellitus, heart diseases, congestive heart failure (CHF), chronic conditions, stroke, (history of) cancer, high blood pressure, arthritis of the knee, arthrosis, Alzheimer's disease or other brain pathology, recovery from an injury and COPD. Sometimes 'co-morbidities' or the 'number of co-morbidities' were included as a separate factor.

When the presence of co-morbidities is considered as a whole, the included studies show that the presence of co-morbidities is a risk factor with ORs ranging from 0.6 to 10.9. Furthermore, 3 of the 4 studies show that the number of co-morbidities play a role with ORs ranging from 1.05 to 2.79 and a ß of -0.12 (p=0.064).

The evidentiary value for the presence of one or more co-morbidities was lowered by 2 levels from high to low based on 1) the risk of bias of the individual studies and 2) inconsistency in the outcome measure.

Miction and defecation problems | Miction and defecation problems were included in 1 study as an investigated factor. In this study, urinary incontinence remained as a significant risk factor in the definitive model (or the final analysis) with a large effect size and an OR of 2.9 (95%CI: 1.3; 6.1). Faecal incontinence did not emerge as a significant factor from the analysis. One other study registered urinary incontinence not as a separate factor, but as part of the overall factor of 'co-morbidities''.

The evidentiary value was lowered by 3 levels from high to low based on 1) the risk of bias of the single small individual study and 2) inaccuracy in the effect on the outcome measure; there is a broad reliability interval due to the small sample size.

A history of past falls (as part of the falls risk) | The determinant 'history of past falls' (defined as 'have you had a fall in the past year? yes/no') was included in 2 studies as an investigated factor. In 1 of these 2 studies, 'history of past falls' remained in the definitive model (or the final analysis) with a moderate effect size and an OR of 1.92 (95%CI: 1.31; 2.81).

The evidentiary value was lowered by 2 levels from high to low based on 1) the risk of bias of the single but fairly large individual study and 2) inaccuracy in the effect on the outcome measure.

Polypharmacy (use of medicines) | The determinant 'polypharmacy' or 'use of medicines', defined as 'the number of different medicines taken', is included in 3 studies as an investigated factor and remained in the definitive model (or the final analysis). All 3 of these studies show that polypharmacy is a risk factor (2x significant, 1x not significant) with a small to large effect size and ORs that range from 1.01 tot 2.57.

The evidentiary value was lowered by 2 levels from high to low based on 1) the risk of bias of the 3 individual studies and 2) inaccuracy in the effect on the outcome measure.

Sensory impairment (hearing or sight) | Problems with hearing or eyesight (together referred to as sensory impairment) were included in 4 studies as an investigate factor and remained in the definitive model (or final analysis). All 4 of these studies show that problems with hearing or sight are a significant frailty risk factor with a small to large effect size and ORs ranging from 1.22 tot 3.18; or an intercept value for frailty of ß=0.22 (p=0.002). In 1 study, the 'problems with hearing' factor was indicated as a non-significant risk factor in the population aged 75 and above. In 1 study, 'hearing or sight problems' was included as a reason for exclusion.

The evidentiary value was lowered by 2 levels from high to low based on 1) the risk of bias of the 3 individual studies and 2) inaccuracy in the outcome measure.

Alcohol consumption | Alcohol consumption was included in 3 studies as an investigated factor. In 1 study alcohol consumption remained (in terms of frequency and quantity) as a significant protective factor in the definitive model or 'final analyses with a small effect size and a ß of -0.07 (p=0.02) (converted into an OR of 0.93 (p=0.02).

The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of this one individual study and 2) inaccuracy in the effect on the outcome measure.

Financial stress (wealth) | Financial stress and wealth were included in 1 study as an investigated factor. In this study, this factor (defined as 'meeting living expenses') remained as a significant risk factor in the definitive model or the final analysis with a small effect size and an OR of 1.05 (95%CI: 1.02; 1.08). In addition, the systematic review by Welstead (2021) also showed on the basis of three studies that financial stress is a risk factor while wealth is a protective factor (Welstead 2021).

The evidentiary value was lowered by 3 levels from high to low based on 1) the risk of bias of this individual study.

Education level | The determinant 'education level' (or duration of education (in years)) was included in 7 studies as an investigated factor. In 1 study, results were adjusted for education level, which means that it does not emerge as a determinant from the analysis. In 5 of the 7 studies 'education level' remained in the definitive model (or final analysis). These 5 studies show that education level (higher or longer) is a protective factor (3x significant, 2x not significant) with a small effect size and ORs that range from 0.91 tot 0.80. The systematic review by Welstead (2021) also concludes on the basis of 2 studies that higher (or longer) education is a protective factor (Welstead 2021).

The evidentiary value for education level was lowered by 2 levels from high to low based on 1) the risk of bias of the individual studies and 2) inaccuracy in the effect on the outcome measure.

Social participation | Social participation was included in 1 study as an investigated factor. In this study, social participation remained as a significant protective factor in the definitive model (or final analysis) with a large effect size and an OR of 0.38 (95%CI: 0.25; 0.58). The systematic review by Welstead (2021) also concludes on the basis of 1 other study that social participation is a protective factor (Welstead 2021).

The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the single small individual study and 2) inaccuracy in the effect on the outcome measure.

Oral intake difficulty / eating problems | The determinant 'oral intake difficulty' was included in 1 study as an investigated factor and remained in the definitive model (or the final analysis) as a significant risk factor with a moderate effect size and an OR of 2.2 (95%CI: 1.5; 3.3). In 1 other study, 'oral function' was included to determine the frailty status and did therefore not emerge from the analysis as a determinant.

The evidentiary value for 'oral intake difficulty' was lowered by 3 levels from high to very low based on 1) the risk of bias of the individual studies and 2) inaccuracy in the effect on the outcome measure.

Partner status (married or single) | Partner status was identified by 5 studies, which used different definitions, such as single (yes/no), living with family and partner status: being married (yes/no). These studies show a mixed picture for this factor, with 2 studies showing that 'living alone' is a non-significant protective factor and two studies showing that it is a non-significant risk factor. In one study, 'being married' emerges as a significant protective factor with a large effect size and an OR of 3.6 (95%CI: 1.1; 11.7). The evidentiary value of 'partner status' was lowered by 3 levels from high to very low based on 1) the risk of bias of the individual studies, 2) inconsistency in the outcome measure and 3) inaccuracy in the effect on the outcome measure.

Social support | Social support was included in 1 study as an investigated factor. In this study, social support remained as a significant risk factor in the definitive model or 'final analyses with a large effect size and a ß of -0,015 (p=0.552) (converted into an OR of 0.99 (p=0.55). The systematic review by Welstead (2021) also concludes on the basis of 2 other studies that social status is a protective factor.

The evidentiary value was lowered by 3 levels from high to low based on 1) the risk of bias of the single small individual study and 2) inaccuracy in the effect on the outcome measure; the reliability interval of the OR overlaps by 1.

Sleep problems | Sleep problems, or quality of sleep, were included in 1 study as an investigated factor. In this study, 'sleep problems', however, fall outside the definitive model as being 'non-significant'. Hence the included literature gives no clear picture of the direction and size of the link between sleep problems and frailty.

The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the single small (n=44) individual study and 2) inaccuracy in the effect on the outcome measure.

Hospitalisation in the past year | Hospitalisation, defined as hospitalisation in the past 12 months (yes/no), was included in 1 study as an investigated factor. In this study, 'hospitalisation', however, falls outside the definitive model as being 'non-significant'. Hence the included literature gives no clear picture of the direction and size of the link between hospitalisation and frailty.

The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the single small (n=44) individual study and 2) inaccuracy in the effect on the outcome measure.

Place of residence (country) | The included study by Welstead (2021) (n=20.965) shows that the speed at which older adults become frail differs for each country and that it is related to socio-economic differences between countries. These geographical variations are seen between Northern and Southern Europe, where older adults in Northern European countries become frail more slowly than older adults in Southern European countries (Welstead 2021). The included literature does not give any information on the geographical variations within countries.

The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the one study that was included in the SR of Welstead (2021) and 2) inaccuracy in the effect on the outcome measure (Welstead 2021).

Migration background | The study included by Welstead (2021) (n=95.635) shows that having a background of migration is a frailty risk factor (Welstead 2021). This link appears to be stronger for migrants from low- to middle-income countries compared to migrants from high-income countries. However, the differences between older adults with and without a migration background decreases over time, so that the factor of migration background in older adults between the ages of 80 and 90 is no longer a risk factor.

The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the one study that was included in the SR of Welstead (2021) and 2) inaccuracy in the effect on the outcome measure (Welstead 2021).

Cultural involvement | The study included by Welstead (2021) (n=4575) shows that cultural involvement, defined as 'cultural participation/involvement with a frequency of 'every few months or more often' is a protective factor (Welstead 2021). Another study included 'participating in cultural events' in the determinant 'instrumental activities of daily living' (IADL), as a result of which cultural involvement was not analysed as a separate factor.

The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the single study that was included in the SR of Welstead (2021) and 2) inaccuracy in the effect on the outcome measure (Welstead 2021).

Determinants that must be identified with a measurement instrument:

Physical fitness | 5 studies identified 7 domains or aspects of physical fitness.

- Physical performance: 1 study shows that better physical performance is a significant protective factor with a small effect size and an OR of 0.85 (p=0.02).
- Mobility: 1 study shows that a high score on mobility (identified through a combination score on squatting, standing for 15 min, standing for 2h, lifting up both arms, grasping objects with fingers, picking up 11–12 kg, running for 20–30 min, walking 200–300m, climbing 2-3 stairs) is a significant protective factor with a large effect size and an OR of 13.5 (95%CI: 8.0; 22.5) for the 'worsened frailty + stable frail' group and an OR of 130.7 (95%CI: 74.4; 229.4) for the 'moderate increase + rapid increase' group.
- Walking ability (locomotion): 1 study shows that a good walking ability, measured through a combination score of the 6-metre walk test, timed chair-stands test and a dynamic balance test, is a significant protective factor with a moderate effect size and an OR of 0.61 (95%CI: 0.53; 0.71).
- Vitality: One study shows that a high score on vitality, identified through a combination score of handgrip strength and 'adiposity to muscle ratio', is a significant protective factor with a large effect size and an OR of 0.33 (95%CI: 0.23; 0.46).
- Leg power: 1 study shows that a high score on 'leg power' is a significant protective factor with a moderate effect size and an OR of 0.6 (95%CI: 0.5; 0.7). One other study shows with a more functional test for 'leg power' that a high score on the 'timed up-and-go test' is a protective factor for frailty in the group of older adults aged ≥75 years (ß=0.03 (p=0.51) for the frailty intercept and ß=0.59 (p<0.001) for the frailty slope).
- Handgrip strength 1 study shows that great handgrip strength is a non-significant risk factor with a small effect size and a ß of 0.03 (p=0.11) (converted into an OR of 1.03 (p=0.11))

The studies included in this review show a picture where a high measure of physical fitness is a protective factor for frailty with a small to large effect size.

The evidentiary value was lowered by 1 level from high to fair based on the risk of bias of the individual studies.

Cognitive functioning (problems with) | Cognitive functioning was identified by 7 studies. In 6 of these studies, 'cognitive functioning' remained in the definitive model (or final analysis). All these studies show that problems with cognitive functioning are a significant frailty risk factor with a small to large effect size and ORs ranging from 1.12 tot 9.2; or RR of 1.82 (95%CI: 1.10; 3.02). The systematic review by Welstead (2021) also concludes on the basis of 1 other study that problems with cognitive functioning are a frailty risk factor (Welstead 2021).

The evidentiary value for problems with cognitive functioning was lowered by 3 levels from high to very low based on 1) the risk of bias of the individual studies, 2) inconsistency and 3) inaccuracy in the effect on the outcome measure.

Physical activity | Physical activity was included in 2 studies as an investigated factor. In these 2 studies, 'physical activity' remained in the definitive model (or final analysis). All these studies show that a high amount of (daily) physical activity is a significant protective factor for frailty with a small to moderate effect size and ORs ranging from 0.80 tot 0.53. The systematic review by Welstead (2021) also concludes on the basis of 1 other study that (heavy) physical activity is a protective factor for frailty (Welstead 2021). In 6 other included studies, physical activity was considered to determine the frailty status and did therefore not emerge from the analyses as a determinant.

The evidentiary value for physical activity was lowered by 2 levels from high to low based on the risk of bias of the 2 individual studies.

Self-reported health | Self-reported health was identified by 4 studies. In these studies, 'self reported health' remained in the definitive model (or final analysis) and these show that a high degree of self-reported health is a protective factor for frailty with a small to large effect size and ORs ranging from 0.84 to 0.33, or a ß=-0.33 (p=0.001) for the frailty intercept and ß=0.46 (p=0.519) for the frailty slope for older adults aged 65 to 75 years. And one ß=-0.39 (p<0.001) for the frailty intercept and ß=-0.40 (p=0.02) for the frailty slope in older adults aged ≥ 75.

The evidentiary value for self-reported health was lowered by 2 levels from high to low based on 1) the risk of bias of the individual studies and 2) inconsistency in the outcome measure.

Weight loss | Weight loss was included in 1 study as an investigated factor and remained in these studies in the definitive model (or final analysis). This study shows that weight loss is a frailty risk factor with a ß=-1.93 (p=0.053) for the frailty intercept and ß=-0.34 (p=0.012) for the frailty slope for older adults aged 65 to 75 years. In one ß=-0.18 (p<0.001) for frailty intercept and ß=-0.16 (p=0.329) for frailty slope in older adults aged ≥ 75. In 7 other studies, weight loss was included to determine the frailty status which is why this did not emerge from the analyses as a determinant.
The evidentiary value for weight loss was lowered by 2 levels from high to low based on 1) the risk of bias of the individual studies and 2) inaccuracy in the effect on the outcome measure.
BMI and obesity | In 3 studies, BMI or obesity was included as an investigated factor. In 2 of the 3 studies, BMI or obesity remained in the definitive model (or final analysis) and these show that a higher BMI of the presence of obesity (BMI ≥30 compared to BMI <30) is a frailty risk factor with a small to large effect size and an OR of 1.06 (95%CI: 1.01; 1.12) and RR of 2.58 (95%CI: 2.58; 6.32)
The evidentiary value for a higher BMI or the presence of obesity as a risk factor was lowered by 2 levels from high to low based on 1) the risk of bias of the individual studies and 2) inconsistency in the outcome measure.
Albumin (serum level) | In 2 studies, the albumin concentration in the blood (serum) was included as an investigated factor (dichotomous with a limit value of <4 g/dL). In these studies, 'serum albumin' remains in the definitive model (or final analysis) and these show a mixed picture for this factor, with 1 study showing that a low serum level (of <4 g/dL) is a risk factor for the group of older adults in the frailty trajectory 'from frail to death', with an OR of 2.3 (95%CI: 1.4; 3.9), but a non-significant factor for older adults in the frailty trajectory 'from prefrail to frail or death'. One other study shows that serum albumin is a non-significant factor with an OR of 0.53 (95%CI: 0.27; 1.05)
The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the individual studies, 2) inconsistency in the outcome measure and 3) inaccuracy in the effect on the outcome measure.
C-reactive protein (CRP) | C-reactive protein is an inflammatory marker and was included by 1 study as an investigated factor. This study revealed a 'CRP level in the highest (4th) quartile of the sample' as a significant risk factor with a moderate effect size and an OR of 2.1 (95%CI: 1.3; 3.6) outside the definitive model.
The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the one individual study and 2) inaccuracy in the effect on the outcome measure.
Frailty phenotype (prefrail/frail vs. not frail) | One study included the frailty phenotype (as baseline measurement: not frail/prefrail/frail) as a prognostic variable in the longitudinal analysis. With an OR of 9.18 (95%CI: 6.87; 12.26) for the 'medium-trajectory' group and an OR of 50.69 (95%CI: 30.31; 84.76) for the 'high-trajectory' group, the frailty phenotype has a strong effect size.
The evidentiary value was lowered by 3 levels from high to very low based on 1) the risk of bias of the one individual study and 2) inaccuracy in the effect on the outcome measure.

From evidence to recommendation C.1a

The component 'from evidence to recommendation' contains nineteen criteria that are listed below. For C.1a (important factors) and C.1b (measurement instruments for these factors) a separate evidence-to-decision (EtD) process is used and considering the correlation between these modules, it was decided in the EtD process for C.1a to focus on the 'acceptability' of identifying these factors. The EtD process does not look at the way in which these factors are identified; this is done for C.1b.
The guideline panel divided the determinants into two groups:
1 can be identified without a measurement instrument
2 must be identified with a measurement instrument:

Criteria

Desired effects

Determinants that can be identified without a measurement instrument:

Age | Age is, with a small effect size and a 'fair' evidentiary value, a personal trait that is important for developing a treatment plan. The age of a patient is nearly always known and included in the patient record. The guideline panel is of the opinion that, if someone's age is not known, it should be asked, considering how easily this information can be requested.

Gender | Gender is, with an effect size that ranges from small to moderate and a low evidentiary value, an important personal trait. 'Being female' is a risk factor here for frailty, while 'being male' is a protective factor. The gender of a patient is nearly always known and included in the patient record. The guideline panel is of the opinion that, if someone's gender is not known, it should be asked.

Feelings of depression | The effect size of feelings of depression ranges from small to large and has a very low evidentiary value. Treatment will therefore be affected by frailty, but also by the feelings of depression as such. During the medical history taking, questions can be asked about feelings of depression. The guideline panel considers that the nature of the need for assistance and the impression that the patient makes during the medical history taking could be a reason for using an instrument to identify feelings of depression more effectively. The measurement instruments available for this allow therapists to administer the test themselves. However, the guideline panel indicates that patients often experience this as stressful or awkward. Moreover, administering tests with these instruments is often time-consuming. If the therapist gets the impression that the patient has strong mood swings or feelings of depression, they may consider referring the patient (back) to the general practitioner, case manager or psychologist.

Smoking | Smoking as a determinant has an effect size that ranges from small to large with a low evidentiary value. It is customary during medical history taking to ask about smoking behaviour. The guideline panel finds it important to ask about this, as it gives insight into a person's lifestyle. The guideline panel indicates that it has no objection to asking about smoking behaviour.

Co-morbidities | From the included literature, many conditions emerge that are linked to frailty. Most of these conditions have a comparably strong relationship to frailty that ranges from small to large with a low evidentiary value. The following conditions emerged: diabetes mellitus, heart diseases, congestive heart failure (CHF), chronic conditions, stroke, (history of) cancer, high blood pressure, arthrosis of the knee, arthritis, Alzheimer's disease or other brain pathology, recovery from an injury and COPD. The guideline panel indicates that information on the presence of one or more of these conditions alone does not give insight into the risk of frailty, but that it is at the same time a condition for establishing the treatment plan and treatable quantities. The guideline panel indicates that information regarding co-morbidities can mostly be found in the referral and if not, that it is recommended to ask this information from the treating physician. It is furthermore customary to ask patients about co-morbidities. This information is, however, less reliable.

Miction and defecation problems | Urinary and faecal incontinence emerge from 1 study (Asmar Alencar 2015), where urinary incontinence has a large effect size with a very low evidentiary value. Faecal incontinence emerged as a non-significant factor from the same analysis. The guideline panel indicates that it is important to ask about urinary incontinence and miction problems. This factor can cause sleep problems (having to get out of bed frequently to go to the toilet) and increase the risk of falls (rushing to the toilet).

History of past falls (risk/fear of falling) | A history of past falls has a moderate effect size with a low evidentiary value. Older patients are often questioned about this since older adults who have already fallen in the past run a higher risk of falling again. There are no objections to asking directly about this during the medical history taking. The guideline panel indicates that it would be good to look further into the risk of falling, taking into account not only the history of past falls, but also the frequency, circumstances and seriousness of falls. In addition, the risk of falling, balancing abilities and fear of falling and moving - identified with a measurement instrument if necessary - can also be taken into account to get a clear picture of the (future) risk of falling. It is important to ask explicitly about falling incidents without injury, since these are usually not reported. Indirect questions about the use of aids can also give a good impression of fear of falling, balance and the risk of falling. The guideline panel indicates that it is important in addition to the history of past falls, also to identify a person's risk and fear of falling in order to establish the treatment plan.

Polypharmacy (use of medicines) | Polypharmacy has a small effect size with a low evidentiary value. The guideline panel indicates that it is very important and even a prerequisite, to know about the patient's use of medicines since this could impact a person's load capacity, for example, the use of beta blockers, diuretics, antidepressants, antipsychotics and benzodiazepine (GGZ standards 2022). Information on the use of medication will usually feature in the reference. The guideline panel indicates that it is customary also to ask the patient about this during the medical history taking. This information is, however, less reliable. The guideline panel suggests asking for this information if it does not appear in the reference.

Sensory impairments (hearing or sight) | The determinant 'sensory impairment' includes 'problems with hearing' (auditory)' and 'problems with sight (vision)' which have a small to large effect size with a low evidentiary value. The guideline panel indicates that questions about this should regularly be asked, for example, with patients who wear glasses or a hearing aid, but also patients who complain of headaches or neck pain or patients who have had a (car) accident or stroke. The guideline panel sees no objections to asking a patient about sensory impairments and considers it important to actually do so. Sensory impairments can also play a role in the treatment plan, training opportunities and communication with the patient.

Alcohol consumption | 'Alcohol consumption' is a determinant with a small effect size and very low evidentiary value. It is defined as a protective factor. The guideline panel suggests asking about this regularly but with caution, as it may be a sensitive matter to the patient. The information is valuable as it could correlate with a person's mental status or cognitive functioning and therefore play a role when establishing a treatment plan. The guideline panel indicates that peculiarities regarding someone's personal hygiene, confusion or cognitive functioning could be a reason for asking about their alcohol consumption. The guideline panel indicates that it is important to make it clear to the patient why this question is being asked.

Financial stress (wealth) | Financial stress is a risk factor with a small effect size and low evidentiary value. Asking about this could be experienced as confrontational or unwanted. It is furthermore not clear for the therapist how this information could be used. The guideline panel indicates, however, that it is sometimes important to ask about this in specific cases, for example, if the patient says that they do not have supplementary insurance for paramedical processes and/or if own contribution or insurance excess plays an important part. A patient's financial position can also play a role in discussing 'age-friendly housing', moving; or recommendations for interventions/training for which personal funding is needed.

Education level (higher) | A high level of education is a protective factor with a small effect size and low evidentiary value. The guideline panel indicates that the therapist will not use this information directly in the treatment plan and therefore finds it unusual to ask about this.

Social participation | Social participation is a protective factor with a large effect size and very low evidentiary value. Information on this may be useful in the treatment plan when it comes to participation in joint and/or social activities or otherwise taking part in group activities. The guideline panel indicates that it is customary and desirable to ask about this during the medical history taking.

Oral intake difficulty / eating problems | Eating problems are a risk factor with a moderate effect size and very low evidentiary value. For more information on eating problems in frail older adults, see F.1 of dietetics.

Partner status (married/single) | Partner status, being married or living with a partner is a factor whose link to frailty is not clear. The literature gives a mixed picture in this regard. The evidentiary value for this is very low. The guideline panel indicates that it is customary to ask someone about this, not so much to determine whether they are in the risk group for frailty, but to get an idea of the person's home situation/household. This can, for instance, provide information on the person's autonomy and support (informal caregiver) in the home setting. The patient will see this as a normal question. The guideline panel therefore strongly recommends asking about this.

Social support | Social support is a non-significant protective factor with a small effect size and very low evidentiary value. The guideline panel indicates that questions in this regard may sometimes be asked and that this information could be valuable for getting a clear picture of the patient and their environment. The guideline panel indicates that social support and the extent to which this can be relied on could be relevant. In particular with patients who live on their own, this information can have added value.

Sleep problems | Sleep problems are a non-significant determinant with an unclear direction and very low evidentiary value. The guideline panel indicates that sleep quality is linked to other underlying problems, such as urinary incontinence or pelvic-floor problems, but also other aspects of a person's life, such as stress, emotional wellbeing and recovery capacity. This information can be asked in a quick, simple way and the patient will have no objection to a question about sleep quality. The guideline panel is therefore in favour of asking about someone's sleep quality.

Hospitalisation in the past year | Hospitalisation in the past year is a non-significant determinant with an unclear direction and very low evidentiary value. Although the literature does not support the link to frailty, the guideline panel indicates that it is customary to be aware of this medical background information. For the same reasons, it is good to know about any admission to a nursing home. Although it gives little information on the risk of frailty, the reasons for someone's hospitalisation could be relevant for the treatment plan. This information can be asked in a simple, quick way and the guideline panel is therefore in favour of this question.

Place of residence (country) | The systematic review indicates that the place of residence (Northern Europe versus Southern Europe) is a determinant for the risk of frailty. However, the literature gives no information as to whether this also plays a role on a smaller scale, within the Netherlands. The guideline panel therefore indicates that this information is not relevant in the Dutch context.

Migration status | The systematic review shows that migrants have a higher risk of frailty, but that this effect diminishes over time. The guideline panel indicates that this is virtually never asked about. Speaking Dutch is, in fact, important for communication/explanation and discussing the treatment process and exercises. However, it is not necessary to ask directly about this. The guideline panel does not consider it important to ask the patient about their migration background.

Cultural involvement | The systematic review shows that cultural involvement is a protective factor for frailty. It is, however, not clear to what extent this is a causal link and whether declining cultural involvement is a result of frailty or vice versa. The guideline panel indicates it hardly ever asks about this and that this information has little added value for the therapist.

Determinants that must be identified with a measurement instrument:

Physical fitness | Under the umbrella term of physical fitness, the literature review revealed the following determinants that can have a little to a very large effect size for frailty and a 'fair' combined evidentiary value:

- Physical performance
- Mobility
- Walking ability
- Vitality
- Muscle strength (e.g. leg-muscle strength and handgrip strength)

The guideline panel indicates that the notion of physical fitness is seldom used in practice, but that it is important to identify one or more of the aspects that fall under it by means of a measurement instruments. The determinants mentioned above are specifically covered by the field of exercise and physical therapy. Identifying at least two sub-domains/ determinants of physical fitness/functioning will greatly contribute to getting a good estimation of an older patient's frailty. For very frail patients it may suffice to identify only one sub-domain of physical fitness/functioning if this yields enough information on the frailty status and the area in which frailty is manifested most. The choice for identifying an aspect of physical fitness/functioning can be based on information from the medical history taking, the need for assistance and possibly the presence of a condition/co-morbidity/impairment.

Cognitive functioning (problems with) | Cognitive functioning has a small to large effect size with frailty and a very low evidentiary value. Besides the fact that cognitive functioning is a determinant for frailty, having sufficient cognitive abilities is also important for compliance with the therapy and for remembering and doing exercises. The guideline panel therefore indicates that it is important to obtain this information. Information on the cognitive functioning of an older patient can be asked from a (treating) professional colleague, but can sometimes also be found in the collateral history taking (from a loved one or home care/district nurse/healthcare assistant). The therapist may also use a measurement instrument themselves to identify a patient's cognitive functioning.

Physical activity | Physical activity (movement behaviour) is a protective factor with a small to large effect size and low evidentiary value. Information on a person's physical activity often comes from frailty measurement instruments. As with information regarding physical fitness, information regarding physical activity is considered relevant by the guideline panel. This information gives a good picture of a person's (physical) frailty and load capacity and can, moreover, be used effectively to determine the baseline of an intervention. The guideline panel therefore also believes that this should be asked. A validated measurement instrument may be used if necessary.

Self-reported health | A high degree of self-reported health is a protective factor with a small to large effect size and low evidentiary value. The guideline panel indicates that it rarely identifies this and that this determinant is partly related to pathological insight and cognitive capacity. Information on this is considered important by the guideline panel. In addition, the guideline panel indicates that self-reported health can help direct the formulation of the treatment goals.

Weight loss | Weight loss is a frailty risk factor with a very low evidentiary value and is, moreover, a 'red flag'. (Inexplicable) weight loss can be linked to other important factors, such as sarcopenia, loss of muscle strength and malnutrition, but this does not always have to be the case. The guideline panel considers that the patient should always be asked about weight loss in the past period. If it is confirmed, more questions should be asked about how much weight was lost and at what speed.

Sarcopenia (adiposity to muscle ratio/reduction in non-fatty mass) | Sarcopenia is a factor that resulted from one study as 'adiposity to muscle ratio' (as part of vitality (see the description under the determinant 'physical fitness')) (Yu 2022). The guideline panel indicates that sarcopenia can be linked to many other factors, including weight loss, loss of muscle strength, malnutrition and protein intake. This is supported by the study by Cruz-Jentoft (2019) (Cruz-Jentoft 2019). The guideline panel therefore also finds it important to identify sarcopenia. For more information on sarcopenia in frail older adults, see F.1 of dietetics.

BMI/obesity | A high BMI or obesity is a risk factor with a small to large effect size and low evidentiary value. The guideline panel indicates that it is not customary to identify someone's BMI objectively and that it is sometimes experienced as unwanted or confrontational by the patient. Even with a high BMI, sarcopenia and/or malnutrition may still exist, which is why (the risks of) sarcopenia and malnutrition are also identified in the event of a high BMI. The guideline panel indicates that the therapist can make an estimate of a high BMI 'at sight', but that if there is a suspicion of underweight, the BMI can still be established objectively.

Albumin (serum level) | A low albumin level in the blood is a risk factor with a moderate effect size and a very low evidentiary value. The guideline panel indicates that it may well be difficult to obtain this information, as this requires blood samples. It is furthermore not clear how this information can be used and it is beyond the scope of exercise and physical therapy. The guideline panel therefore considers that there is no need to ask this information from the (treating) physician.

C-reactive protein (CRP) | C-reactive protein is a risk factor with a moderate effect size and very low evidentiary value. As with the factor of albumin level, the guideline panel indicates that for CRP it is probably also difficult to obtain the information. Blood samples would be needed. It is furthermore not clear how this information can be used and it is beyond the scope of exercise and physical therapy. The guideline panel therefore considers that there is no need to ask this information from the (treating) physician.

Frailty phenotype (prefrail/frail versus not frail) | A history of (pre)frailty is a risk factor for future (severe) frailty with a large effect size and very low evidentiary value. The guideline panel indicates that a person's medical (pre)history is important for determining their load capacity. However, it is unlikely that a patient's history of (pre)frailty is known and this can of course not be tracked retrospectively.

For more information in this regard, see B.1 'Measuring frailty'. This module is entirely dedicated to identifying frailty in older adults with a suspicion of frailty.

Undesirable effects

Not applicable

Quality of evidence

Due to bias in the included studies, the small amount of studies per factor, the heterogeneity of the population, measurement methodology and inclination (protective factor/risk factor) of the effect, as well as being imprecise in terms of effect size, the evidentiary value for most factors was lowered by 2 or 3 levels to low or very low. The factors age, physical fitness/functioning and physical activity were, however, considered to have a fair evidentiary value. On the other hand, certain factors received a lower evidentiary value, as they had been included in the frailty measurement instrument. This reduces the number of studies that did analyse the factor as a prognostic factor.

Patient values and preferences

The guideline panel believes that patients have no objection to identifying the recommended factors. After all, by identifying these factors, the therapist gets a clear picture of a person's risk of frailty. It is important to communicate clearly and respectfully to the patient why certain factors are being identified. This certainly applies to factors such as alcohol consumption, financial stress (wealth), education level, migration status, cognitive functioning, living conditions, BMI and feelings of depression.

Balance of desired and undesired effects

Not applicable

Economic considerations and cost-effectiveness

This is further elaborated in the EtD process of C.1b where measurement instruments are discussed that identify the factors found in C.1a.

Equality

The guideline panel considers that the identification of the recommended factors does not lead to inequality and that, by taking someone's education level, financial stress or migration background into account, (health) inequality can in fact be reduced.

Acceptability

This is further elaborated in the EtD process of C.1b where measurement instruments are discussed that identify the factors found in C.1a.

Feasibility

This is further elaborated in the EtD process of C.1b where measurement instruments are discussed that identify the factors found in C.1a.

Possible additional considerations

Focus areas for implementation. This is further elaborated in the EtD process of C.1b where measurement instruments are discussed that identify the factors found in C.1a.

Knowledge gaps

The guideline panel considers that certain factors do have a link to frailty, although they do not emerge from the literature review. These are the factors health literacy and pathological insight.

Literature C.1b: search and select

The systematic search from C.1a with the accompanying evidence-to-decision process is the basis for working out clinical question 1b: How and when can the factors (physical, cognitive, social and mental, environmental) that play a role in frailty be identified most effectively in the diagnostic process and during treatment?

In the guideline panel it was determined which factors could be asked about in the medical history taking and which factors had to be identified with a measurement instrument. Subsequently, an inventory was made of measurement instruments that are frequently used in practice and/or scientific research to identify these different factors. This set of measurement instruments was the starting point for the evidence-to-decision process of C.1b.

From evidence to recommendation C.1b

For the selection of the recommended measurement instruments, the step-by-step plan of the 'Clinimetrics Framework' ('Raamwerk Klinimetrie', Swinkels 2016) was followed. This step-by-step plan was worked out per cluster of interrelated factors.

The action plan consists of the following eight steps:

Step 1 What do you want to measure?
Step 2 Why do you want to measure?
Step 3 What kind of measurement instrument do you want to use to measure?
Step 4 How can you find a measurement instrument?
Step 5 How easy is it to use the measurement instrument?
Step 6 What is the clinimetric quality of the measurement instrument?
Step 7 and 8 Are standard values available and how do you calculate and interpret the data?

The different measurement instruments are analysed step by step. A conclusion and rationale are then described for the choice of recommended and optional measurement instruments.

Step 1 | What do you want to measure?

The factors from C.1a that must be measured with a measurement instrument are clustered in the following five domains:

General frailty and health

For the target group of frail older adults it is important to identify in what area there is frailty and to which extent, as this will provide tools for formulating the need for assistance and subsequently influence the treatment plan. From the literature review it furthermore appeared that perceived health is linked to frailty and that it is therefore important to identify it.

Physical fitness and physical activity

From the literature review, physical activity and physical fitness emerge as important factors that are linked to frailty. Other factors that could also fall under physical fitness are elaborated in the clusters 'falls risk and fear of falling' and 'malnutrition and sarcopenia' below.

Falls risk (balance, muscle strength, walking ability) and fear of falling

From the literature review, history of previous falls emerges as a factor linked to frailty. The guideline panel indicates with the evidence-to-decision process that falls should be described extensively here, for example, by means of the fall analysis of VeiligheidNL. Within the review, the falls risk (balance, muscle strength and walking ability) and fear of falling are important factors in this context. This is also in line with the recommendations from the 'World guidelines for falls prevention and management for older adults' and the guideline for 'Prevention of fall incidents for older adults' of the Dutch Federation of Medical Specialists (Federatie Medisch Specialisten or FMS) (FMS 2017; Montero-Odasso 2022; VeiligheidNL 2023). The falls risk is identified in terms of balance abilities, leg-muscle strength and walking ability (FMS 2017).

Malnutrition and sarcopenia

The literature review shows sarcopenia to be an independent frailty risk factor. Sarcopenia has various facets, such as low muscle mass and the risk of malnutrition. Various existing guidelines recommend screening specifically for sarcopenia

and malnutrition (Cruz-Jentoft 2019; WHO 2017). For this reason, the guideline panel decided to elaborate sarcopenia and malnutrition as a separate factor, where there may well be an overlap with tests that fall under the clusters 'physical fitness' and/or 'falls risk and fear of falling'.
The aim is to screen for the risk of sarcopenia (detecting high-risk patients) and the risk of malnutrition.

Miction and defecation problems
The literature revealed the factor 'miction and defecation problems'; but not as a specific factor that was investigated separately. The guideline panel, however, finds that these problems do constitute an important factor that should be identified specifically. Miction and/or defecation problems form part of movement-related functioning, are prevalent in older adults and lead to falls. For these reasons it was decided to work this factor out separately. This is also in line with recommendations in the WHO guideline 'Integrated Care for Older People: Guidelines on Community-Level Interventions to Manage Declines in Intrinsic Capacity' (WHO 2017). The aim is to identify the degree and severity of miction and/or defecation problems (urinary and faecal incontinence, constipation, urinary complaints), including fluid intake and the influence of these complaints on quality of life. The pelvic physical or exercise therapist has specialised expertise in this regard.

Step 2 | Why do you want to measure?
All measurement instruments are taken for screening/diagnosis and to evaluate the treatment (evaluative).

Step 3 | What kind of measurement instrument do you want to use to measure?

General frailty and health
To assess the degree of frailty in different areas simultaneously, the *Evaluative Frailty Index for Physical Activity* (EFIP) was analysed. The EFIP is a screening instrument in the form of a questionnaire on frailty in older adults, to identify the field in which assistance is needed. The instrument contains questions on impairments in terms of physical, psychological (incl. cognitive) and social functioning and in the field of health (meetinstrumentenzorg.nl). This enables the therapist to make an estimate of which problems are at play and which treatment options there are. In parallel to this, the Groningen Frailty Indicator (GFI) and the Tilburg Frailty Indicator (TFI) were analysed within B.1. Both of these are questionnaires used for determining frailty.

Physical fitness and physical activity
To measure physical activity, both digital activity trackers and questionnaires are included in the analysis. *The Patient-Specific Complaints* (PSC) and the *Patient Specific Goal-setting* (PSG) methods were analysed to objectify activities and participation in ADL.

- The PSC is used as a measurement instrument to determine the functional status of the individual patient. The patient selects the three to five most important physical activities that cause problems.
- The PSG (a more extensive version of the PSC) is an interactive method to support the goal-setting process (clarifying problems, setting goals, drawing up a treatment plan and evaluating).
- Digital activity trackers or movement trackers automatically measure movement behaviour, for instance the number of steps taken in a day. Movement behaviour is recorded with a small mobile device or a special watch, often in combination with an app or a website.

Exercise capacity can be objectified as functional and as maximal exercise capacity. To objectify functional exercise capacity, an analysis was made of the *Six-Minute Walk Test* (6MWT), the *Two-Minute Walk Test* (2MWT) and the *Shuttle Walk Test* (SWT).

- The 6MWT assesses the patient's functional exercise capacity by measuring the maximum distance in metres that the patient can walk in 6 minutes. The test may be done with a walking aid.
- The 2MWT is used to assess patients' gait pattern, gait speed and endurance.

- The SWT is a maximal-exercise test that can be used to determine a person's functional capacity or exercise tolerance. During this test, the patient walks between two cones at a pace indicated by auditory signals. The test can be used to get an idea of the maximum oxygen absorption capacity (VO2max).

For maximum exercise capacity, the Astrand bike test was looked at.

- The *Astrand bike test* is a submaximal test. The test is to be taken for 6 minutes on an exercise bicycle with a heart rate between 125 and 170 beats per minute. By means of calculating the VO2max or reading a nomogram, an impression can be formed of the person's endurance.

Falls risk (balance, muscle strength, walking ability) and fear of falling

To objectify the falls risk, leg-muscle strength and fear of falling, the *Short Physical Performance Battery* (SPPB), *Timed Up and Go* (TUG), *30-second Chair Stand Test* (30CST), *Performance Oriented Mobility Assessment* (POMA-Tinetti), *Mini Balance Evaluation Systems Test* (Mini-BESTest) and *Falls Efficacy Scale International* (FES-I) were analysed.

- The SPPB is a combined performance test that evaluates static balance, gait speed and dynamic balance with leg-muscle strength (with the five-times-sit-to-stand test (5TSTS)) and adds all of these up in one score. The advantage of this test is that all aspects of the falls risk (in terms of physical functioning) are tested in a single test (FMS 2017). When measuring gait speed, a walking aid may be used.
- The TUG is a performance test that within one task gives an impression of muscle strength, walking ability and dynamic balance, also when turning around (FMS 2017; Montero-Odasso 2022). The test may be taken with a walking aid.
- The 30CST is a performance test to evaluate (explosive) muscle strength and strength endurance of the leg muscles in older adults. The test was developed to overcome the floor effect of the original CST/5TSTS (AbilityLab 2013). In an adapted form of the 30CST (the m30STS) the patient may, if necessary, also use their arms, which means that the test can be used for a larger population (McAllister 2020).
- The POMA-Tinetti is a performance test consisting of a balance section and a section that measures gait in order to determine the falls risk. Balance is tested in various situations (static, dynamic, with eyes shut and with destabilising stimuli). The gait evaluation assesses the quality of the person's gait pattern.
  The test is more comprehensive than the SPPB and gives more information on balance and gait, which means that within the field of geriatric psychiatry it is better suited to the situation of frail older adults. The test may also be taken with a walking aid.
- The Mini-BESTest is a performance test that evaluates balance and the falls risk during 14 different tasks. 4 categories are distinguished: anticipatory postural adjustments, reactive postural control, sensory orientation and dynamic gait.
- The FES-I is a questionnaire that identifies fear of falling during various ADL and social activities. The usual version of the FES-I has 16 items. An abridged FES-I Short version with 7 items is also available.

Malnutrition and sarcopenia

To determine the risk of sarcopenia along with the risk of malnutrition, the *Strength, Assistance with walking, Rise from a chair, Climb stairs and Falls* (SARC-F), *Short Nutritional Assessment Questionnaire 65+* (SNAQ-65+), handgrip strength (HGS) measurement and sarcopenia flowchart of the European Working Group on Sarcopenia in Older People (EWGSOP) were analysed.

- The SARC-F is a short questionnaire that can determine the risk of sarcopenia.
- The SNAQ-65+ is a short questionnaire that includes upper-arm measurement that can determine (the risk of) malnutrition.
- A dynamometer is used (as part of the sarcopenia flowchart) to measure handgrip strength (HGS), thereby giving an estimate of muscle function and the overall amount muscle mass in the body. Various brands of dynamometers area available on the market; see step 5 for things to consider in terms of user-friendliness.

- The sarcopenia flowchart of the EWGSOP is not an individual measurement instrument, but a set of measurement instruments that are recommended to screen for sarcopenia step by step. Besides SARC-F and the HGS dynamometer, the flowchart also recommends the CST/5TSTS, the 4-metre walk test, SPPB, TUG and the 400-metre walk test (Cruz-Jentoft 2019). These tests have been described earlier in this module under the headings 'falls risk and fear of falling' and 'physical fitness and physical activity'. To determine the result of the 400-metre walk test (whether or not the person walked 400 metres in 6 minutes), the 6-MWT can be used. In the flowchart a muscle-quality measurement is also recommended using Dual-energy X-ray absorptiometry (DXA) or Bioelectrical Impedance Analysis (BIA). These measurements are not specifically recommended in this guideline due to feasibility; they can, however, be taken with the help of a dietitian (see step 5).

Miction/defecation problems

To determine the frequency and severity of urinary incontinence and the impact of such complaints on quality of life, the *International Consultation on Incontinence Questionnaire* (ICIQ) and *miction diary* were analysed.

- The ICIQ is a questionnaire for evaluating the frequency, severity and impact on quality of life of urinary incontinence.
- The miction diary is a list that the patient can fill in at home during a period of two to seven days. This list helps to get an understanding of both the liquid intake and urination pattern (frequency, quantity, times in the day) and the extent and times of urinary incontinence, including the activity/-ies just prior to or during urine leakage (Martin 2006).

To determine the extent and severity of faecal incontinence and the impact on quality of life, *Wexner* and the *bowel function diary* including the *Bristol Stool Scale* (BSS) were analysed.

- The Wexner is a questionnaire that objectifies the severity of faecal incontinence and the impact on quality of life.
- The bowel function diary is an observation list that the patient fills in on their own for one week. The diary is used to find out what the usual defecation pattern is and to determine the severity of faecal incontinence and/or constipation (Fisher 2008; Lewis 1997). To determine the type of defecation consistency, the bowel function diary is combined with the BSS.

Step 4 | How can you find a measurement instrument?

General frailty and health

The EFIP can be downloaded for free at meetinstrumentenzorg.nl.

Physical activity and endurance

The PSC, PSG, 6MWT, 2MWT, SWT and Astrand bike test can be downloaded for free at meetinstrumentenzorg.nl.

Falls risk (balance, muscle strength, walking ability) and fear of falling

The SPPB, POMA, Mini-BESTTest, TUG and FES-I can be downloaded for free at meetinstrumentenzorg.nl and the 30CST is available for free on line.

Malnutrition and sarcopenia

The SARC-F and HHK can be downloaded for free at meetinstrumentenzorg.nl. The SNAQ-65+ of Stuurgroep Ondervoeding is available free of charge at kenniscentrumondervoeding.nl. The sarcopenia flowchart is available at voedingenbeweging.nu.

Miction and defecation problems

The ICIQ, the miction diary, the Wexner, the bowel function diary and the BSS can be downloaded for free at meetinstrumentenzorg.nl.

Step 5 - What is the practicability?

General frailty and health

The EFIP is usually not taken by questioning; the therapist initiates an open conversation with the patient during which topics from the EFIP are addressed. The questionnaire therefore serves as a guideline for the intake conversation. Some questions, however, need to be asked explicitly to ensure that the physical or exercise therapist does not interpret the patient's answers. This applies in particular to a number of questions on psychological and social topics. By repeating the questionnaire, only questions about items where a change can be expected need to be asked. In the experience of guideline-panel members, it takes at least 30 to 40 minutes to fill in. This is quite long; however, since it is integrated in the intake interview, the EFIP is regarded as practicable, particularly when the intake conversation can be combined with a first treatment session. Moreover, the EFIP can be taken in parts to make it more practicable. Experience in the field also shows that the more frequently the therapist works with the EFIP, the more practicable it becomes. Besides, integrating the EFIP in the EPDs will further increase its practicability in the future.

Physical fitness and physical activity

- The PSG, which includes the PSC, can be used as a measurement instrument, but at the same time also as a method to set goals together with the patient (Stevens 2013; Stevens 2018). Because the PSG is part of the methodology, administering it does not require additional time (Stevens 2018), which is why the PSG is very practicable.
- The practicability or the user-friendliness of the currently commercially available activity meters varies. Patients do see the added value of using an activity meter for obtaining insight into their own movement behaviour and to become motivated to exercise more, but this only applies if the meter provides feedback about the number of steps and potentially the number of active minutes (Ummels 2020). Patients with chronic diseases, however, find similar activity trackers technically complicated. They want the therapist's help when the meter is used for the diagnostic and/or therapeutic process and do not want to spend too much money on it (at most €50) (Ummels 2018). A good example of an activity tracker recently developed especially for older adults is MISS Activity. The design and accompanying app are seen as user-friendly by older adults (Ummels 2022).
- The 6MWT is a simple test that can be used in various populations that cannot be tested with prolonged tests (e.g. the 12MWT) or a test in which participants must walk at an external pace (e.g. the SWT). The 6MWT is a self-paced test and is commonly used in daily practice in the Netherlands (Holland 2014; Singh 2014). The test is considered to be very practical. For patients who cannot complete the 6MWT, the 2MWT is a good alternative. This test is recommended for patients with various chronic diseases and is regarded as practicable.
- The SWT is often preferred by patients who have an inherently faster walking speed. For frail older adults the test is less practicable due to the equipment required (stopwatch, CD player, pre-recorded CD with 1-minute protocol, tape measure) and the time needed (35-45 min.). The test can, moreover, not be done in a home setting or in the frail older adult's direct environment. This test will therefore not be evaluated further.
- The Astrand bike test is less practicable due to the specific equipment it requires (bicycle ergometer, pulse monitor and Åstrand&Rhyming Nomogram with age correction), the lack of standard conditions for older adults and the fact that the test cannot be done at home. This test will therefore not be evaluated further.

Falls risk (balance, muscle strength, walking ability) and fear of falling

- The practicability of the SPPB is regarded as good: little equipment is needed, the test can be done effectively in a home setting, the test is easy to explain and carry out and the average duration is 5-10 minutes.
- The practicability of the TUG is regarded as (very) good: The test can be taken quickly, also in a home setting, and very little equipment is needed.
- The practicability of the 30CST is regarded as (very) good: This test is easy to explain and quick to take, also in a home setting. Very little equipment is needed, only a stopwatch and a chair with a back.
- The practicability of the POMA is somewhat lower since the test is more comprehensive. The test takes approximately 10-15 minutes. The test is applicable in a home setting.

- The practicability of the Mini-BESTTest is regarded as moderate to sufficient. Various equipment is needed, such as special foam, a step with an angle of 10 degrees and a box that is 23 cm high. The test is therefore somewhat less applicable in a home setting. The time needed to take it is 10-15 minutes.
- The practicability of the FES-I is good: The time needed to complete it is 6 minutes for the FES-I and 4 minutes for the FES-I short (meetinstrumentenzorg.nl). The questions are formulated to be easily understandable.

Malnutrition and sarcopenia

- The SARC-F is regarded as well practicable, as it consists of a limited number of simple questions that are easy to answer for most patients, it takes up to 5 minutes to complete, no specific expertise is required and no extra equipment is needed (meetinstrumentenzorg.nl).
- The SNAQ-65+ is regarded as well practicable, on account of the three simple steps that can be asked or performed by the therapist, the fact that it takes no more than 5 minutes to complete and the fact that it requires very little equipment in the form of only a tape measure (meetinstrumentenzorg.nl).
- The HGS is regarded as (fairly) practicable due the use of a simple protocol with the various brands of dynamometers to measure handgrip strength and the short duration (5 minutes maximum) in which the test can be taken (meetinstrumentenzorg.nl). The costs related to dynamometers are, however, fairly high (Langius 2016). The physical effort for the patient differs depending on the brand. The guideline panel has a preference for the Martin Vigorimeter, which can measure dynamically and is therefore not as stiff as the Jamar for instance, which measures statically. This makes it more comfortable for the patient. The Jamar is also less practicable in a home setting, as the apparatus is heavy to carry along. The costs of the two brands are comparable and relatively high. This means that not all practices have a dynamometer at their disposal.
- The practicability of Dual-energy X-ray absorptiometry (DXA) or Bioelectrical Impedance Analysis (BIA) (within the sarcopenia flowchart) (Cruz-Jentoft 2019) is low for most physical and exercise therapy practices in a primary care setting, seeing that the equipment is costly and mostly not available. The equipment is, however, frequently available in an intramural setting. It is also possible to cooperate in this area with dietetics in both a primary and secondary care setting, where the equipment could well be available.

Miction/defecation problems

- The practicability of the ICIQ and Wexner is regarded as good: The measurement instruments are free of charge and easily obtainable in Dutch, are fairly efficient and also suitable to give to the patient to take home and fill in later.
- The practicability of the miction diary is lower. The load on the patient is high. Sufficient hand function and sight are needed to collect and measure the amount of urine. Not all older adults are able to collect the urine by themselves and/or read the small lines on the measuring cup. The diary that is shorter to update (48 hours) appears to be as reliable as a diary that is kept over a longer period. This is less burdensome for the patient, which leads to better compliance (van Haarst 2014).
- The practicability of the bowel function diary is regarded as good, since it does not require any actions other than filling in the questionnaire.

A general addition regarding the practicability of all questionnaires is that it less suited to people with (serious) cognitive issues. Performance tests can nevertheless still be used in many cases, provided that the explanation is adapted. Adapting the explanation can, however, influence the test results. If the test is repeated, it is important to keep the same adapted explanation.

Step 6 | What is the clinimetric quality?

General frailty and health

The inter-rater reliability of the EFIP is good (Cohen's kappa=0.72, ICC=0.96). The intra-rater reliability (Cohen's kappa=0.77 en 0.80, ICC=0.93 en 0.98) is also good. In terms of validity, as expected, low to moderate correlations with various performance tests (the TUG and POMA) and the Cumulative Illness Rating Scale (CIRS-G) were found, with correlations of 0.61, -0.70 and 0.66 (de Vries 2013) respectively.

Physical fitness and physical activity

- Too little research has been done so far on the clinimetric quality of activity trackers for frail older adults. A systematic review was, however, done regarding the validity of various activity trackers for healthy older adults, from which it appears that the validity for counting steps is fairly good, but that it declines as the walking speed drops (Straiton 2018). The evidence for validity 'in real life' is, moreover, still limited. From a more recent study among health older adults, two activity trackers (Garmin Vivoactive 4s and Garmin Vivosport) proved to be sufficiently valid, also at lower walking speeds and for real-life measurements (Kastelic 2021). Besides walking speed, the carrying position of an activity tracker is an important aspect to take into account with frail older adults in terms of clinimetric quality. Various studies have found that the validity of trackers worn on the wrist and hip declines (progressively) if the older adult uses a walking aid. For older adults who walk slowly or who use walking aids, trackers worn on the ankle seem to be more valid (Caldeira 2019). Two examples of valid trackers in this respect are StepWatch and Fitbit One, which are worn around the ankle. MISS Activity, which was also mentioned in the 'practicability' step, is a tracker that is carried in or on the clothes pocket. The algorithm was adjusted to the low walking speed of older adults and has also been validated (Ummels 2020).
  An aspect to be taken into account when choosing or recommending a suitable activity tracker is the purpose of the measurement. A therapist will probably introduce an activity tracker to determine changes in individual movement behaviour.
  As such, it is particularly important that the device is reliable, even though the tracker does not have to be 100% valid per se (Kooiman 2018). Of course a valid tracker will always be preferable if it is available. The websites www.beweegtech.nl or seniorzorg.nl can possibly be of help to find a suitable tracker.
- The methodological quality of the PSC was in general found to be good (Van Der Wees 2012). Reliability will depend on the activity chosen (Nijkrake 2009). If VAS is used instead of the NRS for the questionnaire, the reliability of the PSC is sufficient (Rollman 2010). Based on the clinimetric properties of the PSC, the clinimetric quality of the PSG is also considered to be sufficient.
- The 6MWT is suitable for measuring exercise capacity and is a valid, reliable and responsive measurement instrument (Holland 2014; O'donnell 2009; Puente-Maestu 2016; Singh 2014; van 't Hul 2003). The clinimetric quality of the 6MWT is considered good.
- The clinimetric quality of the 2MWT is considered good. It is a valid, reliable and responsive measurement instrument for frail older adults (Connelly 2009).

Falls risk (balance, muscle strength, walking ability) and fear of falling

- The clinimetric quality of the SPPB is (very) good, with high ICC's (0.72-0.92) on test-retest reliability and high odds ratios in terms of validity when the SPPB score is examined as an explanatory factor for the presence or absence of impairments in ADL (Freiberger 2012). The responsiveness is also considered as good (Freiberger 2012; Montero-Odasso 2022).
- The clinimetric quality of the TUG was investigated comprehensively in various (clinical) populations and is good to very good (Christopher 2021).
- The clinimetric quality of the 30CST was investigated in various populations of older adults. With the version where the arms may be used (m30STS), reliability appears to be good to very good and the test appears to be responsive. (McAllister 2020). The test was, moreover, able to distinguish between fallers and non-fallers among older nursing-home residents (Applebaum 2017).

- The clinimetric quality of the POMA is good. In terms of validity, the test is able to distinguish fallers and non-fallers among older nursing-home residents (Borowicz 2016).
- The clinimetric quality of the Mini-BESTest is good: the inter-rater reliability (ICC=0.99) and the test-retest reliability (ICC=0.93) are high (Viveiro 2019). The Mini-BESTest can also distinguish between fallers and non-fallers among nursing-home residents (Viveiro 2019).
- The clinimetric quality of both the FES-I and the FES-I short is good for older adults with a higher falls risk (Greenberg 2012; Montero-Odasso 2022).

Malnutrition and sarcopenia

- SARC-F has a low sensitivity (29.5%) and high specificity (98.1%) for the identification of sarcopenia in older adults (Yang 2018). This is consistent with data from a meta-analysis where the pooled results showed a sensitivity of 0.20 and specificity of 0.90 (Ida 2018). SARC-F shows poor diagnostic values for the identification of sarcopenia in geriatric rehabilitation patients (Dedeyne 2022), but despite the questionable sensitivity, SARC-F is considered to be one of the best available measurement instruments for the screening of sarcopenia, with a low percentage of false positives (Beaudart 2016). SARC-F has a good to excellent inter-rater reliability, a moderate to good test-retest reliability and a low to high internal consistency (Voelker 2021).
- For SNAQ-65+ no predictive values are known, as there is no golden standard for measuring malnutrition. SNAQ-65+, however, does have a good perception validity and an average predictive validity for mortality (Wijnhoven 2012). SNAQ has an average to good reliability with ICC values of 0.69-0.90 (Kruizenga 2005).
- HGS has excellent reliability with ICC values of 0.94-0.98 (Schaubert 2005). Moreover, HGS has excellent validity ($r > 0.96$), as well as a high test-retest reproducibility ($r > 0.80$) (Roberts 2011). The measurement instrument is therefore suitable for use in practice (Langius 2016).

Miction/defecation problems

- The clinimetric quality of ICIQ is good, with a construct validity that is good (Avery 2014; Timmermans 2013) and a test-retest reliability that is moderate to very good (Avery 2014). The internal consistency is very good with a Cronbach's alpha of 0.95 (Avery 2014). The test-retest reliability of the miction diary is good when filled in for 3-4 days, with ICCs between 0.79 and 0.84 (Brown 2003).
- The clinimetric quality of the Wexner is good, with an inter-rater reliability of 0.75 (Vaizey 1999) and a good construct validity (Deutekom 2005; Vaizey 1999). For older adults living at home in particular, the test-retest reliability is acceptable with convergent validity (Fallon 2008). The test-retest reliability of the bowel function diary is good (ICC ≥ 0.71) (Camilleri 2011). The construct validity of the BSS is moderate ($r = 0.491$), but the inter- and intraclass correlations are good (Blake 2016).

Step 7 and 8 | Are standard values available and how is the data to be calculated and interpreted?

General frailty and health

EFIP includes 50 items, divided into the following subcategories: Physical functioning (19 items); Psychological functioning (8 items); Social functioning (7 items); Health (16 items). The score can be calculated by attributing points to filled-in answers, according to the instructions for the measurement instrument. The score is then determined by adding up the total of scored points and dividing the result by 50 (total number of items). The result is a percentage score between 0 and 1, where a total score of 0.20 or higher indicates frailty. No MCD or MCID values are known for EFIP.

Physical fitness and physical activity

- For activity trackers, different standard values are given for different populations. For example, various studies assert that a person must walk at least 7,500 to 10,000 steps per day to qualify their lifestyle as healthy (Hancock 2018; Lee 2019; Tudor-Locke 2004). However, it appears that a healthy person takes an average of only 5,500 to 6,000 steps per day and people with a chronic illness only 3,500 to 5,500 per day (Lee 2019; Tudor-Locke 2001).

- Standard values do not apply to PSC and PSG, as these concern actions that are subjectively perceived as problematic and that differ from one person to the next.
- For 6MWT, standard values are available and can be calculated using the following formula (for which the BMI must first be determined) (meetinstrumentenzorg.nl):
  - ♂ 6MWT = 1.266 – (7,80*age) – (5,92*BMI)
  - ♀ 6MWT = 1.064 – (5,28*age) – (6,55*BMI)

  The average standard values for older adults (Rikli 2013):

6MWT	60-64 years	65-69	70-74	75-79	80-84	85-89	90-94
Women	572m	553	530	503	466	421	366
Men	622m	594	567	530	485	430	366

  The score indicates the functional fitness standard for each group and these are the values that are needed to maintain functional mobility and fitness despite age-related decline (Rikli 2013).
- The formula for 2MWT is to calculate the standard values that apply to healthy adults between the ages of 18 and 89 (meetinstrumentenzorg.nl):
  Distance = 252.583 - (1.165 x age) + (19.987 × gender*) *[1 = male, 0 = female]
  The MDC of the 2MWT is 15 metres, which means that when the patient scores a change of more than 15 metres on the test, it is fair to speak of an actual change (Connelly 2009).
  Average distances of the 2MWT for different groups of frail older adults (Connelly 2009):
  - Nursing-home residents (average age 87±6 years, the majority using a walking aid): 77.5 metres.
  - Older adults in sheltered housing (average age 85±4 years, none using a walking aid): 150.4 ± 23.1 metres.

Falls risk (balance, muscle strength, walking ability) and fear of falling

- SPPB gives a total score on the basis of which people can be divided by severe impairments (0-3), impairments/high risk of impairment (4-9) and sufficient mobility/low risk of impairment (9-12). The CST/5TSTS within the SPPB gives an indication of the falls risk: a score of 14 seconds or more indicates a higher falls risk (meetinstrumentenzorg.nl).
- A TUG score of <10 seconds is regarded as normal for older adults (Borowicz 2016). Cut-off values between 11 and 13.5 seconds were found in different studies as cut-off values for a higher falls risk (Borowicz 2016; Christopher 2021). The 'World guidelines for falls prevention and management for older adults' apply a cut-off value of >15 seconds (Montero-Odasso 2022). MCID values for (frail) older adults are not found in the literature.
- With 30CST/m30STS (when using arm rests), the number of times are counted that the patient can stand up from and sit down on a chair in 30 seconds. Averages are known, which are stated on the test form; these apply when no arm rests are used. When arm rests are used, it is known that the cut-off value of 7 repetitions indicates the distinction between fallers (<7) and non-fallers (≥7) (Applebaum 2017). A score below the average indicates an increased risk of falling. Moreover, a higher score indicates better leg-muscle strength and better strength endurance (AbilityLab 2013). The MDC has been established at 0.7; this means that an increase of 1 extra repetition in the test cannot indicate a measurement error (McAllister 2020).
- POMA gives a total score on the basis of which the falls risk can be determined. The maximum score is 28 points. A score below 26 indicates a problem: the lower the score, the greater the problem. A score of > 24 indicates a low risk of falling, 19-24 points indicate an increased risk of falling and a score of < 19 points to a high falls risk (meetinstrumentenzorg.nl).
- The Mini-BESTest gives a maximum total score of 28 points. A score < 19 points indicates an increased risk of falling. The MDC is determined at 4.9 points for nursing-home residents (Viveiro 2019) and 3.5 for patients with balance disorders (Godi 2013). The MCID value for patients with balance disorders is 4 points (Godi 2013).

- FES-I consists of 16 items and the shortened version of 7 items. For each question the patient chooses from 4 possible answers; from not concerned about falling at all, to very concerned about falling (scoring 1-4 points). A high score corresponds with a great fear of falling.
  Interpretation of FES-I: score 16-19: people are hardly concerned about falling, score 20-27: people are moderately concerned about falling, score 28-64: people are very concerned about falling.
  Interpretation of FES-I short: Score 7-8: people are hardly concerned about falling, score 9-13: people are moderately concerned about falling, score 14-28: people are very concerned about falling. No MCID values are known, but it is obvious to see the clinical relevance of a decrease from very concerned to moderately concerned or from moderately concerned to hardly concerned.

Malnutrition and sarcopenia

- With SARC-F, 0-2 points can be scored for each question, depending on how much effort a particular activity requires, with a total of 0-10 points (meetinstrumentenzorg.nl). A score of 4 or more indicates a high risk of sarcopenia (Malmstrom 2016).
- The results of SNAQ-65+ are indicated with a traffic light score. Green means no malnutrition. Amber indicates a risk of malnutrition, where treatment will consist of additional food. Red indicates a poor nutritional condition (malnutrition) with the advice to refer to a dietitian. The scoring, treatment and any necessary referral are further explained in the measurement instrument (kenniscentrumondervoeding.nl; meetinstrumentenzorg.nl).
- For HGS (Jamar, in kg), standard values are available based on age and gender (Langius 2016). A value below the 10th percentile is considered low. The Martin Vigorimeter uses other standard values, which are expressed in kiloPascals (kPa) (Desrosiers 1995):

	Right hand (kPa)	Left hand (kPa)
Women		
60-69 years	53.7 ± 10.2	52.4 ± 9.9
70-79 years	52.3 ± 12.0	50.1 ± 11.2
80 years and older	44.1 ± 9.4	42.7 ± 10.9
Men		
60-69 years	89.4 ± 16.7	88.1 ± 17.2
70-79 years	83.0 ± 18.2	79.6 ± 16.2
80 years and older	64.6 ± 14.5	64.3 ± 14.7

* average; ± standard deviation

Miction/defecation problems

- The ICIQ score can vary from 0-21 points. A higher ICIQ score indicates a poor quality of life. The MCID value is 4 points (Lim 2019). No clear standard values are available for the miction diary.
- The Wexner score can vary from 0-20 points. A higher score indicates more severe defecation problems. A score > 2 can identify women with a reduced quality of life (Jangö 2020). The MCID value is -2 to -3 points (Bols 2013).
- Standard data for outcomes of the bowel function diary is not available. The bowel function diary can, however, be used to determine constipation according to the Rome III criteria (NHG 2010). With the BSS, the following standard values are applied: 1-2 constipation, 3-4 normal faeces, 5-7 indication of diarrhoea. Consensus is, however, lacking on these values (meetinstrumentenzorg.nl).

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C.2 Personalised interventions

Literature: search and select

Research questions

1 What is the effectiveness of personalised interventions for the improvement in physical functioning in frail older adults (compared to non-personalised interventions)?
2 What are the characteristics of personalised interventions for frail older adults (to maintain or improve physical functioning)?

Relevant outcome measures

The guideline panel sees physical fitness and functional mobility as crucial outcome measures for decision-making; and quality of life (QoL), activities of daily living (ADL), gait (speed) and frailty with regard to decision-making as important outcome measures.
Various measurement instruments are used for many comparisons based on outcome measures. It was therefore decided to use a standardised mean difference (SMD), where the threshold of clinical relevance is fixed at an SMD of 0.2.

Search

On 7 February 2023 an information specialist (H.W.J. Deurenberg, independent information specialist) completed a systematic search in Medline and Cinahl (see Appendix C.2.1a and C.2.1b for the search justification). This systematic search produced 218 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 184 articles were excluded. For 34 articles, the full article was then screened; eventually the search yielded 15 RCTs and 1 systematic review of which the information was included during the EtD process (Arrieta 2022; Arrieta 2019; Campo-Prieto 2022; Courtney 2012; Dondzila 2016; Ferreira 2018; Gronstedt 2013; Hill 2015; Jahanpeyma 2021; Lindberg 2022; Makizako 2020; McCullagh 2020; Skelton 2019; Suikkanen 2021; van den Helder 2020; van Lieshout 2018).

See Appendix C.2.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix C.2.3.

Inclusion criteria

Types of studies	randomised controlled trials
Types of patients	frail older adults
Type of intervention	personalised
Type of comparison	non-personalised
Type of outcome	physical fitness, functional mobility, QoL, ADL, gait (speed), frailty

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix C.2.4. The 15 studies included in total 1,891 frail older adults. The average age of the patients varied between 68 and 85.1 years and the percentage of women varied from 0% to 100%. The duration of the intervention varied between 8 weeks and 12 months. There was 1 study with an average intervention duration of 8 days (discharge from hospital).
One focus area are the control conditions in many studies. Some studies describe the control group as 'usual care', others as 'waiting list' and yet others give a more comprehensive, non-personalised intervention*. Hence the intensity of the

control programme is not always equal to that of the intervention groups. For the intervention descriptions that match research question 2, see Appendix C.2.7.

* Personalised care (Nederlands Huisartsen Genootschap 2021): personalised care is a way of providing tailored care to people with a need for care. Personalised care is a core value in physical and exercise therapy care. The following aspects form part of personalised care:
  - care in which the entire person is central and not their disease or impairment: one of the fundamental attitudes of the physical and exercise therapist is to include all aspects of the bio-psychosocial model here (Engel 1977);
  - care which is tailored to the patient's individual characteristics, capabilities, wishes, needs, learning strategy and context;
  - care that is based on 'deciding together'. Here an assessment is made as to which healthcare is needed and is most suited to the person, based on the principle that the physical or exercise therapist and the patient will together consider the diagnosis, treatment, supervision and follow-up of the patient and then make a decision;
  - care with continuity, so that a relationship of trust can be built.

Individual study quality (RoB)

The design and conduct of the individual studies (risk of bias, RoB) was assessed by WG using the Cochrane Risk-of-Bias tool (Higgins 2011). An overview of the study quality assessment (RoB) per study is provided in Appendix C.2.5.

Effectiveness and evidentiary value

For the meta-analysis, outcomes from various texts are clustered if these fall under the same outcome/construct. The chosen clusters are listed below for comparison.

Comparisons

The effect of personalised interventions compared to non-personalised interventions is described in 15 studies. An overview of the results is shown in the following SoF tables. See Appendix C.2.6a to C.2.6f for the forest plots of the six outcome measures. The effectiveness and evidentiary value of each outcome measure are described below.

Physical fitness (timed chair test, FTSTS, 6-MWT, stair-climb test, BBS, Tinetti test, handgrip strength)

10 studies compared the effectiveness of personalised interventions for physical fitness to that of non-personalised interventions. The standardised mean difference (SMD) between the groups over a short term was respectively 0.28 points (95% BI 0.01 to 0.55); (*n*=1001) in favour of personalised interventions. This is regarded as a clinically relevant effect. The evidentiary value was lowered by 3 levels to very low considering the differences in frailty of patients between the studies, the difference in the duration of interventions, variations in the control-group programme, variations in measurement instruments, differences in the direction of the effect and exceeding of the threshold of clinical relevance by the reliability interval of the pooled effect.

Certainty assessment							Number of patients		Effect		Certainty	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Personalised	Non-personalised	Relative (95% CI)	Absolute (95% RI)		
Physical fitness												
10	Randomised trials	Not severe	Severe[a]	Severe[b,c,d,e]	Severe[g]	Not found	502	499	-	SMD **0.28 SD higher** (0.01 higher to 0.55 higher)	●○○○ Very low	Crucial

RI: reliability interval MD: mean difference; SMD: standardised mean difference. a. differences in direction of the effect; b. differences in frailty status (upon inclusion); c. variation in control intervention; d. variation in duration of intervention; e. variation in used \ measurement instruments; f. various unblinded studies; g. reliability interval of the pooled effect exceeds the defined threshold of clinical relevance

Functional mobility (SPPB, TUG, 8-feet-up-and-go-test)

10 studies compared the effectiveness of personalised interventions for functional mobility with that of non-personalised interventions. The standardised mean difference (SMD) between the groups over a short term was 0.54 points (95% RI 0.27 to 0.81); (*n*=1097) in favour of personalised interventions. This is regarded as a clinically relevant effect.

The evidentiary value was lowered by 2 levels to low considering the differences in frailty of patients between the studies and the difference in the duration of interventions, variations in the control-group programme, variations in measurement instruments and differences in the direction of the effect.

Certainty assessment							Number of patients		Effect		Certainty	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Personalised	Non-personalised	Relative (95% CI)	Absolute (95% RI)		
Functional mobility												
10	Randomised trials	Not severe	Severe[a]	Severe[b,c,d,e]	Not severe	Not found	540	557	-	SMD **0.54 SD higher** (0.27 higher to 0.81 higher)	●●○○ Low	Crucial

RI: reliability interval MD: mean difference; SMD: standardised mean difference. a. differences in the direction of the effect; b. differences in frailty status (upon inclusion); c. variation in control intervention; d. variation in duration of intervention; e. variation in used \ measurement instruments

Quality of life (RAND-36, SF-12, EuroQoL)

5 studies compared the effectiveness of personalised interventions for quality of life with that of non-personalised interventions. The standardised mean difference (SMD) between the groups over a short term was respectively 0.6 points (95% RI -0.09 to 1.29); (*n*=808) in favour of personalised interventions. This is regarded as a clinically relevant effect.
The evidentiary value was lowered by 3 levels to very low considering the differences in frailty of patients between the studies, the difference in the duration of interventions, variations in the control-group programme, variations in measurement instruments and exceeding of the threshold of clinical relevance by the reliability interval of the pooled effect.

Certainty assessment							Number of patients		Effect		Certainty	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Personalised	Non-personalised	Relative (95% CI)	Absolute (95% RI)		
QoL												
5	Randomised trials	Severe[f]	Not severe	Severe[b,c,d,e]	Very severe[i]	Not found	378	413	-	SMD **0.6 SD higher** (0.09 higher to 1.29 higher)	●○○○ Very low	Important

RI: reliability interval MD: mean difference; SMD: standardised mean difference. b. differences in frailty status (upon inclusion); c. variation in the control intervention; d. variation in duration of intervention; e. variation in used \ measurement instruments;f. various unblinded studies; g. reliability interval of the pooled effect exceeds both defined thresholds of clinical relevance (positive as well as negative effects)

Activities of daily living ADL (Barthel Index, IADL scale, FIM, Katz-6)

5 studies compared the effectiveness of personalised interventions for ADL with that of non-personalised interventions. The standardised mean difference (SMD) between the groups over a short term was respectively 0.49 points (95% RI 0.10 to 0.89); (*n*=1126) in favour of personalised interventions. This is regarded as a clinically relevant effect.
The evidentiary value was lowered by 3 levels to very low considering the potential bias of moderately/unclearly randomised studies on questionnaires, differences in frailty of patients between the studies, the difference in the duration of interventions, variations in the control-group programme, variations in measurement instruments and exceeding of the threshold of clinical relevance by the reliability interval of the pooled effect.

Certainty assessment							Number of patients		Effect		Certainty	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Personalised	Non-personalised	Relative (95% CI)	Absolute (95% RI)		
Activities of Daily Living												
5	Randomised trials	Severe[f]	Not severe	Severe[b,c,d,e]	Very severe[g]	Not found	564	562	-	SMD **0.49 SD higher** (0.1 higher to 0.89 higher)	●○○○ Very low	Important

RI: reliability interval MD: mean difference; SMD: standardised mean difference. b. differences in frailty status (upon inclusion); c. variation in control intervention; d. variation in duration of intervention; e. variation in used \ measurement instruments;f. various unblinded studies; g. reliability interval of the pooled effect exceeds the defined threshold of clinical relevance

Gait (WIQ, 10 meter walk test)

4 studies compared the effectiveness of personalised interventions for gait (speed) with that of non-personalised interventions. The standardised mean difference (SMD) between the groups over a short term was respectively 0.54 points (95% RI -0.00 to 1.08); (*n*=690) in favour of personalised interventions. This is regarded as a clinically relevant effect.

The evidentiary value was lowered by 3 levels to very low considering the differences in frailty of patients between the studies, the difference in the duration of interventions, variations in the control-group programme, variations in measurement instruments, differences in the direction of the effect and exceeding of the threshold of clinical relevance by the reliability interval of the pooled effect.

Certainty assessment							Number of patients		Effect		Certainty	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Personalised	Non-personalised	Relative (95% CI)	Absolute (95% RI)		
Walking												
4	Randomised trials	Severe[f]	Severe[a]	Severe[b,c,d,e]	Not severe	Not found	337	353	-	SMD **0.49 SD higher** (0.1 higher to 0.89 higher)	●○○○ Very low	Important

RI: reliability interval MD: mean difference; SMD: standardised mean difference. b. differences in frailty status (upon inclusion); c. variation in control intervention; d. variation in duration of intervention; e. variation in used \ measurement instruments;f. various unblinded studies

Frailty (TFI, GFI)

2 studies compared the effectiveness of personalised interventions for frailty as such with that of non-personalised interventions. The standardised mean difference (SMD) between the groups over a short term was respectively 0.15 points (95% RI 0.2 to 0.5); (*n*=393) in favour of personalised interventions. This qualifies as a non-clinically relevant effect.

The evidentiary value was lowered by 3 levels to very low considering the differences in frailty of patients between the studies, the difference in the duration of interventions, variations in the control-group programme, variations in measurement instruments, the small number of studies and the exceeding of the threshold of clinical relevance by the reliability interval of the pooled effect.

Certainty assessment							Number of patients		Effect		Certainty	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Personalised	Non-personalised	Relative (95% CI)	Absolute (95% RI)		
Frailty												
2	Randomised trials	Severe[f]	Not severe	Severe[b,c,d,e]	Very severe[h,i]	Not found	196	197	-	SMD **0.15 SD higher** (0.2 lower to 0.5 higher)	●○○○ Very low	Important

RI: reliability interval MD: mean difference; SMD: standardised mean difference. b. differences in frailty status (upon inclusion); c. variation in control intervention; d. variation in duration of intervention; e. variation in used \ measurement instruments;f. various unblinded studies; h. small number of studies; g. reliability interval of the pooled effect exceeds both defined thresholds of clinical relevance (positive as well as negative effect)

From evidence to recommendation

The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects and quality of evidence

The crucial outcome measures of physical fitness (very low evidentiary value) and functional mobility (low evidentiary value) shows a clinically relevant effect of personalised interventions. The important outcome measures of gait, QoL and ADL show a clinically relevant effect with a very low evidentiary value. The outcome of frailty shows no clinically relevant difference (very low evidentiary value). Five of the six outcome measures thus show a clinically relevant difference in frail older adults between personalised and no-personalised interventions in favour of personalised interventions.
The guideline panel considers the desirable effects of personalised interventions compared to non-personalised interventions as fair with a fair evidentiary value.

Undesirable effects

The included studies from the literature review have revealed no undesirable effects or adverse events that are the result of the personalised intervention.
There are a number of studies with a large drop-out rate of patients who indicated that they wanted to take part in the intervention. This, however, seems to have to do with the study design rather than the characteristics of the intervention. The reasons for drop-out prior to the intervention in these studies had to do with a long lapse of time between informed consent and the start of the intervention, where someone's changing health status could also have played a role.
The guideline panel indicates that personalised interventions in physical and exercise therapy can be adapted to the patient's frailty status and load capacity. Differences between patients will lead to individually adapted intervention tracks. The structure and timeline will therefore differ from one patient to another. A personalised intervention can, besides being adapted to load capacity and the structure of the training, also be characterised by patient preferences in terms of training frequency, location and time. As a result, a personalised intervention will have no undesirable effects for the individual patient.
The guideline panel considers the undesirable effects of personalised interventions compared to non-personalised interventions to be absent. (The evidentiary value of this cannot be determined.)

Patient values and preferences

The guideline panel expects that personalised interventions for most frail older adults will be more easily accessible. Personalised interventions can, for example, be offered regardless of the setting, while keeping the person's preferences in mind. Very frail patients often attach more value to personalised interventions. Personalised programmes are mostly offered individually. The social aspect, which characterises a 'one size fits all' group intervention, is therefore missing.

The social aspect of group training sessions can be motivating for some frail older adults, while other patients might experience peer pressure during group programmes. The group set-up, the approach (e.g. competitive or a buddy system) and the way in which the group is led, will play a role here. The guideline panel indicates that group programmes can also offer interventions that are adapted to the patient. With proper differentiation, group interventions can also take patients' individual traits into account. However, the possibilities of personalisation are limited with this type of intervention. Individual intervention programmes can go a step further in terms of personalisation, increasing the impact on outcome measures. The expected better outcomes can play a role in someone's preferences.

The guideline panel expects that older adults in a pre-stage of frailty or with an increased risk of frailty benefit from group or non-personalised interventions and interventions of a more preventive nature.

The guideline panel furthermore indicates that the personalised/non-personalised dichotomy is a simplified view of the reality and that instead there is a continuum where both individual and group interventions can be personalised to a greater or lesser degree. However, individual interventions are more suitable in situations that call for a high degree of personalisation.
The guideline panel assesses that the patients attach great value to personalised interventions and that there is little variation among patients in this regard. The variations in patient preferences is likely to be related to the severity of a patient's frailty, which means that personalised interventions are considered more suitable for frailer patients and that such interventions are also preferred by this group of patients.

Economic considerations and cost-effectiveness

The preventive nature of both personalised and non-personalised intervention programmes plays an important role in economic considerations and costs-effectiveness. In general, the costs for society of preventing health deterioration are weighed against the costs of not preventing this (increased pressure on healthcare and higher costs of healthcare).
From society's point of view | For society, personalised interventions for frail older adults can lead to savings. The preventive aspect (selective prevention) of interventions for frail older adults will go hand in hand with cost savings for society. The guideline panel expects that this will apply both to (individual) personalised intervention programmes and to group interventions with a very limited potential for personalisation (compared to no intervention programme).
From the therapist's point of view | For the physical and exercise therapist, personalised programmes can be more financially advantageous than group interventions, as individual programmes call for more intensive one-on-one supervision from the physical or exercise therapist. Individual programmes therefore mean more billable hours per patient.
From the patient's point of view | For the patient, a personalised intervention can be more expensive. Individually adapted intervention programmes that are delivered by a physical or exercise therapist are paid for by the patient. The patient often has supplementary insurance for this, but not always. There will be differences between whether someone has supplementary insurance and, if so, how much supplementary insurance has been taken out for physical and exercise therapy. This is due to the current reimbursement structure in physical therapy. Individual prevention programmes in physical therapy can therefore entail additional costs for some patients, while curative treatments (e.g. after a hip fracture) will be reimbursed in full for the patient. Some 'one size fits all' group programmes, on the other hand, such as fall-prevention programmes for older adults, are often subsidised/funded by the municipality or are procured by insurance companies, which means that there will be no (or a very small personal contribution to) extra costs for participants.

The complexity of funding structures and differences between patients' insurance can make it difficult to get a clear weighting in this regard. The guideline panel considers that the resources needed for personalised interventions should be seen as cost-savings (for society) and points out that the cost-effectiveness is linked to the frailty status of the patient, where non-personalised group interventions for patients with an increased risk of frailty may also be cost-effective (compared to no intervention).

Equality

As was already indicated briefly in the section above, 'having supplementary insurance' is a prerequisite for personalised interventions, unless the patient is able and willing to pay for the intervention themselves. Considering the current trend (with supplementary insurance becoming more expensive and insurance packages more and more limited), this could lead to a potential increase in health inequality.
Moreover, there is a large prevalence of patients with low health literacy skills within the frail older adults population. Differences in health literacy can manifest themselves differently between personalised and non-personalised interventions. In a group intervention, the possibility to imitate or copy others when doing an exercise could reduce health inequality, while this possibility lacks in an individually personalised programme. On the other hand, a personalised programme can be adapted to low health literacy as a patient characteristic of some frail older adults.

When judging whether personalised interventions bring more or less health equality compared to non-personalised interventions, many factors play a role. The guideline panel indicates that it is unclear whether personalised interventions lead to an increase in health inequality (neutral).

Acceptability

For frail and very frail older adults in particular, personalised intervention programmes will be suitable. They do not always 'fit' into a 'one size fits all' programme. In view of the various (financial) interests for stakeholders, existing and funded group interventions and the complexity of the funding structure, the guideline panel expects that the support for personalised interventions will vary between stakeholders.

Feasibility

A broad implementation of a recommendation for personalised interventions for frail older adults can lead to more care being delivered by physical and exercise therapists. In addition, with the current ageing
of the population, the number of frail older adults is increasing. This can lead to a (temporary) capacity shortage within the professional field
of physical and exercise therapy.
The implementation of personalised interventions is, for example, seen as likely being realistic by the guideline panel.

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C.3 Balance training

Literature: search and select

Research question

To answer the clinical question, a systematic review was carried out for the following research question (PICO): What is the effectiveness of different forms of balance training in terms of the frequency, and the risk and fear of falling for frail older adults?

Relevant outcome measures

The guideline panel considers fall frequency (measured in the 'number of falls per person per year' and 'number of people who have 1 or more falls') as a crucial outcome for the decision-making process; and falls risk and the fear of falling as important outcome measures for decision-making. The guideline panel considers all possible 'adverse events', such as falls or physical complaints, as undesirable effects.

The FMS guideline on 'Prevention of fall incidents among older adults' defines 'prevention of one or more falls within one year' as clinically relevant for alder adults in a nursing home (FMS 2017). It was, however, difficult to convert this measure for clinical relevance into a percentage of decrease in fall incidents as shown in the systematic reviews. The guideline panel therefore defined a 10% decrease in falls (a Rate Ratio or Risk Ratio below 0.91) as an important effect (clinically relevant difference). In this regard, we maintained thresholds that are often used for Rate Ratio or Risk Ratio (FMS 2012-2022).

Various measurement instruments can be used to measure the falls risk. Measurement instruments frequently used in the literature to measure effects on the falls risk are Timed Up and Go (TUG) and the Berg Balance Scale (BBS). For the BBS we maintain the minimal detectable change (MDC) of 5 points as an important difference (Meetinstrumentenzorg.nl). For TUG, no MDC or MCID data were found in the literature. Based on clinical expertise, a minimal decrease of 3 seconds is regarded as clinically relevant in this test.

Fear of falling is in most cases measured with the Falls Efficacy Scale (FES-I) (Meetinstrumentenzorg.nl). The questionnaire includes 16 items, but a shorter version is available with 7 items. MCID data is not known, but we have determined a cut-off value with a distinction between not concerned about falling, moderately concerned or very concerned. A decrease in score, where the older adults goes from very concerned to moderately concerned or from moderately concerned to not concerned, is regarded as clinically relevant.

Search

In order to answer the research question, a broad systematic search was carried out for systematic reviews of various types of balance interventions.

On 5 May 2022 an information specialist (H.W.J. Deurenberg, independent information specialist) conducted a systematic search in Medline (incl. Pubmed and Cochrane reviews) and Cinahl (see Appendix C.3.1 for the search justification) and on 13 May 2022 the Medline search was repeated with additional search terms. This systematic search produced 263 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 158 articles were excluded. For 105 articles, the full article was then screened; the search eventually yielded 13 studies, which were assessed on quality with AMSTAR-2. Based on this assessment, match with PICO and year, 5 systematic reviews were finally included; 1 review for each type of balance training (Neri 2017; Okubo 2017; Sherrington 2020; Sherrington 2019; Thomas 2019). See Appendix C.3.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix C.3.3.

Inclusion criteria

Types of studies	systematic reviews
Types of patients	frail older adults or older adults with an increased falls risk
Type of intervention	all types of balance training that can be given or recommended by an exercise/physical therapist
Type of comparison	control group without intervention
Type of outcome	frequency, risk and fear of falling, adverse events
Type of timeline	minimum follow-up of 4 weeks

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix C.3.4. The 5 included studies included a total of between 200 (Thomas 2019) and 23,407 older adults (Sherrington 2019). The average age of the older adults was between 75 and 77 years for the systematic reviews that calculated the average or between 60 and 85 for the studies that only gave these data in a descriptive form. The percentage of women was 77% for the reviews that gave this information. 5 different types of balance training were distinguished in the included reviews. The following interventions were given:

Conventional balance training

Conventional balance training includes walking exercises, balance exercises and functional training. The walking exercises included specific corrections of walking techniques (e.g. posture, stride length and cadence). In addition, changes in stride length, walking over difficult surfaces and changes in walking direction are also looked at. Balance exercises are exercises where the balance is challenged and has to be kept. A distinction can be made here between 1) static balance exercises (where the axis of the body must be held above the support surface) and 2) dynamic balance exercises (where the balance must be kept during movement such as stepping forward). The exercises should progress in degree of difficulty: for example reducing the size of the support surface, opening/closing eyes or varying the floor surface. Functional training focuses on performing activities in daily life where a task-specific action is carried out (e.g. picking a bag up from the ground, walking a bit further with it and putting it on the top shelf or, for example, walking while carrying a tray with a glass of water). Integrating the various exercises in ADL is specifically recommended. Conventional balance training can be expanded by adding a cognitive task, so that it becomes a dual motor-cognitive task. In a review by Ghai (2017) it appears that dual-task training is more effective than single-task training for maintaining posture stability in older adults with an increased falls risk (Ghai 2017). An example of a cognitive task is choosing a letter and giving an assignment with it (for example 'how many animals can you name that start with the letter A?') or by giving a 'n-back task' (for example counting back in sixes from 100). This distracts the older adult's attention from the initial motor task while still having to maintain their balance. It is, however, important to keep the added cognitive task within the cognitive abilities of the older adult. Sherrington et al. recommend continuing supervised exercises for at least 12 weeks. A dose-response relationship has also been demonstrated: among older adults who do at least 3 hours a week of walking, balance and functional exercises, the number of falls decrease by 42% compared to an increase of 8% in studies where the dose was less than 3 hours and that used another form of training (Sherrington 2020). In terms of the impact on fall frequency, it made no difference whether exercises were done in a group or individually. The guideline panel notes in this regard that there are, however, differences between older adults with a higher falls risk and (very) frail older adults. The latter are not always able to travel to the site. Exercise in the older adult's individual setting (at home) can also be meaningful for ADL-centred exercises and for the prevention of falls in their own environment. However, having exercise equipment at hand as well as the social aspect of training on site/in a group could be reasons to actually come to a site to exercise. It is therefore recommended to choose between training at home, on site or a combination of the two based on the need for assistance, context and mobility of the older adult.

Tai Chi

Tai Chi is a separate sporting activity. It consists of specific exercises based on the principle of shifting weight between legs. The upright position, head position and direction of the eyes are important. The sequence that is done includes various dynamic movements, speeds and patterns. Slow movements that are done from the lower abdomen and especially in a very relaxed way are characteristic of Tai Chi. The sequence of movements is fixed. Depending on the sequence, doing an entire sequence may, for example, take 3 but also 20 minutes (Huang 2017; Mulligan 2014; Sherrington 2019).
The duration of the intervention varies between 13 weeks and 48 months. It is recommended to continue with an intervention at least once a week for at least 12 weeks. 1 RCT in the review showed that doing Tai Chi twice a week was more effective than once a week (Sherrington 2019).

Proactive and reactive circuit training

Proactive and reactive circuit training is defined as 'practising expected (proactive) or unexpected (reactive) steps in a standing or walking position in reaction to a problem in the environment' (e.g. stepping on an object, avoiding an obstacle or reacting to a disturbance) (Kim 2022; Mulligan 2014; Okubo 2017). Balance exercises with reactive components are exercises where the posture is disturbed from outside (also called a 'perturbation') during a static or dynamic steady-state task (standing or walking). Examples are being pushed or pulled unexpectedly, simulated slipping, tripping or falling while walking and using moveable platforms. The occurrence of these disturbances may therefore be either expected (proactive) or unexpected (reactive). The intervention can take place in an 'analogue' way with a laid-out circuit or with the use of specific equipment such as a treadmill filled with obstacles that must be reacted to. If the intervention takes place in a laid-out circuit, the therapist will have to add reactive components by means of unexpected disturbances.

Exergaming

Exergaming and Virtual Reality Training (VRT) make use of various forms of games combined with physical exercises, such as Wii (computer game with a controller and/or balance board) or Kinect X-box (computer game with camera detection, i.e. without a controller). These offer a wide variety of possibilities. Game consoles are used, sometimes in combination with VR glasses. Wii exercises include a wide variety of different games, like yoga: halfmoon, ski slalom, ski jump, table tilt, balance bubble, Frisbee dog, jet ski and canoe game. In other types of games, seniors, for instance, have to pick up objects, avoid obstacles or do weight shifts (Donath 2016; Neri 2017).

Balance-board training

Balance-board training can be done with various types or forms of balance boards. In the article of Thomas et al. two types of balance boards are used, on which various exercises are done. For example squats, lunges, side swings or standing on toes. Certain types of balance boards can also be used for gamification, for example, sending a moving cursor towards a specific target (Thomas 2019).
Balance-board training can also be made more complex by combining it with a cognitive task, so that it becomes dual-task training (see the earlier explanation with conventional training).
These 2 studies in Thomas et al. were carried out over 8-9 weeks, with a frequency of twice a week, for 10 and 30 minutes per session. The intensity/degree of difficulty was gradually increased (Thomas 2019).

Individual study quality (RoB)

With regard to a systematic review of systematic reviews, the included articles were assessed with AMSTAR-2 (see Appendix C.3.4 for the results). To assess the evidentiary value, a risk-of-bias assessment was made of the individual studies within the systematic reviews. This quality was assessed by means of the Cochrane Risk-of-Bias tool (Higgins 2011) or with the PEDro scale (Verhagen 1999).

Effectiveness and evidentiary value

Conventional balance training

The effect of conventional balance training (walking, balance and functional exercises) compared to no intervention is described in 21 studies as part of a subanalysis in the review by Sherrington (Sherrington 2019). The effectiveness and evidentiary value per outcome are described below.

Fall frequency (number of falls per person per year), measured between 3 and 30 months | 21 studies (*n*=4602) compared the effectiveness of conventional balance training on fall frequency with no intervention (number of fall incidents per person per year) (Sherrington 2019). The Rate Ratio was 0.72 (95%RI: 0.65; 0.80), in favour of the intervention, which showed a 28% decrease in the number of falls in the intervention group compared to the control group. This difference exceeds the previously defined threshold value of 10%. The evidentiary value of this comparison was taken over from Sherrington et al. (2019) and is high.

Fall frequency (number of people who experience 1 or more falls per year [number per 1,000 people]), measured between 3 and 24 months | 22 studies (*n*=4639) compare the effectiveness of conventional balance training on fall frequency with no intervention (number people who experienced 1 or more falls) (Sherrington 2019). The Risk Ratio was 0.86 (95%RI 0.81; 0.91), in favour of the intervention, which showed a 14% decrease in the number of people who experience 1 or more falls, indexed in relation to the control group. This difference exceeds the previously defined threshold value of 10%. The evidentiary value of this comparison was taken over from Sherrington (2019) and is high.

Falls risk | The falls risk was not assessed in this review on conventional balance training.

Fear of falling | The fear of falling was not assessed in this review on conventional balance training.

Adverse events | Adverse events were reported in 10 of the 21 studies. In the intervention group, musculoskeletal complaints were reported for *n*=17 participants, such as knee or back pain, dyspnoea for *n*=4, heart palpitations for *n*=1 and falls during an exercise session, without injury (*n*=2). In the control group, musculoskeletal complaints occurred with *n*=4 participants. The evidentiary value for this comparison was taken over from Sherrington (2019) and was lowered by three levels to 'very low', considering the high risk of bias due to the way the study was set up and carried out (RoB).

Tai Chi

The effect of Tai Chi compared to no intervention is described in 9 studies in the updated review by Sherrington (Sherrington 2020) and for the outcome measure 'number of people who experience 1 or more falls' in 8 studies in the original review by Sherrington (Sherrington 2019). The effectiveness and evidentiary value per outcome are described below.

Fall frequency (number of falls per person per year), measured between 6 and 17 months | 9 studies (*n*=3169) compare the effectiveness of Tai Chi on fall frequency with no intervention (number of falls per person per year) (Sherrington 2020). The Risk Ratio was 0.77 (95%RI 0.61; 0.97), in favour of the intervention, which showed a 23% decrease in the number of falls in the intervention group compared to the control group. This difference exceeds the previously defined threshold value of 10%. The evidentiary value for this comparison was taken over from Sherrington (2020) and was lowered by 1 level to fair, on account of a reason that was not specified.

Fall frequency (number of people who experience 1 or more falls per year (number per 1,000 people), measured between 5 and 17 months | 8 studies (*n*=2677) compare the effectiveness of Tai Chi on fall frequency with no intervention (number people who experienced 1 or more falls) (Sherrington 2019). The Risk Ratio was 0.80 (95% RI 0.70; 0.91), in favour of the intervention, which showed a 20% decrease in the number of people who experience 1 or more falls, indexed in relation to the control group. This difference exceeds the previously defined threshold value of 10%. The evidentiary value of this comparison was taken over from Sherrington (2019) and is high.

Falls risk | The falls risk was not assessed in this review on Tai Chi.

Fear of falling | The fear of falling was not assessed in this review on Tai Chi.

Adverse events | The adverse events of Tai Chi were examined in two of the included studies on Tai Chi in the Cochrane review by Sherrington (2019). In these studies there were no incidents of adverse effects.

Proactive and reactive circuit training

The effect of proactive and reactive circuit training were compared with no intervention in the systematic review by Okubo (2016). The review included 16 studies, of which a subset of 4 studies consisted of the target group of frail older adults or older adults with an increased falls risk. This subset was compared in this review with other studies on older adults aged >60 years, where comparable results and no significant differences were found. The effectiveness and evidentiary value per outcome measure are described below.

Fall frequency (number of falls per person per year), measured between 3 and 12 months | 7 studies (*n*=660) compared the effectiveness of circuit training on fall frequency with no intervention or one intervention hat had no impact on balance ability (number of falls per person per year). The Rate Ratio was 0.48 (95%RI 0.36; 0.65) in favour of the intervention, which showed a 52% decrease in the number of falls in the intervention group compared to the control group. This difference exceeds the previously defined threshold value of 10%. The evidentiary value for this comparison was determined by means of the GRADE method and was lowered by 1 level to 'fair', considering the risk of bias due to the way the study was set up and carried out (RoB) (see Appendix C.3.5).

Fall frequency (number of people who experience 1 or more falls per year [number per 1,000 people]), measured between 3 and 12 months) | 7 studies (*n*=660) compared the effectiveness of circuit training on fall frequency with no intervention/one intervention hat had no impact on balance ability (number of falls per person per year). (number people who experienced 1 or more falls). The Risk Ratio was 0.51 (95%RI 0.38; 0.68), in favour of the intervention, which showed a 49% decrease in the number of people who experience 1 or more falls, indexed in relation to the control group. This difference exceeds the previously defined threshold value of 10%. The evidentiary value for this comparison was determined by means of the GRADE method and was lowered by 1 level to 'fair', considering the risk of bias due to the way the study was set up and carried out (RoB) (see Appendix C.3.5).

Falls risk | The falls risk was measured in 5 studies by means of TUG. The mean difference was -1.61 seconds (95%RI -2.81; -0.41) in favour of the intervention group. This difference does not exceed the previously defined threshold value of 3 seconds. The evidentiary value was determined by means of the GRADE method and was lowered by 2 levels to 'flow', considering the risk of bias due to the way the study was set up and carried out (RoB) and inconsistency between studies (see Appendix C.3.5).

Fear of falling | The fear of falling was not assessed in this review on circuit training.

Adverse events | No adverse events were measured in this review on circuit training.

Exergaming

The effect of exergaming compared with no intervention was described in 28 studies (*n*=1121) in the review by Neri (2017). The effectiveness and evidentiary value per outcome measure are described below.

Fall frequency | Fall frequency was not assessed in this review.

Falls risk | The falls risk was evaluated using TUG in 6 studies (*n*=74). The mean difference was -1.08 seconds (95%RI -1.42; -0.74) in favour of the intervention group. This difference does not exceed the previously established threshold value of 3 seconds. The evidentiary value was determined with the GRADE method and was lowered by 2 levels to 'low', considering the risk of bias due to the way the study was set up and carried out (RoB) (see Appendix C.3.5).

Fear of falling | Fear of falling was evaluated in 3 studies. No quantitative results were described, only the fact that fear of falling improved in 2 of the 3 studies. The evidentiary value for this comparison could therefore not be evaluated.

Adverse events | No adverse events were measured in this review on exergaming.

Balance-board training

The effect of balance-board training compared to no intervention was described in 2 studies in the review by Thomas (2019) (*n*=29). Only the falls risk was examined in this review. It was evaluated using the One Leg Standing test. The percentage of difference between measurements before and after in study 1 was plus 35.2% for the intervention group and -5.8% for the control group. In study 2 the difference was plus 42% for the intervention group and -23.4% for the control group. No meta-analysis was conducted. For this reason, no assessment could be made of the evidentiary value, which was estimated as being 'very low'.

From evidence to recommendation

The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects

- The guideline panel assesses the desirable effects of *conventional balance training* on the crucial outcome measure (fall frequency) compared to no intervention as large/clinically relevant (for substantiation, see the subheading 'effectiveness and evidentiary value').
- The guideline panel assesses the desirable effects of *Tai Chi* on the crucial outcome measure (fall frequency) compared to no intervention as large/clinically relevant (for substantiation, see the subheading 'effectiveness and evidentiary value').
- The guideline panel assesses the desirable effects of *proactive and reactive circuit training* on the crucial outcome measure (fall frequency) compared to no intervention as large/clinically relevant (for substantiation, see the subheading 'effectiveness and evidentiary value'). The guideline panel assesses the desirable effects of circuit training on the important outcome measure (falls risk) compared to no intervention as small/clinically insignificant (for substantiation, see the subheading 'effectiveness and evidentiary value').
- The guideline panel assesses the desirable effects of *exergaming* on the important outcome measure (falls risk) compared to no intervention as small/clinically insignificant (for substantiation, see the subheading 'effectiveness and evidentiary value').
- The guideline panel cannot make any assessment of the desirable effects of *balance-board training* on the important outcome measure (the falls risk) compared to no intervention, as a pre-post analysis was done only in the intervention group in this review, without comparing it to a control group. An average increase of 35-42% on the One Leg Standing test is, however, seen as fairly large.

Undesirable effects

The undesirable effects were described for two types of balance interventions, where with conventional balance training a small number of participants showed undesirable effects, such as musculoskeletal complaints. With Tai Chi, no undesirable effects were found. For the remaining balance interventions, no information was found on undesirable effects. A further potential undesirable effect raised by the guideline panel for the various types of balance training is a possible increase in the falls risk for frail older adults in a nursing home. This is particularly true at the start of an exercise programme, since older adults might then misjudge their own physical capacities, for example, due to cognitive problems. They will, for instance, start to move more without assistance, increasing the likelihood of falling. In addition, urinary and faecal incontinence were also raised by the guideline panel as a potential general undesirable effect of moving more/following an exercise programme. From the literature it is also known that urinary or faecal incontinence may affect treatment, since certain forms of training that increase intra-abdominal pressure (such as certain balance exercises, strength exercises and walking exercises) may lead to more urine leakage, flatulence and/or defecation, which means that older adults will also be less inclined to do these exercises. Both embarrassment (in a group or in front of the therapist) and focussing on personal hygiene play a role here (Westerik-Verschuuren 2017).

The guideline panel considers the undesirable effects of personalised interventions compared to non-personalised interventions to be small; however, the therapist does need to keep these in mind. The guideline panel considers the undesirable effects of Tai Chi compared to no intervention to be trivial.
The guideline panel's estimate is that any undesirable effects of the previous three types of balance interventions will be the same as for conventional balance training: a potentially increased falls risk at the start of training, musculoskeletal complaints and urinary or faecal incontinence.

Quality of evidence

The quality of the evidence was assessed by means of the GRADE method. For two types of balance training (conventional balance training and Tai Chi) the GRADE assessment could be taken over from the review by Sherrington (2019), and this is described in the table in Appendix C.3.4. For proactive and reactive circuit training and exergaming, a GRADE assessment was done (see Appendix C.3.5). This method could not be used for balance-board training as this review did not perform a meta-analysis.

- The guideline panel therefore assesses the evidentiary value of the desirable effects of *conventional balance training*as high. The guideline panel assesses the evidentiary value of the desirable effects of *conventional balance training* as very low.
- The guideline panel assesses the evidentiary value of the desirable effects of *Tai Chi* as fair. The guideline panel assess the evidentiary value of the undesirable effects of *Tai Chi* as not possible to be determined, due to the fact that these were not found.
- The guideline panel assesses the evidentiary value of the desirable effects of *proactive and reactive circuit training* as fair.
- The guideline panel assesses the evidentiary value of the desirable effects of *exergaming* as fair.
- The guideline panel assesses the evidentiary value of the desirable effects of *balance-board training* as very low.

Patient values and preferences

- For conventional balance training, the guideline panel's estimate is that older adults appreciate the recognisability of this intervention. This applies in particular to walking and functional training. The estimate is furthermore that specific balance exercises will be seen as useful by certain patients. The guideline panel assesses that the patients attach great value to this intervention and that there is little variation among patients in this regard.
- For Tai Chi, the guideline panel's estimate is that this intervention will be less recognisable for older adults. This is a disadvantage. Everyone may not be open to this type of training, due, for example, to personal or religious beliefs. At the same time, many older adults do find the slow movements in this intervention enjoyable to do. Patients with Parkinson's disease have many positive experiences with Tai Chi. The guideline panel assesses that the patients attach fair to great value to this intervention and that patients vary moderately to greatly in this regard.
- Proactive and reactive participation circuit training are experienced as enjoyable by older adults and many people are enthusiastic about it. This can have a beneficial impact on compliance. It can be offered both individually and in a group set-up and can also be done outdoors. This is also appreciated. The guideline panel assesses that the patients attach fair to great value to this intervention and that there is little to moderate variation between patients in this regard.
- Exergaming is often seen as enjoyable at the beginning, but in the experience of guideline-panel members, this effect can wear off over time. Exergaming is regarded as a possible alternative to add variety to the standard exercise programme. There is often no link to the older adult's daily life in exergaming, which makes it not always easy for older adults to relate to it. This, however, depends on the different forms of exergaming and on the level of the older adult; some people reach a ceiling effect much faster than others. For some frail older adults, exergaming will not be applicable due to cognitive, sight or hearing problems. The guideline panel assesses that the patients attach low to fair value to this intervention and that patients vary greatly in this regard.
- Balance-board training can be experienced as scary by older adults, which is why external supporting points are often provided in the walkway. It is, however, difficult to do this intervention at home. The guideline panel assesses that the patients attach moderate to fair value to this intervention and that patients vary moderately to greatly in this regard.

Balance of desirable and undesirable effects

The guideline panel came to the following assessment: in all types of balance training the desirable effects definitely outweigh the undesirable effects: potential undesirable effects must, however, be kept in mind, such as musculoskeletal complaints due to overexertion, urinary or faecal incontinence and a possible increase in the falls risk for patients who are unable to properly assess the risks of moving/exercising autonomously due to, for instance, cognitive problems.

These undesirable effects may, according to the estimates of the guideline panel, occur in all types of balance training. Differences between interventions will depend on the values and preferences of patients, where patient preferences are likely to lean most towards conventional balance training and circuit training, followed by Tai Chi.

Economic considerations and cost-effectiveness

No cost-effectiveness studies resulted from the systematic review on the effectiveness of the various balance interventions. The guideline panel made an estimate of differences between the necessary resources (costs) of the various interventions:

- The guideline panel considers the necessary resources for conventional balance training to be low. Regular physical and exercise therapy is relatively inexpensive compared to other care and is not associated with any high additional expenses such as the cost of equipment.
- The guideline panel considers the necessary resources for Tai Chi to be low; in most cases, however, the patient will have to pay for Tai Chi classes.
- The guideline panel considers that the necessary resources for proactive and reactive circuit training are low to moderate, provided that this intervention is given with a physical circuit. The costs will then possibly be slightly higher than for regular therapy, since more space is needed, which will, for example, increase the cost of renting a room. If technical aids are used, such as a special reactive training programme on a treadmill with accompanying screen, the costs will be high.
- The guideline panel considers the necessary resources for exergaming to be high; however, this will depend on the type of exergaming. This intervention may require considerable investment either from the practice/care facility or from the older adult themselves.
- The guideline panel considers the necessary resources for balance-board training to be low. This may, however, depend on the type of balance board that is used.

Equality

The effect of the different types of interventions on equality between patients depends on the setting. In a primary care setting, exercise and physical therapy are mostly reimbursed by supplementary healthcare insurance. Not every patient has the means to take out supplementary insurance, which means that the intervention could lead to reduced equality. In a secondary care setting this plays a lesser role since the budget for exercise and physical therapy will then be regulated under the Dutch act on long-term care. With geriatric rehabilitation care (geriatrische revalidatiezorg or GRZ) and residence in a primary care setting (eerstelijnsverblijf or ELV) that are budgeted under the healthcare insurance act, physical and exercise therapy form part of the treatment.

Acceptability

- The guideline panel expects that conventional balance training will be accepted by all key stakeholders, since this training method is taught on the course and is therefore well known in the professional field and among patients.
- The guideline panel expects that Tai Chi will likely be accepted by the majority of key stakeholders. The acceptability will depend on the availability of the intervention in the older adult's neighbourhood, possible costs and whether the older adult is familiar with this intervention. Following online Tai Chi classes is also a possibility, if the therapist estimates that it can be done safely.
- The guideline panel expects that proactive and reactive circuit training will be accepted by all key stakeholders, provided that it is done in the conventional way (with a physical circuit). If this intervention is to be done with more advanced equipment, there will presumably be more variation in the degree to which the intervention is accepted.
- The guideline panel expects that there will be considerable variation in the degree to which an exergaming intervention will be accepted by the key stakeholders, depending on the availability and budgeting of the necessary equipment.
- The guideline panel expects that balance-board training will likely be accepted by all key stakeholders, provided that it can be done safely (e.g. with the help of a supporting bridge).

Feasibility

- The implementation of conventional balance training is regarded as realistic by the guideline panel. The intervention is simple to implement, also in a home setting and is known to most physical and exercise therapists. The costs are low.
- The implementation of Tai Chi is regarded as moderately realistic by the guideline panel. Additional training is needed for physical and exercise therapists to be able to offer this intervention. However, they can also refer to a Tai Chi teacher.
- The implementation of proactive and reactive circuit training is regarded as realistic by the guideline panel, if the step training can be done without additional equipment such as a special treadmill. The intervention is simple to implement using a variety of exercise equipment that is readily available in most practices. Possibly not all physical and exercise therapists will be familiar with the setting up of a circuit and the introduction of voluntary and unexpected step reactions; this issue can, however, be solved easily by consulting with colleagues or following a supplementary course. The costs are low, even though an extra room might be necessary which would entail extra rental costs.
- The implementation of exergaming is regarded as realistic by the guideline panel in nursing homes where sufficient financial resources are available; however, in a primary care setting, implementation is not considered realistic. Advising an older adult to purchase this equipment is not realistic either. A practice could nevertheless consider, for instance, buying a Wii Fit for the practice, so that various patients could use it. The costs are, however, high. This intervention is furthermore less suited to very frail people. Exergaming may be suitable for people who are not as easily motivated by other types of interventions. This intervention can also be offered as an alternative to create variety if purchasing is feasible.
- The implementation of balance-board training as a separate intervention is not regarded as realistic by the guideline panel. Balance-board training could, however, form part of a regular intervention, if it is in line with the patient's preferences and if it can be done safely. The costs are low and the intervention can be implemented with regular exercise equipment such as a balance trainer.

Knowledge gaps

The knowledge gap that was determined on the basis of the clinical question, is a study of fear of falling. Only 1 review had fear of falling as an outcome measure and the results were only described very summarily. There is, however, a great need in the professional field for being able to deal effectively with fear of falling. An additional PICO is:

P | frail older adults with a fear of falling
I | exercise intervention aimed at preventing falls and reducing the fear of falling
C | no intervention or an intervention that is not specifically aimed at fall prevention/reducing the fear of falling
O | fear of falling, effective aspects

In addition, there is a knowledge gap with regard to the optimal dose of balance training.

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C.4 Functional training

Literature: search and select

Research question

To answer the clinical question, a systematic literature analysis was carried out for the following research question (PICO):

What is the effectiveness of functional training compared to training without a functional component on (maintaining) physical fitness, physical mobility, activities of daily and quality of life for frail older adults?

P | frail older adults
I | functional training alone or in combination with another type of training
C | control intervention without functional training (e.g. only muscle-strength training in a gym)
O | physical fitness, functional mobility, activities of daily living (ADL) and quality of life (QoL)

Relevant outcome measures

The guideline panel considered physical fitness and functional mobility as crucial outcome measures for decision-making; and ADL and QoL as important outcome measures for decision-making. The guideline panel sees adverse events as undesirable effects. Various measurement instruments are used for comparisons based on outcome measures. It was therefore decided to apply a standardised mean difference (SMD). The threshold of clinical relevance was established at an SMD of 0.2.

Search

On 8 December 2022 an information specialist (H.W.J. Deurenberg, independent information specialist) completed a systematic search in Medline and Cinahl (see Appendix C.4.1a and C.4.1b for the search justification). This systematic search produced 612 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 567 articles were excluded. For 45 articles, the full article was then screened; eventually the search yielded 10 RCTs.

Included studies (Arrieta 2018; Arrieta 2019; Gretebeck 2019; Gronstedt 2013; Jahanpeyma 2021; Liao 2019; Parker 2015; Sales 2017; Shahtahmassebi 2019; Suikkanen 2021; Tsaih 2012)

See Appendix C.4.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix C.4.3.

Inclusion criteria

Types of studies	randomised controlled trials
Types of patients	frail older adults
Type of intervention	functional training alone or in combination with another type of training (in a context of exercise and physical training)
Type of comparison	control intervention without functional training (active control group)
Type of outcome	crucial: physical fitness & functional mobility; Important: ADL & QoL

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix C.4.4. The 10 studies in total included 1144 frail older adults. The average age of the patients varied between 69.8 and 85.0 years and the percentage of women varied from 36% to 77%. The duration of the intervention varied between 4 weeks and 12 months. There was 1 study with a varying intervention duration (discharge from hospital) of 65 days on average.
All the included studies had interventions where functional training was a component of the overall intervention. The size of this component differed between studies. Another focus area are the control conditions in many studies. For inclusion, active control interventions were chosen, as is also done in exercise and physical therapy. An answer can thus be given to the question of what the effectiveness of functional training is. Studies with a passive control group, such as advice to continue with activities of daily living, without any control intervention supervised by a physical or exercise therapist, were excluded. However, also within the 10 studies that were included, considerable differences were found in the control conditions.

Individual study quality (RoB)

The design and execution of the individual studies (risk of bias, RoB) was assessed by WG with the help of the Cochrane Risk-of-Bias tool (Higgins 2011). An overview of the study quality assessment (RoB) per study is provided in Appendix C.4.5 Risk-of-bias table.

Comparisons

The effect of functional training as part of an intervention, compared to interventions without functional training, was described in 10 studies. In both conditions (intervention and control) the study object was interventions as they are performed in the Netherlands within the context of physical and exercise therapy. An overview of the results is shown in the following SoF tables. See Appendix C.4.6a to C.4.6d for the forest plots of the 4 outcome measures. The effectiveness and evidentiary value per outcome measure are described below.

Physical fitness (timed chair test, FTSTS, 6-MWT)

In 7 studies the effectiveness of functional training on physical fitness is compared with that of non-functional training. The standardised mean difference (SMD) between the groups was 0.25 points (95% RI 0.13 to 0.38); (n=990) in favour of interventions with a functional-training component. This is regarded as a clinically relevant effect. The study by Parker (2015) was not included in the pooled effect, since the outcome on the post-test on FTST was not distributed in the normal way and for this reason was reported as median (Parker 2015). In the study by Parker (2015) both the functional-training group and the non-functional-training group showed progress in physical fitness. This meant a non-significant difference (p=0.228) in favour of the non-functional-training group.
The evidentiary value was lowered by 2 levels to low due to the differences in frailty of patients between the studies, the variation in control interventions and the threshold of clinical relevance that was exceeded by the 95% reliability interval of the pooled effect.

Certainty assessment							Number of patients		Effect		Quality of evidence	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Functional training	Non-functional training	Relative (95% CI)	Absolute (95% RI)		
Physical fitness												
7	Randomised trials	Not severe	Not severe	Severe[a,b]	Severe[c]	Not found	506	484	-	SMD **0.25 SD higher** (0.13 higher to 0.38 higher)	●●○○ Low	Crucial

RI: reliability interval MD: mean difference; SMD: standardised mean difference. a. differences in frailty status (upon inclusion); b. variation in control intervention; c. reliability interval of the pooled effect falls over the defined threshold of clinical relevance

Functional mobility (SPPB, TUG)

5 studies compared the effectiveness of functional training interventions on functional mobility with that of non-functional training interventions. The standardised mean difference (SMD) between the groups was 0.53 points (95% RI 0.30 to 0.75); (*n*=573) in favour of interventions with a functional-training component. This is regarded as a clinically relevant effect.
The evidentiary value was lowered by 1 level to fairly due to the differences in frailty of patients between the studies and the variation in control interventions.

Certainty assessment							Number of patients		Effect		Quality of evidence	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Functional training	Non-functional training	Relative (95% CI)	Absolute (95% RI)		
Functional mobility												
5	Randomised trials	Not severe	Not severe	Severe[a,b]	Not severe	Not found	291	282	-	SMD **0.53 SD higher** (0.3 higher to 0.75 higher)	●●●○ Fair	Crucial

RI: reliability interval MD: mean difference; SMD: standardised mean difference. a. differences in frailty status (upon inclusion); b. variation in control intervention

Activities of Daily Living; ADL (Barthel Index, FIM, DEMMI, Lawton's 8-item questionnaire)

In 4 studies the effectiveness of functional training on ADL is compared with that of non-functional training interventions. The standardised mean difference (SMD) between the groups was 0.29 points (95% RI 0.15 to 0.43); (*n*=783) in favour of interventions with a functional-training component. This is regarded as a clinically relevant effect. The study by Parker (2015) was not included in the pooled effect, since the outcome on the post test (DEMMI) was not distributed in the normal way and for this reason was reported as median (Parker 2015). In the study by Parker (2015) both the functional-training group and the non-functional-training group showed progress in ADL. This gives a non-significant difference (*p*=0.228) in favour of the functional-training group.

The evidentiary value was lowered by 2 levels to low based on the risk of bias in the individual studies. (Partly) unblinded studies present a risk of bias, particularly with questionnaires and self-reporting, in terms of the measurements of ADL. In addition, the threshold of clinical relevance was exceeded by the 95% reliability interval of the pooled effect.

Certainty assessment							Number of patients		Effect		Quality of evidence	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Functional training	Non-function-al training	Relative (95% CI)	Absolute (95% RI)		
ADL												
4	Randomised trials	Severe[d]	Not severe	Not severe[a,e]	Severe[c]	Not found	402	381	-	SMD **0.29 SD higher** (0.15 higher to 0.43 higher)	●●○○ Low	Important

RI: reliability interval MD: mean difference; SMD: standardised mean difference. a. differences in frailty status (upon inclusion); c. reliability interval of the pooled effect falls over the defined threshold of clinical relevance; d. unblinded studies in combination with self-reporting; e. variation in duration of intervention;

Quality of life (SF-12 PCS, physical component)

In 1 study the effectiveness of functional training on quality of life is compared with that of non-functional training interventions. It is not possible to pool this data, but for the sake of completeness, it is shown below. The standardised mean difference (SMD) between the groups over a short term was 0.09 points (95% RI 0.48 to 0.66); (*n*=48) in favour of the intervention with a functional-training component. This qualifies as a non-clinically relevant effect.

The evidentiary value was lowered by 3 levels to very low based on the risk of bias in the study. (Partly) unblinded studies present a risk of bias, particularly with questionnaires and self-reporting, in terms of the measurement of quality of life. In addition, the total effect was based on 1 small study and both thresholds of clinical relevance (on both sides of the no-effect threshold; 0-line) were exceeded by the 95% reliability interval of the total effect.

Certainty assessment							Number of patients		Effect		Quality of evidence	Importance
Number of studies	Study design	Risk of bias	Inconsist-ency	Indirect evidence	Inaccuracy	Other factors	Functional training	Non-functional training	Relative (95% CI)	Absolute (95% RI)		
Quality of life												
1	Randomised trials	Very severe[d]	Not severe	Not severe	Very severe[f,g]	Not found	27	21	-	SMD **0.09 SD higher** (0.48 lower to 0.66 higher)	●○○○ Very low	Important

d. unblinded studies in combination with self-reporting; f. based on one study; g. reliability interval of the pooled effect exceeds both defined thresholds of clinical relevance (positive as well as negative effect)

From evidence to recommendation

The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects

The crucial outcome measure physical fitness shows a clinically relevant effect with a very low quality of evidence, while functional mobility shows a clinical relevant difference with a fair quality of evidence. The important outcome measure ADL shows a clinically relevant effect with a low quality of evidence, while quality of life (QoL) shows a clinically not relevant effect with a very low quality of evidence. Three of the 4 outcome measures thus show a clinically relevant positive effect for interventions with a functional-training component. When these effects are weighed up against each other, the guideline panel considers the desirable effects of interventions with a functional-training component compared to interventions without a functional-training component as fair.

Undesirable effects

Undesirable effects due to functional training did not emerge from the literature review. The guideline panel did not establish any undesirable effects of functional training either. Therefore the guideline panel considers the undesirable effects of interventions with a functional-training component compared to interventions without a functional-training component as trivial/absent.

Quality of evidence

The quality of evidence for the four outcome measures vary from very low to fair, with a low and fair evidentiary value for the crucial outcome measures in conclusion. This brings the overall evidentiary value to 'low'. None of the studies reported undesirable effects due to the intervention with a functional-training component.
The guideline panel assesses the evidentiary value of the desirable effects as low.
The evidentiary value for undesirable effects cannot be determined.

Patient values and preferences

The guideline panel indicates that for frail older adults in particular, functional training is very suitable. Conditions for functional training are (almost) always present, whereas conditions for other intervention components, such as the availability of fitness equipment (for strength training) is not always present. In addition, frail older adults sometimes have difficulty in doing exercises with fitness equipment or weights. Functional-training exercises are also highly recognisable for patients and hold fewer risks compared to strength exercises using fitness equipment. Patients experience it as safe and enjoyable. The guideline panel also indicates that functional exercises often fit the need for assistance of the patient, such as improving walking ability or other mobility-related needs for assistance like 'turning in bed' or 'getting up from a chair'. Functional training is furthermore experienced as less burdensome compared to other intervention components and functional exercises can very effectively be transferred to the patient's own environment/home situation. Functional-training exercises are, moreover, often given as practice, so that the patient can do them in their home situation without supervision from the physical or exercise therapist. This gives the patient more flexibility, as exercises can be done at a time and on the day of their choice. The guideline panel does, however, indicate that it is important to be attentive to the transferability of the exercises to a home situation. Exercises in the home situation have the added benefit that the informal caregiver (for instance the partner or children) can supervise the patient in this regard. This gives patients the possibility to continue doing the exercises independently after the intervention period, which is something that patients enjoy. In addition, the intervention effects will last longer as a result.
The guideline panel assesses that the patients attach great value to functional training and that there is little variation among patients in this regard. The desirable effects definitely outweigh the undesirable effects (absent/trivial).

Balance between desirable and undesirable effects

Considering the positive effects of functional training on three of the four outcome measures, the absence of undesirable effects and patients' preference for training with a functional-training component, the guideline panel judges that the desirable effects definitely outweigh the undesirable effects.

Economic considerations and cost-effectiveness

The guideline panel provides several reasons why functional training saves costs. First of all, less equipment is needed for functional training. Therefore, there is no need to subscribe to a gym to do (or continue doing) functional exercises independently. Functional training is, moreover, highly suited to a home setting. It is therefore easier to keep doing the exercises. This then leads to more effective interventions and desirable effects that last longer. What is more, in a home setting, the patient can increase the frequency or intensity (if they wish) of the intervention, which could result in fewer treatment sessions with the physical or exercise therapist. This saves costs for the patient and for society. The (partial) elimination of travelling time for the patient can in some cases lead to more travelling time for the therapist (in the case of home treatment). This is not expected to lead to more travelling time in total, but will (slightly) shift the travelling time from the patient to the therapist.
The guideline panel assesses that the resources needed for functional training will save costs for society and for the patient and will be neutral for the therapist. Interventions with a functional-training component are probably cost-effective.

Equality

The guideline panel indicates that offering functional training as a component of an intervention will not lead to health differences in the group of frail older adults. It is expected that all frail older adults will benefit from the opportunity to do functional training. Considering equality and differences in healthcare, access to paramedical care do play an important role, not so much in terms of the content of the intervention (but whether or not it is functional training). For patients with cognitive frailty, functional training does not lead to greater health differences either. The guideline panel indicates that interventions are always geared to patient preferences and characteristics, even in the case of cognitive frailty. As long as patients with cognitive frailty continue to receive exercise or physical therapy, cognitive frailty will consequently not lead to greater health differences. Functional training can also take place under supervision.
The guideline panel expects that functional training will not lead to an increase or decrease in health differences (neutral).

Acceptability

As regards acceptability, the guideline panel indicates that functional training is already widely implemented, also outside the population of frail older adults. Key stakeholders have already seen and experienced the added value of functional training as a component of intervention for other populations. Healthcare insurers also appreciate the input of functional-training interventions. In addition, it is stated that healthcare insurers often support the use of functional exercises in some patient populations, for instance in Parkinson's disease care, since it seems to lead to cost savings.
It is therefore not a matter of accepting a new intervention method, but accepting an existing intervention component for a specific target group, in this case frail older adults.
The guideline panel expects that (further) implementation of functional training will be accepted by all key stakeholders.

Feasibility

The guideline panel indicates that functional exercises are already widely used in physical- and exercise-therapy interventions. Key stakeholders take a positive attitude towards this and therapists also have experience in it. This experience with interventions that contain a functional-training component will contribute to a smooth implementation. A further implementation of functional training is therefore feasible, especially seeing that it concerns an existing intervention component that is being extended to the population of frail older adults.
(Further) implementation of functional training for frail older adults is considered by the guideline panel to be realistic.

Possible additional considerations

Not applicable

Knowledge gaps

Not applicable

Sources

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C.5 Focus areas for self-management of healthy movement behaviour

Literature: search and select

Research question

To answer the clinical question, a systematic review of qualitative research was carried out on the following research question (PICO): 'According to frail older adults, what are specific focus areas with regard to improving their self-management abilities for healthy movement behaviour?'

Relevant outcome measures

The outcome measures were determined with the guideline panel: focus areas, success factors, barriers, experiences, preferences, stimulating factors and limiting factors for self-management interventions to improve movement behaviour. These outcome measures were examined through qualitative research, namely semistructured interviews, focus groups and discussion groups with frail older adults, but also with healthcare providers and/or loved ones of this population.

Search

To answer the clinical question, a qualitative systematic review of the literature was carried out.
On 6 November 2022 an information specialist (H.W.J. Deurenberg, independent information specialist) conducted a systematic search in PubMed, Medline and Psychinfo (see Appendix C.5.1 for the search justification). On 10 November and 18 November 2022, additional searches were carried out with supplementary search terms. These systematic searches produced 334 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 251 articles were excluded. For 83 articles, the full article was then screened; eventually the search yielded 12 studies (Arkkukangas 2020; Arkkukangas 2017; Blackburn 2021; Burton 2022; Ehn 2018; Greenwood-Hickman 2016; Happe 2021; Kononova 2019; Mikkelsen 2019; Pettersson 2019; Stehr 2021; Ziebart 2018). See Appendix C.5.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix C.5.3.

Inclusion criteria

Types of studies	qualitative studies
Type of population	all older adults diagnosed as frail or pre-frail with a valid measurement instrument for measuring frailty. (the setting can be older adults living at home (community-dwelling), nursing-home residents or older adults in geriatric rehabilitation care (institutional care)) and who also qualify for a self-management programme to improve their movement behaviour or who have followed a similar intervention; these interventions include one or more elements that are recommended in the Guideline on Self-Management or by healthcare providers of these older adults.
Type of intervention	not applicable
Type of comparison	not applicable
Type of outcome	focus areas, success factors, barriers, experiences, preferences, stimulating factors or limiting factors for self-management interventions to improve movement behaviour.
Type of timeline	not applicable

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix C.5.4. These 12 included studies included a total of 595 frail older adults, 2 family members, 2 dietitians and 1 physical therapist. The average age of the patients varied from 60 to 99 years and the percentage of women varied from 48 - 77%. The patients received different types of interventions, but all with elements that further self-management in order to improve their movement behaviour. The interventions varied from carrying an activity tracker to a home-exercise programme. Some patients received no intervention, but qualified for the study because they had too low a activity level, which means that they are part of the population of the guideline.

Individual study quality (RoB)

The design and conduct of the individual studies (risk of bias, RoB) were scored by MSK by means of the CASP Qualitative Checklist (Critical Appraisal Skills Programme 2018). The opinion on the various items was discussed with the subject-matter expert, after which consensus was reached. An overview of the study quality assessment (RoB) per study is provided in Appendix C.5.5 (Risk-of-bias table).

Data extraction

Two independent researchers performed the data extraction. For this purpose, they made use of the extraction table for qualitative research of Cochrane Epoc (Noyes 2007; Noyes 2011). First, the contextual details were extracted; goal, population, method, setting and outcome measures. The description of the exercise intervention was also extracted. This data can be found in Appendix C.5.4. Subsequently, all other factors were extracted. It was decided to extract 'author interpretations' from the results and conclusions of the studies, rather than individual quotes, opinions or experiences of frail older adults.

Data analysis

Atlas.ti Web (Version 5.1.2-2023-05-30) was used to analyse the extracted factors. Based on all the factors, labels were formulated inductively by the two independent researchers. Subsequently, consensus was reached. In order to place the labels within existing theoretical frameworks, a classification of the labels was then made, in consultation with the guideline panel, within the COM-B model (Capability, Opportunity, Motivation, Behaviour) and using the behaviour change taxonomy of Michie et al. (Michie 2013; Michie 2014). This model and this taxonomy are widely supported frameworks in the field of behaviour change and self-management. The labels were clustered into topics. This classification can be found in Appendix C.5.7. The results were then summarised in Table C.5.1 under 'Results and confidence in the evidence'.

Results and confidence in the evidence

The confidence in the evidence was assessed using the GRADE CERQual method. This is the GRADE tool that is used to assess the quality of qualitative studies by evaluating each subtopic by four criteria: methodological quality, coherence, adequacy and relevance. The end assessment shows how much confidence there is in the opinion of the frail older adult and whether the subtopic has an impact on maintaining healthy movement behaviour in the frail older adult. This end assessment is included per topic in Table C.5.1. The substantiation of the assessment is described in Appendix C.5.6.

Table C.5.1 | **Overview of main and subtopics with regard to self-management for healthy movement behaviour**

Main topics and subtopics	Explanation	Studies
Individual characteristics with regard to mobility (based on the COM-B model)		
Capability	Consists of physical and psychological capability. • Physical capacity is determined through physical complaints due to frailty, multimorbidity, fatigue and pain • Psychological capacity is determined through discipline, uncertainty due to own frailty and the fear of falling. Confidence in the evidence: Moderate	Arkkukangas (2017) Blackburn (2021) Burton (2022) Greenwood-Hickman (2016) Mikkelsen (2019) Pettersson (2019) Stehr (2021) Ziebart (2018)
Motivation	Consists of reflective and automatic motivation. • Reflective motivation is determined by the amount of interest or disinterest in the intervention. Older adults find it difficult to change their behaviour, find themselves too old or think that they can do it themselves and therefore do not want any help. They do, however, find it pleasant to have their own responsibility for the exercises. • Automatic motivation is determined by intrinsic motivation. Older adults may enjoy sedentary habits and therefore have no motivation to carry out the intervention. The fact that the exercises are not fun may have an influence on this. Motivation can be increased by routine. Confidence in the evidence Fair	Arkkukangas (2017) Arkkukangas (2020) Burton (2022) Blackburn (2021) Ehn (2018) Greenwood-Hickman (2016) Kononova (2019) Pettersson (2019) Stehr (2021) Ziebart (2018)
Opportunity	Consists of the physical and social environment. • The physical environment is made up of many factors; e.g. weather, facilities in and passability of the neighbourhood and the physical accessibility of the practice. At home, adaptability and space play a role. Opportunities for participating in a programme, financial possibilities and the time that healthcare staff have at their disposal are also determining factors. • Social environment is about social support, for example, in the personal environment and from healthcare staff. Older adults have too little time due to social engagements and may be ashamed of not undertaking enough physical activity. Tension in exercise groups is also indicated as a contributing factor. Confidence in the evidence Fair	Arkkukangas (2017) Burton (2022) Blackburn (2021) Ehn (2018) Greenwood-Hickman (2016) Happe (2021) Kononova (2019) Mikkelsen (2019) Stehr (2021) Ziebart (2018)
Characteristics of the intervention (based on the Behaviour Change Technique taxonomy)		
1 Goals and planning	Consists of goal setting, action planning and reviewing of behaviour goal(s) • Goal setting, which consists of defining outcome and/or behaviour goals, is often mentioned as a component of the intervention that will ensure higher motivation during the intervention. • Action planning means that it is easy to plan the intervention within ADL, partly due to the clear structure of the intervention. • Reviewing behaviour goal(s) involves goals that can be adjusted to the older adult's level. It is also pointed out that in the case of a higher onset level, there may be less change in the movement behaviour. Confidence in the evidence High	Arkkukangas (2017) Arkkukangas (2020) Blackburn (2021) Burton (2022) Ehn (2018) Greenwood-Hickman (2016) Happe (2021) Mikkelsen (2019) Pettersson (2019) Stehr (2021) Ziebart (2018)

Main topics and subtopics	Explanation	Studies
2 Feedback and monitoring	Consists of feedback on behaviour, self-monitoring of behaviour and feedback on outcome(s) of behaviour • Feedback on behaviour refers to the feedback that is given with regard to safety (e.g. drinking enough water) and the fact that exercises are supervised by the therapist. • Self-monitoring of behaviour means that the person monitors their own progress so that the next goals can be reached: becoming more aware of own movement behaviour, pressure to do exercises and motivation to do exercises. • With regard to feedback on outcome(s) of behaviour, it is underlined that it is important to give feedback that is easy to understand. Confidence in the evidence Fair	Arkkukangas (2020) Arkkukangas (2017) Blackburn (2021) Ehn (2018) Greenwood-Hickman (2016) Happe (2021) Kononova (2019) Mikkelsen (2019)
3 Social support	Consists of social support (unspecified), which pertains more specifically to a group of older adults with more or less the same level of mobility who follow the intervention together or who exercise together. It could also be just one sports buddy. The older adults will team together in the long term, which enables them to share challenges and increases their motivation to maintain healthy movement behaviour. The social support and a sense of community will also give the older adult a sense of belonging. Confidence in the evidence Fair	Arkkukangas (2020) Blackburn (2021) Ehn (2018) Greenwood-Hickman (2016) Happe (2021) Kononova (2019) Mikkelsen (2019) Stehr (2021) Ziebart (2018)
4 Shaping knowledge	The label instruction on how to perform behaviour looks at the instructions and information on exercises that older adults would like to receive. It is noted, however, that instructions for familiar exercises do not need to be too detailed. Confidence in the evidence Very low	Arkkukangas (2020) Ziebart (2018)
5 Natural consequences	Information about health consequences refers to the information that older adults would like to receive regarding the consequences of ageing and the importance of doing exercises in this process. Confidence in the evidence Low	Greenwood-Hickman (2016) Happe (2021) Pettersson (2019)
6 Comparison of behaviour	Consists of demonstrations of the behaviour that present exercises easily to the older adult. More specifically, the exercises are presented visually. Confidence in the evidence Low	Arkkukangas (2020) Happe (2021)
7 Associations	This is a component of prompts or cues, where different types of reminders during the intervention ensure that the older adult moves more at home. It includes alarm clocks, reminders from an app, a booklet or self-monitoring. Confidence in the evidence Low	Arkkukangas (2017) Arkkukangas (2020) Burton (2022) Ehn (2018) Greenwood-Hickman (2016) Happe (2021) Pettersson (2019)

Main topics and subtopics	Explanation	Studies
8 Repetition and substitution	Consists of behaviour substitution, habit formation, generalisation of target behaviour and graded tasks • Strategies for keeping up movement behaviour after the intervention and offering exercises that are appropriate for the home setting generally fall under this topic. • With regard to behaviour substitution, presenting exercises is mentioned as an alternative to daily physical activities. • Habit formation consists of the motivation that arises from routine and the fact that the older adult wants to be familiar with the exercises. • Generalisation of target behaviour refers to doing the exercises in daily life. • With regard to graded tasks, the absence of supervision for progress is mentioned. Confidence in the evidence Fair	Arkkukangas (2017) Arkkukangas (2020) Blackburn (2021) Greenwood-Hickman (2016) Happe (2021) Mikkelsen (2019) Pettersson (2019) Ziebart (2018)
10 Reward and threat	Social rewards include feedback that is given in the form of, for example, awarding smileys or stars. This stimulates people to reach goals. Confidence in the evidence Low	Happe (2021) Arkkukangas (2020) Ehn (2018)
Follow-up care	It was pointed out that the interventions that were offered were experienced as being too short and that there is a need for 6-12 months' follow-up care. There was also a need for information on facilities available after the intervention. Confidence in the evidence Low	Blackburn (2021) Greenwood-Hickman (2016) Happe (2021)
Other focus areas		
Qualities and characteristics of the therapist	A good relationship with the therapist is important and includes empathy, trust and a positive attitude. The older adult wants to be heard and supported and have the opportunity to ask for help with exercises. Progress supervision is also mentioned. The exercises must be presented in a pleasant way and match the older adult's fields of interest. Therapists mention that they are sometimes wary of letting the older adult move. Confidence in the evidence Low	Arkkukangas (2017) Blackburn (2021) Burton (2022) Greenwood-Hickman (2016) Pettersson (2019) Ziebart (2018)
Intervention effects	Comprises internal and external consequences. • Internal consequences are increased awareness of the importance of exercises to counter functional deterioration. Self-monitoring can also increase someone's awareness of their own movement behaviour. Positive physical and mental consequences are felt as a consequence of the exercise intervention. • External consequences are increased awareness of the influence that the environment has on negative behaviour (sedentary habits) and experiencing positive social consequences as a result of the exercise intervention. Confidence in the evidence High	Arkkukangas (2017) Arkkukangas (2020) Blackburn (2021) Burton (2022) Ehn (2018) Greenwood-Hickman (2016) Kononova (2019) Mikkelsen (2019) Pettersson (2019) Stehr (2021) Ziebart (2018)

Main topics and subtopics	Explanation	Studies
Technology-related factors	Consists of user-friendliness of technology and experiences with technology • In terms of user-friendliness of technology, it is stated that people appreciate it if exercises can be presented in a simple way and that it is important to be able to use them easily in ADL. Support is important here and older adults often still encounter design problems. • The experienced mentioned vary: It is noted that older adults might feel that they are being watched. Some older adults furthermore do not trust technology and the use of it causes them stress. There is, moreover, the fear that they might break the technology. Technology that does not work sometimes causes frustration. This balanced in part by user-friendliness and the ability able to monitor progress with the help of technology. Confidence in the evidence Low	Arkkukangas (2020) Ehn (2018) Happe (2021) Kononova (2019) Pettersson (2019)

From evidence to recommendation

The component 'from evidence to recommendation' contains eight criteria that are listed below.

Criteria

Relevance of the topics (desirable and undesirable effects)

With regard to the current qualitative research design, desirable and undesirable effects of the intervention are interpreted as factors/focus areas/topics that in the opinion of the patient/therapist have a positive or negative impact on movement behaviour. In this respect, the guideline panel assesses, on the basis of the points following from the literature review, how relevant the topic is for the movement behaviour of the older adult.

Individual characteristics with regard to movement

- The guideline panel considers that the subtopics that fall under the main topic of individual characteristics regarding movement behaviour (Capability, Motivation and Opportunities) are very relevant for the movement behaviour of the frail older adult.

Intervention characteristics

- The guideline panel considers that 'Goals and planning' are very relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Feedback and monitoring' are relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Social support' is very relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Shaping knowledge' is relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Natural consequences' are relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Comparison of behaviour' is somewhat relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Associations' are relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.

- The guideline panel considers that 'Repetition and substitution' are relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Reward and threat' are somewhat relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Follow-up care' is relevant as an intervention characteristic for stimulating movement behaviour in frail older adults.

Other focus areas

- The guideline panel considers that 'Qualities and characteristics of the therapist' are relevant as a focus area for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Intervention effects' (e.g. increased awareness of movement behaviour as an intervention effect) are relevant as a focus area for stimulating movement behaviour in frail older adults.
- The guideline panel considers that 'Technology-related factors' are somewhat relevant as a focus area for stimulating movement behaviour in frail older adults.

Confidence in the evidence (quality of evidence)

Confidence in the evidence was assessed by means of the GRADE CERQual analysis:

- For the topics 'Goals and planning' and 'Intervention effects' there is high confidence in the evidence.
- For the topics 'Individual characteristics with regard to mobility ' (Capability, Motivation and Opportunity), 'Feedback and monitoring', 'Social support' and 'Repetition and substitution', there is fair confidence in the evidence.
- For the topics 'Natural consequences', 'Comparison of behaviour', 'Associations', 'Follow-up care', 'Qualities and characteristics of the therapist' and 'Technology-related factors', there is little confidence in the evidence.
- For the topic 'Knowledge shaping' confidence in the evidence is very low.

Patient values and preferences

The guideline panel assesses the values and preferences of patients according to their insights into everyday practice in the Netherlands. Accordingly, to what extent do the values and preferences submitted by patients from the international study also apply to patients in the Dutch practice?

Individual characteristics with regard to mobility

- The guideline panel considers that patients attach great value to paying attention to individual characteristics with regard to mobility (Capability, Motivation and Opportunity) and that the Capability component displays considerable variation between patients and moderate variation in terms of Motivation and Opportunity.

Intervention characteristics

- The guideline panel assesses that the patients attach great value to the intervention characteristic 'Goals and planning' and that there is moderate variation between patients in this regard. The guideline panel expects that the value that patients attach to 'Goals and planning' depends on the cognitive capability of the patient.
- The guideline panel assesses that the patients attach great value to the intervention characteristic 'Feedback and monitoring' and that there is considerable variation between patients in this regard. The guideline panel expects that the value that patients attach to 'Feedback and monitoring' depends on the involvement and interest of the patient in their own treatment track.
- The guideline panel assesses that the patients attach great value to the intervention characteristic 'Social support' and that there is moderate variation between patients in this regard.
- The guideline panel assesses that the patients attach reasonable value to the intervention characteristic 'Knowledge shaping' and that there is moderate variation between patients in this regard.

- The guideline panel assesses that the patients attach reasonable value to the intervention characteristic 'Natural consequences' and that there is considerable variation between patients in this regard. The guideline panel expects that the value that patients attach to 'Feedback and monitoring' depends on the interest of the patient in the consequences.
- The guideline panel assesses that the patients attach reasonable value to the intervention characteristic 'Comparison of behaviour' and that there is little variation between patients in this regard.
- The guideline panel assesses that the patients attach reasonable value to the intervention characteristic 'Associations' and that there is considerable variation between patients in this regard. The guideline panel expects that the value that patients attach to 'Associations' depends on the patient's cognitive ability and that patients who are cognitively less sharp attach more value to this intervention characteristic.
- The guideline panel assesses that the patients attach great value to the intervention characteristic 'Repetition and substitution' and that there is moderate variation between patients in this regard.
- The guideline panel assesses that the patients attach reasonable value to the intervention characteristic 'Reward and threat' and that there is moderate variation between patients in this regard.
- The guideline panel assesses that the patients attach great value to the intervention characteristic 'Follow-up care' and that there is considerable variation between patients in this regard. The guideline panel expects that the value that patients attach to 'Follow-up care' depends on the phase of condition in which they are and that patients in an acute phase are likely to attach more value to this intervention characteristic than patients in a chronic phase.

Other focus areas

- The guideline panel assesses that the patients attach great value to the intervention characteristic 'Qualities and characteristics of the therapist' and that there is little variation between patients in this regard.
- The guideline panel assesses that the patients attach great value to the intervention characteristic 'Intervention effects' (e.g. increased awareness of movement behaviour as an intervention effect) and that there is moderate variation between patients in this regard. The guideline panel expects that the value that patients attach to 'Intervention effects' depends on the cognitive status of the patient, since the patient must be able to understand the impact of these effects in order to attach value thereto.
- The guideline panel assesses that the patients attach reasonable value to the intervention characteristic 'Technology-related factors' and that there is considerable variation between patients in this regard. The guideline panel expects that the value that patients attach to 'Technology-related factors' depends on the patient's technological capabilities and interest.

Balance between desirable and undesirable effects

From the literature review it appeared that there may be undesirable effects for a few factors if these are used in the treatment:

- Reward and threat: possible undesirable effects are that smileys and stars may be seen as childish by the patient and will therefore not be motivating for the improvement in healthy movement behaviour. The guideline panel does, however, expect that the desirable effects are likely to outweigh the undesirable effects, depending on the way the feedback and rewards are given and whether these are suited to the patient. Rewards can, moreover, be determined together with the patient, to ensure that they are suited to the patient.
- Technology-related factors: undesirable effects are that older adults might feel watched, that the use of technology may cause stress, that some older adults do not have any confidence in technology and that they may be wary of breaking the technology. Technology that does not work could, moreover, cause frustration. Technology that is user-friendly, however, may well be a positive factor for moving more, partly due to the interest that some older adults have in being able to monitor their progress with the use of technology.
- The guideline panel came to the assessment that the desired effects probably outweigh the undesirable effects. This will depend on the patient to whom the technology is offered in the treatment. The guideline panel, for instance, expects that for patients with a language barrier, patients with an insufficient understanding or a fear of technology and patients with cognitive problems, the undesirable effects are likely to outweigh the desirable effects.

Economic considerations and cost-effectiveness

For each main topic of the intervention, the guideline panel made an estimate of the volume of resources needed.

- The guideline panel assesses that the resources needed for questioning and discussing individual characteristics with regard to movement (Capability, Motivation and Opportunity) amount to savings. Asking questions about and identifying characteristics take time, but will ensure a more specific implementation of the treatment.
- The guideline panel assesses that the resources needed for making use of the various intervention characteristics will amount to savings, provided that these characteristics are used effectively. If these are not used effectively, the necessary resources will be negligible.
- The guideline panel assess that the resources needed for the use of technology (e.g. activity trackers, apps or online programs) by the older adult are substantial or moderate, depending on the cost of the apps or activity trackers that are used.

Based on the current literature review, it is not possible to decide whether the exercise intervention as a whole or broken up into different intervention characteristics is cost-effective.

Equality

The guideline panel estimated for each main topic how the use thereof in the intervention would impact health equality.

- The guideline panel expects that asking questions about and discussing individual characteristics with regard mobility will lead to a possible increase in health equality.
- The guideline panel expects that making use of the various intervention characteristics will lead to a possible increase in health equality.
- The guideline panel expects that the use of technology (e.g. activity trackers, apps or online programs) by the older adult will lead to a possible decrease in health equality due to the difference in understanding of technology between older adults and a potential lack of financial means.

Acceptability

- The guideline panel expects that asking and talking about individual characteristics with regard to mobility (Capability, Motivation and Opportunity) will be accepted by all key stakeholders, since it is already largely done in practice.
- The guideline panel expects that the implementation of the various intervention characteristics by all key stakeholders will be accepted, because these characteristics are already known in practice and are already implemented to a greater or lesser degree.
- The guideline panel expects that the use of technology in exercise interventions will probably be accepted by the majority of key stakeholders, since there are still some focus areas regarding implementation, such as the use thereof in the treatment itself, how reimbursements would work and how measurement data can be securely stored and processed.

The guideline panel considers the topics 'Intervention effects' and 'Qualities and characteristics of the therapist' not to be applicable for the assessment of acceptability.

Feasibility

- The guideline panel considers that asking and talking about 'Individual characteristics with regard to mobility' is realistic. The costs are low and paying attention to these characteristics is something that is already done to a large extent in practice, which means that the acceptability thereof is also good.
- The guideline panel considers the application of 'Intervention characteristics' as realistic. The costs are low, the factors are good for application in a home setting and are already applied to a greater or lesser extent in practice, which means that it will be widely accepted.
- The guideline panel considers that taking account of desirable 'Qualities and characteristics of the therapist' is realistic, since physical and exercise therapists learn this during their training and therefore have the skills to apply it.

- The guideline panel considers the use of technology within the exercise-/physical-therapy intervention as probably realistic. Therapists must take the patient's cognitive capability and interests into account before technology is proposed. The costs of technology are moderate to high and there are many factors that must be taken into account, such as reimbursements and safeguarding of measurement data. At the same time, there are options that have been and are being developed specifically for (frail) older adults.

Additional literature

Many of the outcomes of the literature review correlate with the Barrier Analysis report (resulting from the focus groups and individual interviews organised by the Patient Federation Netherlands and Alzheimer Nederland, (Patientenfederatie Nederland 2021)), the report *Werkzame elementen van beweeginterventies voor 55-plussers* (Nijland 2018) and the e-book *Bevorder de zelfredzaamheid van kwetsbare ouderen met bewegen van Kenniscentrum Sport & Bewegen* (Preller 2021). The 'individual characteristics with regard to movement' are mentioned in all documents as impediments to older adults' mobility. It is, moreover, stated that a personal approach during the intervention (based on the characteristics of patients) is essential for motivating frail older adults to move (Nijland 2018; Patientenfederatie Nederland 2021; Preller 2021). This is in line with the conclusion of the report that behaviour-change techniques (BCTs) that have been studied and found to be less effective with frail older adults might well be stimulating for healthy movement behaviour if a personal approach is followed (Nijland 2018). In this way, good use can be made of the 'intervention characteristics' based on BCTs and 'other factors' in the treatment of frail older adults. In the report and e-book, concrete examples are provided of the way in which these elements can be applied in practice.

Knowledge gaps

When answering the research question and in the subsequent EtD process, a number of knowledge gaps were brought to light. In the literature search there were, for example, no results for the stimulation of health movement behaviour in frail older adults through the system of family and informal caregivers surrounding the frail older adult. The results were collected from frail older adults and pertained to frail older adults or to the therapist. The results furthermore revealed nothing about the effectiveness of applying the focus areas that the frail older adult finds important in the intervention for furthering and maintaining healthy movement behaviour. This is therefore a second language gap.

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D Occupational therapy

D.1 Identifying factors relevant to frailty

Literature: search and select

Research question

Which information must an occupational therapist identify to get a holistic picture of the frail older adult and to decide on a treatment goal together with the older adult? And how must the occupational therapist set up the process to gather this information systematically?
To answer these research questions, a systematic review was performed. The following criteria were used for this:

P	(Population)	frail older adults
I	(Intervention)	necessary information specific to the target group that must be identified by a professional to get a picture of the frail older adult, their environment and their activities
O	(Outcome)	a holistic picture of the frail older adult and/or loved ones in relation to the person, environment and activities

P	(Population)	frail older adults
I	(Intervention)	a methodical occupational-therapy process of information collection
O	(Outcome)	a model or process

Relevant outcome measures

Considering the exploratory nature of the clinical question, only information that is relevant to identify with regard to frail older adults was looked at. In this stage, the effect of collecting certain information within the treatment was disregarded. Outcome measures or effects were therefore not looked for. All factors pertaining to the person, activities and environment that were identified through the literature review were considered important by the guideline panel within the occupational-therapy treatment. All reported process steps and/or process models to give shape to the treatment are also considered important by the guideline panel. These factors are weighted during the EtD process.

Search

To answer the research question, a systematic review of the literature was carried out. The data found is presented in a descriptive way.

An information specialist carried out a search on 30 June 2022 to find systematic reviews (SRs) on occupational therapy for (frail) older adults in PsycInfo and Medline (see Appendix D.1.1 for the search justification). On 24 October 2022, a supplementary search was done in PsycInfo and Medline to find primary studies on information and process steps that an occupational therapist can use to get a holistic picture of the frail older adult and their loved ones. This systematic search produced 389 unique hits. After screening by two assessors of the titles and summaries based on the inclusion criteria (see table below), 357 articles were excluded. For 55 articles, the full text was screened; eventually the search yielded 22 studies that met the inclusion criteria (Carrier 2012; Dickerson 2014; Hoyle 2016; Kessler 2019; Lauckner 2014; Lewis 2021; Lund 2012; Moats 2007; Murdock 2015; Norberg 2014; Norberg 2017; Nygard 2004; Provencher 2020; Raber 2019; Schiavi 2018; Tollen 2008; Tuntland 2017; Waddell 2016; Walder 2017; Waldersen 2017; Williams 2013; Wressle 2002). In addition, the results of the search for SRs of module 3 were consulted for further relevant articles. 3 relevant SRs came out of this, of which 2 were included based on the selection criteria (Engels 2021; Schoessow 2010). See Appendix D.1.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix D.1.3.

Inclusion criteria

Types of studies	primary studies and systematic reviews
Type of population	frail older adults
Type of intervention	n/a
Type of comparison	n/a
Type of outcome	holistic picture of a frail older adult
Type of timeline	no restriction on date of publication

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix D.1.4. The 24 included studies, of which 22 are primary studies with different study designs and 2 systematic reviews, included at least 1,992 participants. In three studies, the number of participants were not reported. Participants had various conditions and in many cases co-morbidities, such as cerebrovascular diagnosis, cardiopulmonary diagnosis, orthopaedic/musculoskeletal diagnosis, Parkinson's disease, respiratory conditions, hearing or sight problems, cancer and/or dizziness/balance problems. The average age of the participants varied between 59 and 90 years and the percentage of women varied from 31% to 91%. In three studies, occupational therapists were included as participants, with a total of 23 active occupational therapists participating.

Individual study quality (RoB)

The Risk-of-Bias tool was not used to score the literature. The assessment of individual study quality is not relevant to this clinical question, as the quality of the studies has no impact on the extracted data. From the selected literature the factors and process steps were extracted that are important for collecting information on the frail older adult in order to be able to offer a qualitative occupational-therapy treatment.

Effectiveness and evidentiary value

Data extraction and quality assessment

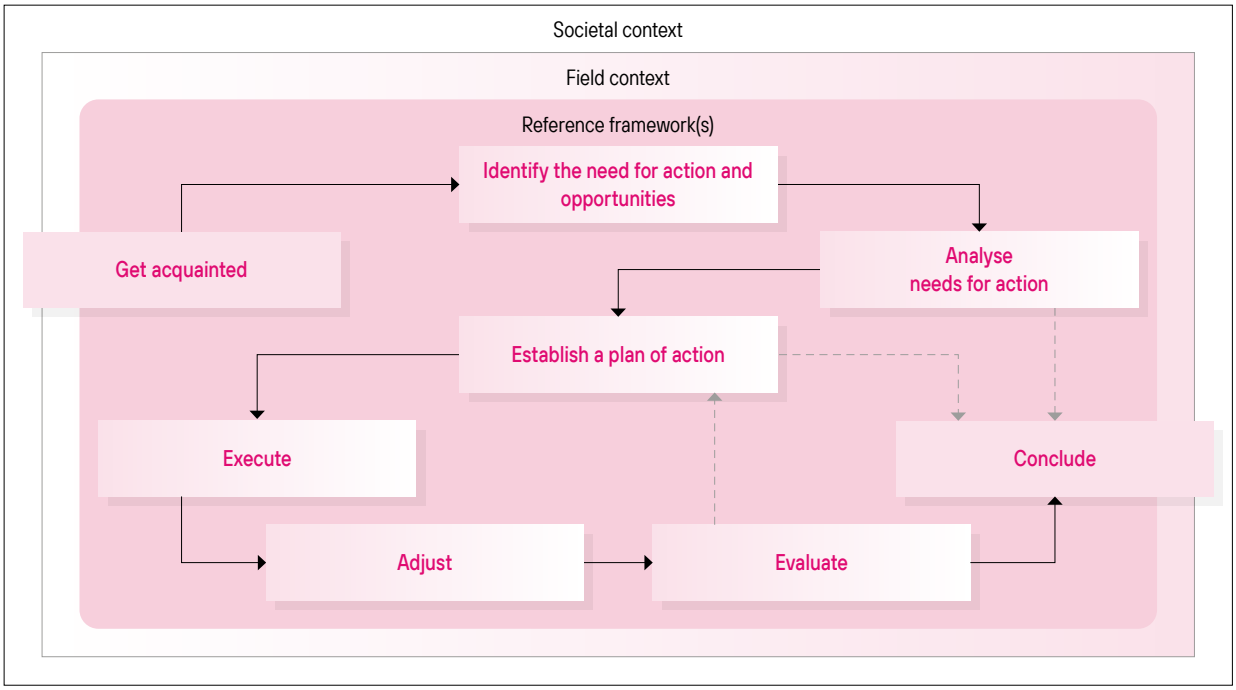
One researcher (Cochrane Netherlands) extracted the relevant data from each selected study: country, purpose of the study, study design, in- and exclusion criteria, characteristics of the study population, potentially used theory, model or framework and data with regard to information and process that are relevant for an occupational therapist to form a holistic picture of the frail older adult and the treatment goal.
The methodological quality of the selected studies was in general not assessed. The quality of the study design has no relationship with the extracted data of the clinical question and is therefore not relevant to be assessed. If there was any doubt about the extracted data, a second researcher was consulted (Cochrane Netherlands). The outcomes were presented to the guideline panel to verify the validity of the results.

Summary of the results

The results were summarised qualitatively by means of an inductive thematic analysis. The extracted text on the information to be collected by occupational therapists was classified by one researcher (Cochrane Netherlands) into differentiating items. These items were then grouped under overarching topics. The classification was then submitted to a second researcher (Cochrane Netherlands) and after discussion, the final classification was submitted to and approved by the guideline panel and subject-matter experts. The results of the process steps were analysed in a comparable way, classifying according to the Canadian Practice Process Framework (CPPF), which is an occupational-therapy process model (le Granse 2017; van Hartingsveldt 2022). This model was chosen because it focuses specifically on occupational

therapy and describes various steps in a comprehensive way. Figure D.1.2 gives a schematic presentation of the phases of clinical reasoning as defined in the CPPF model.
The results are shown in Tables D.1.1 and D.1.2. Based on this, conclusions were formulated.
Due to the extent of the clinical question and the diversity in types of studies, no level of confidence in the evidence according to the GRADE(-CERqual) method was assigned to each review finding (Lewin 2018) (Lewin 2018a; Lewin 2018b). The components of the GRADE-CERQual method (limits of the method, coherence, adequacy (amount and wealth) of the data and significance) are, however, looked at in a short discussion section.

Discussion



Source: Grondslagen van de ergotherapie (Foundations of occupational therapy) (2017)

Figure D.1.2 | **Occupational-therapy process model**

Aspects to be considered when interpreting the results of this systematic view based on the four components of GRADE-CERQual, which are useful for determining the degree of confidence in the evidence:

- *The methodological quality of the studies* was not assessed. When assessing the methodological quality of an article, possible bias of the results in relation to the research question of the study are looked at. The research question of the included studies often did not correspond with the clinical question for the guideline. From all the studies, we extracted the data that is relevant for answering the clinical question for the guideline, regardless of the research question of the study. Accordingly, an assessment of the methodological quality says nothing about a possible bias with regard to the extracted results.
- *Coherence (correlation between the data from the studies and the ultimate, overarching review finding).* Due to the fact that all relevant data from the included studies was given a place in the tables with overarching topics, the coherence is high. All mentioned data to be included contribute to the holistic
  picture of the (frail) older adult. The process steps that were mentioned are embedded in the process of clinical reasoning and may therefore extend beyond the process of data collection and determining a treatment goal.
- *Adequacy of the data (amount and wealth of data that support the review finding).* In the result tables the number of studies that are linked to the topics and the description and number of subtopics are indications of the amount and wealth of data.

- *Relevance (degree to which the data from studies applies to the context of the clinical question; for example, perspective or population, the studied phenomenon and the setting).* All results come from studies with an occupational-therapy perspective where the focus lies on older adults or people with chronic diseases over the age of 65. Most of the studies focus specifically on one certain disease, such as a stroke, a sight problem, cancer and Parkinson's disease. In some studies this led to specific information that does not fully apply to the entire population of frail older adults. This applies to a lesser extent to the results of the process steps. Where possible, the topics and subtopics were formulated generically. With specific data, the results refer to the study in question.

Table D.1.1 | **Overarching topics with regard to the necessary data of the person (*n*=20 studies)**

Main topic and subtopics	Factors	Studies
Person		

Personal factors/life-course-determinants	• Gender and age
	  - Female gender is positively associated with higher COPM-P&S scores following an occupational-therapy intervention (Tuntland 2017)
	• Marital status
	• Living conditions (single, with a partner, etc.)
	• Education level
	• Current job status
	• **Life story/life events**
	• Preferences, interests and changes therein
	• Personal choices and goals (linked to (social) activities, pain/symptoms, use of strategies or living situation)
	• Motivation
	  - Greater willingness to change was positively associated with the attainment of goals (Waldersen 2017)
	• Knowledge of and need for information on disease and activities
	• Self-confidence
	• Extent to which someone makes an effort to organise and plan things
	• Interpersonal characteristics that can have an impact on the performance of daily activities:
	  - Willingness to take risks
	  - Communication style, verbal and non-verbal
	  Capacities to interact, communicate needs, express emotions and feelings, and trust others
	  - Need for control, preference for autonomy in the relationship
	  - Reaction (capacity) to change and challenge, capacity to adapt, reaction to differences in people
	  - Preferences and possibilities with regard to giving and receiving feedback
	  - Preference for interaction, trusting other people and receiving physical contact
		Hoyle (2016)
		Norberg (2017)
		Schiavi (2018)
		Tuntland (2017)
		Lund (2012)
		Provencher (2020)
		Raber (2019)
		Walder (2017)
		Waldersen (2017)
		Williams (2013)

Physiology (of disease or age)	• Type of disease(s) (e.g. cancer, stroke, Parkinson's disease, heart failure) • Severity of the disease • Course of the disease (e.g. time since stroke until discharge to rehabilitation setting or home setting) • **Symptoms of the disease, co-morbidities or age, including fatigue, pain or skin condition** • Energy level • **Sleep pattern and fatigue in general**	Schoessow (2010) Engels (2021) Murdock (2015) Norberg (2014) Norberg (2017) Schiavi (2018) Provencher (2020) Waldersen (2017)

Main topic and subtopics	Factors	Studies
Physiology (of disease or age) *(continued)*	• **Nutritional status** • Pain - A higher amount of pain is negatively associated with the achievement of goals (Waldersen 2017) - The presence of pain predicted worse COPM-P&S scores after an occupational-therapy intervention (Tuntland 2017) • Co-morbidity - A fracture, neurological condition other than a stroke, dizziness of balance problems as the main conditions, and discomfort, anxiety or depression predicted worse COPM-P&S scores after an occupational-therapy intervention (Tuntland 2017)	Tuntland (2017) Lund (2012)
Motor skills	• **Physical (im)possibilities, posture, body functions, physical capacity, endurance, walking ability**	Schoessow (2010) Schiavi (2018) Nygard (2004) Provencher (2020)
Sensory skills	• **Sight, sense of touch and feeling, smell and hearing decrease as a person grows older**	Schoessow (2010) Dickerson (2017)
Cognitive functioning	• **Executive (dys)function(s)** • **Memory (loss)** • **Attention span** • **Learning capacity** • **Concentration ability** • **Understanding (of disease)** • **Emotion regulation** • **Cognitive flexibility** • **Impact of cognition on the safe performance of activities** - Older adults with mild cognitive issues benefit more from the HOME intervention than those without cognitive issues (Provencher 2020)	Schoessow (2010) Murdock (2015) Tollen (2008) Lund (2012) Nygard 2004; Provencher (2020) Dickerson (2014)
Psychological functioning	• Positive or negative mental state (depression, stress and anxiety) • Resilience • **Coping strategies:** Which are spontaneously applied by the person and with which do they have more difficulty? These coping strategies influence a person's ability to adapt. Holding on to the hope of once again being able to perform an activity is crucial in reaching for one's limits and improving. Coping strategies mentioned are: - Adapting activities, pacing, setting priorities, planning, explaining to others (about disease/possibilities), asking/getting help from others, use of humour, physical contact, expression of anger, stirring oneself, keeping hope and considering yourself fortunate • **Feelings and emotions:** Disease and functional loss can lead to various emotions and feelings and are influenced by coping strategies and personality. Emotions and feelings mentioned are: - Anger, fear or concern, despondency, fear of falling - Feeling of meaninglessness, emptiness due to a lack of (opportunities for) meaningful activities (alienation) - Feeling of exclusion due to physical impairments (marginalisation)	Schoessow (2010) Murdock (2015) Norberg (2014) Norberg (2017) Schiavi (2018) Tollen (2008) Tuntland (2017) Lewis (2021) Lund (2012) Walder (2017) Williams (2013)

Main topic and subtopics	Factors	Studies

Psychological functioning *(continued)*	- Different emotions that go with different phases of a disease, for example, with a stroke (Williams 2013):
	  - Shock phase
	  - Phase in which a person's life changes
	  - Phase in which the person continues with their life and must continue to do their best
	• Mental fatigue	

Quality of life	• General quality of life or related to health	Engels (2021) Tuntland (2017)
Meaning	• Meaning or spirituality has to do with finding a purpose in the activities that someone does in life and being involved in meaningful activities in their own (social) environment and finding fulfilment in these activities • Older adults occupy themselves with living wills and long-term care due to their age and health • People with a chronic disease, such as Parkinson's disease, describe their spiritual experience as living with daily uncertainty, making plans for the future and ensuring a meaningful life	Schoessow (2010) Murdoch (2015) Hoyle (2016) Lewis (2021) Tollen (2008)
Daily actions/activities		

Activities	• Wishes of a person with regard to performing meaningful (daily) activities
	• **Changes in activity (reduced activity) due to age, disease or changes in interest, such as falling (fall prevention, falls risk)**
	• **Activities that a person can still perform (despite impairments and/or disease)**
	• Types of activities
	  - Leisure/free time
	  - Rest/sleep
	  - Housekeeping
	  - ADL and IADL
	  - Self-care
	  - Communication
	  - Mobility inside and outside the home
	  - Activities to prevent deterioration, both mental and physical
	• Intensity of activities (low, medium, high)
	• Amount of activities (time per week)
	• Satisfaction with activity
	• Performance of activity, including:
	  - Degree of (in)dependence in performing activities
	  - Amount of (extra) time and effort required for an activity, for how long a person can continue with an activity
	• Relevance of, importance of, pleasure in and value of an activity for the person
	• Balance/imbalance: no activities or a lack or surplus of activities
	• Alternative solutions if someone cannot perform and activity
	• **Support needed from the social/physical environment to perform activities**
		Engels (2021)
		Murdock (2015)
		Norberg (2017)
		Schiavi (2018)
		Tollen (2008)
		Wressle (2002)
		Tuntland (2017)
		Lewis (2021)
		Lund (2012)
		Nygard 2004;
		Waddell (2016)
		Waldersen (2017)

Main topic and subtopics	Factors	Studies
Mobility outside and transport	• Mobility outside and use of transport, e.g. car • Driving a car: for this, strategic abilities (e.g. determining the purpose of a journey, navigation), tactical skills (making decisions while driving, adapting to weather conditions) and operational skills (operating the car, visual and motor skills) influence and are influenced by physical, sensory and cognitive factors, emotion regulation and insight	Lund (2012) Dickerson (2014)
Environment		
Social environment	• The social sphere can be divided into various sub-spheres: cultural and social policy in the neighbourhood, social support, both instrumental and emotional, and social capacity (social network) • In the social sphere the concept of 'community' is described: the physical environment, people in the environment and the social network and meaning that a person gives to it • A social life consists of social activities and social networks, where a person makes contact with others, such as: work, leisure time, support from family and friends and support from professionals, institutions or society - After a HOME intervention, older adults with the support of family have improved participation, while older adults without support have no improved participation (Provencher 2020) • The size of a social network (from one person or within a community) determines how much social participation can take place • Through impairments and disease, people can lose social activities or contacts, relationships with others remain intact despite disease or impairments, they receive help or delegate their activities to others and can belong somewhere through relationships with others • Circumstances beyond the person's control can impede social participation (deprivation)	Schoessow (2010) Engels (2021) Hoyle (2016) Norberg (2014) Murdock (2015) Tollen (2008) Lewis (2021) Lund (2012) Provencher (2020) Waldersen (2017)
Physical environment	• The physical environment (place of residence, environment, neighbourhood) forms part of the community • Adjustments to the home and environment that the person has already made and willingness of the person to make adjustments • Obstacles in the environment; reduced access in- and outside the home, aids or furniture blocking access, unsuitable furniture • Goals are achieved more frequently (following an occupational-therapy intervention) if people had dangers in the home environment (e.g. no stair railing) compared to those who had no dangers in the home environment (Waldersen 2017)	Schoessow (2010) Hoyle (2016) Norberg (2014) Norberg (2017) Nygard 2004; Waldersen (2017)
Formal use of healthcare.	• **Current use of help at home, professional or informal** • **Hospitalisations/treatments in the past** • **Type of treatment and medication**	Tuntland (2017)
Technology	• Which supporting instruments or aids are used for which activity • (Un)successful use of supporting instruments or aids in daily life • Willingness to use support instruments or aids • Phone usage	Schoessow (2010) Norberg (2014) Norberg (2017) Lund (2012) Waldersen (2017)

Factors for which a specific recommendation was formulated are shown in **bold** in the table.

Table D.1.2 | **Overarching topics with regard to the process to obtain data on the person (*n*=12 studies)**

Phases of clinical reasoning*	Explanation and subtopics	Studies
1 Get acquainted, collect information about the person, environment and activities, and build a treatment relationship	Collect information and check interactions. This will partly be influenced by the knowledge and experience of the occupational therapist and by the amount of and access to information in the medical record	Carrier (2012) Lauckner (2014) Norberg (2017)
	Occupational therapists can determine the ability to drive by asking questions with regard to strategy (cognitive ability to make strategic decisions), tactics (possibility to assess situation and adapt to it) and operational functioning (performing tasks without thinking about it); this is in line both with the collection of information and with forming a picture of how a person functions	Dickerson (2014)
	a The occupational therapist introduces the sets of goals and gives broad categories and specific examples of goals (related or not to change with regard to a specific disease) b Share information on capabilities; the person is asked about their interests, capabilities and experiences and the occupational therapist looks at the unique aspects of these meaningful activities in more detail	Kessler (2019) Waldersen (2017)
	By involving family in the identification of activities and formulating goals for the treatment, joint pastimes can also be taken into account	Engels (2021)
	A home visit gives more insight into the identity of a person who is receiving treatment; the occupational therapist will get a better understanding of how (meaningful) activities are performed by observing a person in their own environment; a person also has a greater say in their own environment, which will create a more equal balance of power between the therapist and the person who is receiving treatment	Moats (2007)
2 Identify the need for action and opportunities Together get an understanding of problems and opportunities	Through the gathered information, the occupational therapist forms a picture of the person and their situation	Carrier (2012)
	Identifying the individual needs of the person and prioritising problems and activities based on their importance, execution and the satisfaction of the person	Lund (2012) Lauckner (2014) Norberg (2017)
3 Analyse needs for action	Giving people time to tell their own own story and reflect on their achievements will make it easier to form goals. Joint goal-setting is characterised by, on the one hand, the wishes of the older adult and, on the other, the joint weighting of the risks and feasibility of goals. Occupational therapists must consciously make an effort to listen actively, clarify the meaning of a goal and respect a person's choices. Four pitfalls for occupational therapists when selecting goals are: a Immediate approval from the occupation therapist the moment the person has presented a goal b Exploring a goal, after which the occupational therapist gives their approval c The person presents a vague goal, which then gets abandoned d The person sticks to their stated goal until it gets approved by the occupational therapist	Kessler (2019)

Phases of clinical reasoning*	Explanation and subtopics	Studies
3 Analyse needs for action *(continued)*	a Determine willingness to change behaviour through observation and interviews b Functional capabilities are evaluated by the occupational therapist in three prioritised activities	Waldersen (2017)
	Involvement of professionals in the case of legal incapacity and/or frailty: In the case of legal incapacity of a person, assistance providers will be more involved in decision-making. In the case of frailty or reduced cognition, decisions are based on a mix of the person's preferences and professional considerations. According to occupational therapists, putting the person first in this type of situation means giving recommendations, but not making a decision.	Moats (2007)
	Family plays a major role in decision-making around a person who is receiving treatment	Engels (2021) Moats (2007)
	Stimulating skills that an occupational therapist can use to determine and reach goals: adapting, coaching, consulting, collaborating, coordinating, designing or building, guiding, connecting/engaging, specialising and advocating. • Advocating: the occupational therapist ensures that the person is capable of making a decision • Collaborating: an active partnership between the occupational therapist and the person, where the latter makes the choices • Empathy: confirming the thoughts, feelings and experiences of the person • Encouragement: emphasising strong points and addressing the person's self-confidence • Instruction: offering a clear structure for activities, give explicit instructions and indicate limits • Problem-solving: involving the person in the practical analysis of treatment options The modes must be geared to the person's interpersonal characteristics	Lauckner (2014) Raber (2019)
4 Establish a plan of action	Based on the picture of the person and the situation, the occupational therapist will determine a general strategy; for this, the occupational therapist can choose an intervention model	Carrier (2012) Lauckner (2014) Norberg (2017)
	Based on individual needs, the content of the treatment is determined	Lund (2012)
	Use of a structured method based on a(n occupational-therapy) model: The use of a structured method, like the Canadian Model of Occupational Performance (CMOP), could lead to more people being able to identify a goal and being better able to repeat what the goals are (or were) and a higher frequency of treatments compared to occupational therapy where no structured method is used	Wressle (2002)
5 Execute the action plan	The plan is executed and the occupational therapist offers support to reach the set goals	Carrier (2012) Lauckner (2014) Norberg (2017) Waldersen (2017)
6 Adjust	Check how the person and their environment react to the plan and weigh the results of the plan against the intensity	Carrier (2012) Lauckner (2014) Norberg (2017)

Phases of clinical reasoning*	Explanation and subtopics	Studies
7 Evaluate	Depending on the reactions and results, the plan can be adjusted or continued	Carrier (2012) Lauckner (2014) Norberg (2017)
8 Conclude	The occupational-therapy treatment is concluded when the goals have been reached, based on joint consultation or for another reason for which the treatment cannot be continued	Lauckner (2014)

From evidence to recommendation

The component 'from evidence to recommendation' consists of nine criteria, which are listed below, and describes the considerations of the guideline panel on which the recommendations are founded. Additional considerations follow later. This chapter assesses which information is essential for the occupational therapist to identify in frail older adults. The information that can be collected is classified under three main topics: person, activities and environment. Each main topic contains a number of subtopics. It is part of the standard operating procedure of an occupational therapist to form a comprehensive, holistic picture of the older adult by gathering information on these main topics. All subtopics are in fact important to identify, which also forms part of the current standard operating procedure. To formulate specific recommendations, as a more in-depth development of this operational procedure, the guideline panel has, based on Table D.1.1, selected the factors that are essential to identify in the target group of frail older adults. These factors were chosen based on priority for the target group and/or deviating outcomes compared to other target groups, as a result of which the information in question has a significant impact on choices regarding the treatment track. Since no GRADE assessment was made and the question is of an exploratory nature, the assessment of the criteria of the (sub)topics will be based on the opinion of the guideline-panel members.

Criteria

Desirable effects

In this module, desirable effects are seen as focus areas, possible benefits, positive outcomes and/or accessories to identify factors, both for the person under treatment and for the occupational therapist. The guideline panel formulated the considerations and assessments of desirable effects based on expert opinion.

Personal factors/life-course determinants

Identifying personal factors is very important in the occupational-therapy treatment. Occupational-therapy treatment is always personalised and hence designed on the basis of the obtained information on the person. The treatment cannot be implemented effectively to reach goals if the interventions are not adapted to the older adult. Frail older adults have often experienced a lot in their lives. Asking about their life story/life events can help to identify coping strategies. Based on this information, the occupational therapist can estimate which interventions will be suited to the older adult, which will lead to a higher chance of success.

The guideline panel considers that the desirable effects of identifying personal factors/life-course determinants are significant. With this information, a targeted treatment can be started.

Physiology

It is desirable to obtain information on disease symptoms, co-morbidity and/or age and to adjust the treatment and interventions accordingly. This gives information on the degree of frailty and thus also plays a large role in the treatment of frail older adults in particular. Asking for information, such as sleep pattern, fatigue, pain, eating habits and nutritional status, will give the occupational therapist a clear picture of the current state of functioning. These factors are also linked to the performance of activities of daily living and to participation. The sleep-wake rhythm changes with age and can be disrupted, which will reduce older adults' energy as a result. Reduced appetite often occurs in frail older adults and can lead to malnutrition and sarcopenia. Malnutrition can also occur in overweight or obese people. If there is a risk of malnutrition and sarcopenia, contact can be made with or the person can be referred to a dietitian.
The guideline panel considers the desirable effects of identifying the person's physiology as significant. Without listing the right (medical) data, it will not be possible to establish a targeted treatment.

Motor skills

Information on physical (in)capabilities has a great impact on the treatment track. Frail older adults have reduced physical functioning, which means that in many cases not all interventions can be implemented. Hence the measurement of motor performance is determining for the content of occupational-therapy treatments. When there is a question of reduced motor performance and this is expected to be capable of improvement, (occupation-based) exercises and improvement actions can be proposed and the person can also be referred to an exercise or physical therapist.
The guideline panel considers that the desirable effects of identifying the person's motor skills as significant. Without listing the right (medical) data, it will not be possible to establish a targeted treatment.

Sensory skills

Identifying the sensory skills of the older adult will give both the older adult and the occupational therapist an understanding of possible causes and consequences. Frail older adults are not always aware of their increasing deterioration. With ageing, the various sensory skills deteriorate, so that stimuli are received less accurately or incompletely. When brain damage is also present, information processing decreases both at a sensory level and in the brain, which will further aggravate the consequences. In addition, there may be a need for or an hypersensitivity to stimuli.
The guideline panel considers that the desirable effects of sensory skills play a significant role in being able to offer targeted treatment.

Cognitive functioning

Identifying cognitive functioning is very important during diagnosis/medical history taking. Frail older adults often have slower or reduced cognitive functioning. The information obtained on cognitive functioning is taken into account in the treatment, both in terms of the duration of the treatment and as far as the intervention and communication are concerned.
The guideline panel considers that the desirable effects of identifying cognitive functioning have a great impact on being able to achieve a targeted treatment that is suited to the older adult. See Module D.2 for instruments to identify cognitive functioning.

Psychological functioning

Identifying psychological factors is very important for the occupational-therapy diagnosis. An understanding of the cognitive strategies and emotional status of the older adult helps to shape the treatment and interventions. This information will ensure that the occupational therapist can properly gear the treatment to the older adult and that the therapy is used in a targeted manner. As indicated, asking about the personal factor of life story/life events can serve as a tool to identify coping strategies. The guideline panel considers that the desirable effects of identifying psychological characteristics and capabilities are significant.

Activities

Identifying meaningful daily activities of the older adult is very important during medical history taking, since these determine how the treatment is administered. Identifying current daily activities and changes in activities due to age or disease will help the older adult as well as the occupational therapist to understand possible causes and consequences. It is furthermore important to establish a link between activities and the environment. It is desirable to determine if and how the social and/or physical environment can be used in the performance of meaningful activities of daily living. Together with the frail older adult, suitable goals can be established for the current situation. Meeting the wishes of the older adult will strengthen intrinsic motivation. Load capacity also decreases in frail older adults. Balance/imbalance when performing activities is an important factor for occupational therapists, with energy management often becoming a significant part of the treatment. The guideline panel considers that the desirable effects of activities play a significant role in being able to offer targeted treatment.

Environment

Identifying the social environment will better enable the occupational therapist to gauge the older adult's situation. The network, the size thereof and cultural background all have an impact in this regard. With this knowledge, the approach to needs for assistance can be better geared to the older adult, and the occupational therapist can where necessary use reinforcement from and with the the social environment. Involving the social network, especially loved ones, is essential with frail older adults. The use of healthcare can also be seen as a component of the social environment.
By identifying the physical environment, which consists both of the person's own home and the immediate environment, it is possible to determine, along with the need for assistance of the older adult, where specific problems lie and what can be done about them. Without the physical context, the frail older adult can be trained in taking action, but if it does not fit the living environment, the effect of the training will be minimal. In addition, there is often a falls risk in the physical environment. Fall prevention will be an essential intervention for many frail older adults. Physical environment also includes the use of technology and supporting instruments. The guideline panel considers the desirable effects of identifying the social and physical environment as significant for the ability to treat the frail older adult within their environment and increase their self-reliance.

Undesirable effects

In this module, undesirable effects are seen as focus areas, disadvantage, negative outcomes and/or possible impediments for identifying factors, both for the frail older adult and for the occupational therapist. The guideline panel formulated these considerations based on expert opinion.

Personal factors

When asking about personal factors, the occupational therapist may become biased. Information regarding education level can, for example, lead to a bias with regard to the level of the older adult. Information on the education level alone, however, does not say anything about the (cognitive) functioning of the older adult. The occupational therapist can furthermore be guided too much by the wishes and preferences of the older adult in the process of choosing a certain intervention. The guideline panel considers the undesirable effects of personal factors as small.

Physiological and sensory skills

Biases may arise in relation to the frail older adult's physiological and sensory capabilities. It is important for an occupational therapist to be aware of and alert to this. The guideline panel considers that the undesirable effects of identifying physiological and sensory capabilities are small.

Motor skills

The frail older adult may experience the assessment of their motor skills as burdensome. The guideline panel considers that the undesirable effects of identifying the person's motor skills are small.

Cognitive functioning

A possible undesirable effect is the risk that the older adult themselves may not understand that they have cognitive problems and may not recognise any impairments in their daily functioning. The involvement of a loved one can be of great importance in obtaining the right information in this regard. In this way realistic goals can be established that are suited both to the needs and wishes of the older adult and to their cognitive capabilities. The guideline panel considers the undesirable effects of identifying cognition as fair.

Psychological factors

Feelings and motions may stand in the way of treatment. A possible undesirable effect could be that the treatment is not successful due to feelings of depression. It will then be important to get in touch with the person's referrer or general practitioner or another healthcare professional involved who is specialised in this respect. The guideline panel considers that the undesirable effects of identifying psychological factors are significant.

Activities

A possible risk is that the older adult will give incorrect information or that they will not be able to provide the necessary information. A frail older adult cannot always recognise to what extent their activities of daily living have changed, as it happened gradually or because their understanding of their own actions is limited. Moreover, activities such as going to the toilet are often not seen as an activity. In this kind of situation, it is advisable to consult a loved one, so that realistic goals can be established.

The guideline panel considers the undesirable effects of identifying activities as fairly significant, as it can be difficult to collate the information.

Environment

A possible undesirable effect is that networks can intertwine to form a too large network, blurring the need for assistance or decreasing the older adult's motivation to be self-reliant.

Careful consideration must be given to what falls under the social environment as far as the older adult's actions and need for assistance are concerned. Moreover, the physical environment can change due to altered health. For example, adjustments to the home, possible admission under the Dutch law on long-term care or moving to a single-story home. This cannot always be anticipated in medical history taking, which is why it must be checked regularly. The guideline panel considers the undesirable effects of identifying the social and physical environment as fair. The risk is not always present, but it is worth being aware of it.

Quality of evidence

The quality of the evidence was not assessed, due to the exploratory nature of the question and the method of data extraction. The degree of confidence in the evidence was assessed with the help of the components of GRADE-CERQual. The confidence in the coherence of the evidence is high, since all the information cited contributes to forming a holistic picture of the frail older adult. The relevance is high, since all the results come from studies that focus on occupational therapy for older adults and people with chronic diseases over the age of 65.

Lastly, the richness of the data was looked at. Personal, physiological and social environment factors are cited in 10, psychological factors in 11 and activity factors in 12 of the 21 studies as worth being identified. The guideline panel considers this as fairly adequate and hence the confidence in the evidence as fair. These topics furthermore also come up in various models and instruments for measuring frailty. Examples are the integral conceptual model of frailty (Gobbens 2010a) and instruments such as the Tilburg Frailty Indicator (Gobbens 2010b) and the Groningen Frailty Indicator (Peters 2012).

Information on motor and sensory skills are mentioned in respectively 4 and 2 of the 21 studies as worth identifying. The guideline panel considers the degree of adequacy as very small and hence the confidence in the evidence as very low.

Cognitive functioning and physical environment factors are mentioned respectively in 7 and 6 of the 21 studies as worth identifying. The guideline panel considers the degree of adequacy as small and hence the confidence in the evidence as low.

Client values and preferences

Older adults generally have no objections to the collection of information on their life. It is important to take account of the (cultural) background of the frail older adult. An important condition, though, is that there must be a good treatment relationship, where the older adult feels seen and heard, for example, when the occupational therapist asks about their preferences, fields of interest, personal choices and goals. Another condition is that the older adult should know why certain information is being collected and how it will help them. This requires good, clear communication with the individual older adult on the part of the occupational therapist. See also the generic Module B.2 on communication. Clear information also helps the older adult to make choices about the treatment (self-management and joint decision-making), which means that someone will also be motivated to reach the treatment goals and that personalised care can be provided. This is supported by the study by Waldersen (2017), in which a high degree of willingness to change is positively associated with the reaching of goals.

Depending on the personal situation of an older adult, conversations about important life events, mental functioning and emotions, and conversations and observations regarding their cognitive functioning may be confrontational for older adults. However, some older adults also like to be able to express their emotions and feelings and to talk about this with an outsider. The guideline panel is of the opinion that identifying motor abilities can be experienced as very burdensome by the frail older adult. The occupational therapist must be alert to this burden.

Balance between desirable and undesirable effects

Personal, physiological and sensory factors

The risk of bias is real. Occupational therapists can reduce this risk by being aware of their own assumptions and world view. On the other hand, the risk does not outweigh the need to link up with the older adult. The guideline panel came to the following assessment: the desirable effects definitely outweigh the undesirable effects.

Motor skills

The desirable effects definitely outweigh the undesirable effects. The reasoning for this is that information on physical capabilities is essential for the design of the treatment.

Cognitive functioning and psychology

Before treatment starts, the desirable as well as undesirable effects must be taken into account in order to gear the treatment to the frail older adult.

Activities

Before treatment starts, the desirable as well as undesirable effects must be taken into account in order to optimise the overall effect of the treatment. The motivation for this is that without linking up with the actions of the frail older adult, the effect of the treatment will be minimal or absent.

Environment

Both the desirable and the undesirable effects are important to keep in mind when making an assessment. The desirable effects are, however, expected to outweigh the undesirable effects.

Economic considerations and cost-effectiveness

Identifying factors regarding the person, activities and environment and the relationship between these as completely as possible is a meticulous process that costs time and money. The use of this fairly inexpensive paramedical care is, however, compensated for by the fact that the timely use and the effectiveness of treatment that addresses the right determining factors may prevent or postpone other (more expensive) care (Hamstra 2022). A clear picture of the factors that cause and maintain frailty is essential in order to work effectively towards the goals of the older adult.

Cognitive functioning

The guideline panel considers that additional information from loved ones is often necessary to form a complete picture when the older adult's cognitive functioning is limited. Observations will then also be important. Eventually this will save costs in the further process, since a good overview will limit the need for later adjustments to the treatment. Without a good list of meaningful actions, unsuitable goals will be established as well as treated. This will lead to unnecessary extra costs if the process has to be started over again at a later stage.

Identification and training

The guideline panel considers that obligatory training and the procurement of the correct measurement instruments could form a barrier to identifying the necessary factors. It is also possible to identify factors without extra training and equipment, by means of observations. When an occupational therapist does not have the necessary equipment or training while it is necessary to get an understanding of the motor and/or sensory skills, an extra consultation can be arranged with a healthcare professional who does have the right equipment or the referrer can be contacted to discuss how the necessary information can be obtained. The guideline panel considers that this probably is cost-effective, but it requires more planning capacity.

Environment

The guideline panel considers that the resources needed for identifying the social and physical environment in a primary care setting are negligible. Identifying the physical environment from a secondary care setting entails more costs, since a home visit might also take place.

Equality

The guideline panel expects that the actual identification of factors with regard to the person, activities and environment will have no effect on health equality. The stages before and after this process can, however, have an effect on health equality. Reporting an issue, taking the initiative to start with treatment and buying the aids could be barriers for frail older adults in case of financial difficulties, cognitive deterioration and/or lack of a support system. Furthermore, not being able to take care of all matters or to ask for the right help is probably also part of frailty. Healthcare professionals must take this into account when treating frail older adults.

Acceptability

The guideline panel expects that the identification of factors with regard to the person, activities and environment will be accepted by all key stakeholders. It is an essential and basic component to identify the personal, physiological, motor, sensory, cognitive and psychological factors before further treatment and/or interventions can be set up in line with the goals of the frail older adult. Identifying activities and the environment forms a standard part of the occupational-therapy medical history taking. In contracts with health insurers it is also stipulated that the treatment of meaningful activities falls within the defined scopes of the occupational-therapy profession. Information on the environment forms the basis on which to build the occupational-therapy treatment.

In a secondary care setting, the guideline panel considers it desirable to free up time and budget in a timely manner to identify the social and physical environment. The occupational therapist can justify it to the organisation, since this information is essential for making decisions together with the person (and their loved ones) about suitable goals. The occupational therapist must know where the person goes physically and in what social network they find themselves, in order to adapt the training accordingly.

Feasibility

It is feasible for the occupational therapist to identify factors with regard to the person, activities and environment. This is an essential part of medical history taking in occupational therapy. The feasibility for an individual occupational therapist of identifying specific factors will depend on the questioning, the frail older adult and the occupational therapist's assessment.

When essential information is missing and an occupational therapist does not have the proper training, knowledge and/or measurement instruments, the patient can be referred to a fellow occupational therapist or another healthcare professional. Identifying psychological factors falls under the current protocol in the diagnostic phase. Coping strategies can be identified, for instance, by asking about life events in relation to day-to-day actions. If the person shows resistance to the identification of feelings and emotions or when there is a risk of mental problems, they can be referred to a specialised healthcare professional.

Possible additional considerations

Skin condition

The literature analysis does not specifically highlight the identification of skin conditions as a factor in relation to symptoms of disease or age. The guideline panel considers that a deteriorating skin condition is often consistent with symptoms of disease or age and that it frequently occurs in frail older adults. Frail older adults have an increased risk of skin tears and decubitus due to reduced blood supply and to the dryness and reduced elasticity of the skin. Occupational therapists can be involved in this problem in a preventive and curative capacity to give advice about aids and if necessary refer the patient to a skin therapist. Skin condition as a factor was therefore added as part of the symptoms of disease or age.

Knowledge gaps

The role of loved ones could not be examined in further detail due to practical limitations. The clinical question and the module of this guideline are limited to frail older adults and the occupational therapist. It is, however, very important to involve the frail older adult's loved ones in the treatment process. Loved ones are also closely involved in the treatment of many frail adults where conditions such as Parkinson's disease, CVA, dementia and other cognitive disorders or psychiatric problems play a role. Any revision of the guideline must therefore pay attention to this to improve care for all stakeholders. The clinical question furthermore focuses on the minimal identification of information. In any revision, it would be advisable to go deeper into the clinical question by linking it to the comprehensive model of frailty (Gobbens 2010a). The clinical question and recommendations can then focus on the collection of information to get a picture of the vicious circle of frailty and the question of what maintains it (physical, social and mental frailty and the correlation between these).

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D.2 Identifying cognitive functioning

Literature: search and select

Research question

What is known about the clinimetric characteristics and the utility of four frequently used occupational-therapy instruments for identifying cognitive functioning in activities of daily living among frail older adults?

For reasons of practicality, it was decided to limit the study set to four measurement instruments. The set was composed by the guideline panel based on utility in practice, relevance and the measurement area of cognitive functioning. Cognitive-Complaints Participation (CoCo-P) is a measurement instrument for identifying cognitive complaints in everyday life and is possibly also suitable for frail older adults as a target group. CoCo-P has two versions: one that is filled in by the person under treatment and one that is filled in by their their loved one. A revision of the guideline should include an examination of this measurement instrument. The Montreal Cognitive Assessment (MoCA) and Mini-Mental State Examination (MMSE) are not included, as these are screening instruments where cognitive deterioration is identified according to eight cognitive areas. These screening instruments are not aimed at cognitive functioning in activities of daily living, which is what the occupational therapist focuses on.

To answer the clinical question, a systematic literature analysis was carried out for the following research question (PICO):

P (Population)	frail older adults
I (Intervention)	Assessment of Motor and Process Skills (AMPS), Árnadóttir OT-ADL Neurobehavioural Evaluation (A-ONE), Allen Cognitive Level Screen (ACLS) and Perceive Recall Plan Perform (PRPP)
C (Control)	no requirements
O (Outcome)	clinimetric characteristics (validity, reliability, responsiveness), feasibility, interpretability

Relevant outcome measures

The guideline panel considers clinimetric characteristics (validity, reliability and responsiveness) for decision-making to be crucial outcome measures. Feasibility and interpretability are defined as important outcome measures. The guideline panel defined no outcome measures as undesirable effects.

Search

An information specialist carried out a search in July 2022 to find systematic reviews (SRs) on occupational therapy for (frail) older adults (see Appendix D.3.1 for the search justification). This produced 1 study that meets the inclusion criteria (see the table below) (Wales 2016). On 17 April 2023, a further systematic search was done in Medline for studies on clinimetric characteristics of the relevant measurement instruments (AMPS, A-ONE, ACLS and PRPP) for frail older adults (see Appendix D.2.1 for the search justification). For reasons of practicality, it was decided to limit the search based on publication dates. Only publications since 2012 were included. For reasons of practical limitations, it was also not possible to perform a search in a second database. This systematic search in Medline produced 610 unique hits. The selection procedure was a double-blind procedure performed by 1 researcher rom Cochrane Netherlands and 1 researcher from Ergotherapie Nederland. Differences between the 2 assessors were discussed after which there were no discrepancies left. After screening the title and abstract based on the inclusion criteria (see table below), 602 articles were excluded. The remaining 8 articles were screened in full and of 6 of them were included (Douglas 2013; Fioravanti 2012; Steultjens 2012; Van Keulen-Rouweler 2017; Wales 2018; Wesson 2017). 1 review was identified by checking references of the included studies (Douglas 2008). See Appendix D.2.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix D.2.3.

Inclusion criteria

Types of studies	clinimetric reviews, primary studies
Type of population	frail older adults
Type of intervention	Assessment of Motor and Process Skills (AMPS), Árnadóttir OT-ADL Neurobehavioural Evaluation (A-ONE), Allen Cognitive Level Screen (ACLS) and Perceive Recall Plan Perform (PRPP)
Type of comparison	n/a
Type of outcome	clinimetric characteristics, feasibility, interpretability
Type of timeline	publication date starting from 2012

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix D.2.4. Relevant studies were 2 (systematic) reviews and 6 primary studies. The number of participants was not clearly reported in the SRs. The average age in 1 SR was 70 years while in another SR, half of the participants were older than 70. The 6 primary studies included 561 participants in total. The average age of the participants varied between 72 and 85 years, while the percentage of women and men was not reported.

Individual study quality (RoB)

The methodological quality was assessed for each clinimetric characteristic by means of the COSMIN Risk of Bias tool (Mokkink 2018; Prinsen 2018). The methodological quality of the included SRs was assessed with an adapted version of the AMSTAR-2 tool (see Appendix D.2.5) (Prinsen 2018; Shea 2017). Compared to the original AMSTAR-2 tool the assessment criteria focused on clinimetric research, an area was added (9B criteria for measurement characteristics) and the publication-bias area was left out, since this cannot clearly be assessed for clinimetric research.

Effectiveness and evidentiary value

One researcher (Cochrane Netherlands) collected the relevant data from each study, namely: country, study design, instrument, characteristics of the study population, clinimetric characteristics and information on the feasibility and interpretability of the instrument. For AMPS only data on the process part of the measurement instrument (AMPS-P) was extracted. The motor component of AMPS falls outside the scope of this clinical question. Evidence was found in the literature for both the standard execution of the ACLS, also called ACLS-5, and for the larger version of the ACLS, which can, for example, be taken with people with impaired fine motor skills and/or sight, called the Large Allen Cognitive Screen (LACLS). Clinimetric characteristics are divided into the nine areas of the COSMIN taxonomy, namely: content validity, structural validity, internal consistency, intercultural validity/measurement variance, reliability, measurement error, criterion validity, testing of hypotheses for construct validity and responsiveness (Prinsen 2018). The results for the clinimetric characteristics were assessed for each study by means of the Terwee quality criteria as either adequate (+), not adequate (-) or undetermined (?).
If there was any doubt about the data to be extracted, a second researcher was consulted (Cochrane Netherlands). The results were summarised per clinimetric characteristic for each instrument. A GRADE assessment was then attributed according to the COSMIN methodology (Prinsen 2018).

The outcomes of the results are described in various tables:

- Table with outcomes on the clinimetric characteristics, see Appendix D.2.6;
- Table with outcomes on interpretability, see Appendix D.2.7;
- Table with outcomes on feasibility, see Appendix D.2.8;
- Table with a summary of the results and GRADE assessment, see the table below.

Table D.2.1 | **Summary of the results with regard to the clinimetric characteristics of the GRADE assessment**

COSMIN areas	AMPS-P	A-ONE	ACLS	PRPP
Content validity	No studies found	No studies found	No studies found	No studies found
Structural validity	No studies found	No studies found	No studies found	No studies found
Internal consistency	One study of good methodological quality and one review, of which the methodological quality of the primary studies was unclear, yielded mixed results in terms of internal consistency. The internal consistency appears inadequate when taken in hospital and adequate when taken at home. **GRADE: Low**[1]	Adequate based on review, where the methodological quality of the primary studies is unclear. **GRADE: Not assessable due to incomplete reporting**	No studies found	No studies found for phase 1. Adequate for the total score of Phase 2 based on one study of very good quality. **GRADE: Low**[5]
Intercultural validity/ measurement invariance	Excellent based on review, where the methodological quality of the primary studies is unclear. **GRADE: Not assessable due to incomplete reporting**	No studies found	No studies found	No studies found
reliability	Two reviews gave contradictory results with regard to test-retest reliability. **GRADE: Very low**[2]	Adequate based on review, where the methodological quality of the primary studies is unclear. **GRADE: Not assessable due to incomplete reporting**	Poor test-retest reliability based on one review, where the methodological quality of the primary studies is unclear. **GRADE: Not assessable due to incomplete reporting**	The inter-rater reliability is not adequate for single intake, but may be with several intakes and the average thereof, based on two studies of a very good methodological quality. **GRADE: Low**[5]

COSMIN areas	AMPS-P	A-ONE	ACLS	PRPP
reliability *(continued)*	The inter-rater reliability was considered excellent in one review, where the methodological quality of the primary studies is unclear. **GRADE: Not assessable due to incomplete reporting**		Excellent inter-rater reliability based on one review, where the methodological quality of the primary studies is unclear. **GRADE: Not assessable due to incomplete reporting**	The inter-rater reliability is adequate for Phase 2, but not for all subscales of Phase 1 based on one study of a very good methodological quality. **GRADE: Low**[5]
Measurement error	Measurement error is undetermined in two studies of inadequate or poor methodological quality. **GRADE: Fair**[3]	No studies found	No studies found	No studies found
Criterion validity	No studies found	No studies found	Adequate for people with dementia compared to people with normal cognition based on one study of very good methodological quality. **GRADE: High**	No studies found
Testing of hypotheses for construct validity	Adequate construct validity from several studies of adequate to very good methodological quality. **GRADE: High**	Adequate based on review, where the methodological quality of the primary studies is unclear. **GRADE: Not assessable due to incomplete reporting**	Adequate based on one study of partly very good and partly questionable methodological quality and one review where the methodological quality of the primary studies was unclear. **GRADE: Fair**[3]	No studies found
Responsiveness	Adequate based on one study of very good methodological quality and undetermined based on one study of inadequate methodological quality. **GRADE: Low**[4]	No studies found	No studies found	No studies found

AMPS-P = Assessment of Motor and Process Skills Process; A-ONE = Árnadóttir OT-ADL Neurobehavioural Evaluation; ACLS = Large Allen Cognitive Level Screen 5; PRPP = Perceive Recall Plan Perform. 1. Downgraded for inconsistency (-1) and imprecision (-1); 2. Downgraded for methodological quality (-1), inconsistency (-1) and imprecision (-1); 3. Downgraded for methodological quality (-1); 4. Downgraded for methodological quality (-1) and inconsistency (-1); 5. Downgraded for imprecision (-2);

From evidence to recommendation

The component 'from evidence to recommendation' contains eight criteria that are listed below. The guideline panel described the considerations from the field and on evidence. The considerations from the field are based on the experience, knowledge and expertise of the guideline-panel members. In addition, course material was used of the four measurement instruments, the Occupational Therapy Guideline CVA and supplementary literature (Árnadóttir 1990; Buikema 2008; Steultjens 2013). The recommendations are based on consensus in the guideline panel on the various criteria. This is described in the rationale (see practice guideline).

Criteria

Quality of evidence

AMPS-P | The literature that was found on the use of AMPS-P for frail older adults does not contain any evidence on content validity, structural validity and criterion validity. The results are mixed for internal consistency with a low GRADE rating. The internal consistency looks inadequate when taken in hospital and adequate when taken at home. This could be explained by the fact that for AMPS-P, activities are observed in a natural setting. When a person is not used to performing these activities in a clinical setting, this might influence the outcomes. The results for test-retest reliability were also mixed, with a very low GRADE rating. Intercultural validity and inter-rater reliability scored adequate and a GRADE rating was not possible for either area. Construct validity and responsiveness also scored adequate with a high and a low GRADE rating respectively. The measurement error was found to be undetermined, since the minimal important change was not reported, with a GRADE rating of fair. The guideline panel rated the evidentiary value of the desirable effects as ranging from very low (e.g. reliability) to high (construct validity).

A-ONE | The literature that was found on the use of A-ONE for frail older adults does not contain any evidence on content validity, structural validity, intercultural validity, measurement error, criterion validity and responsiveness. Internal consistency, reliability and construct validity were found to be adequate. The quality of the evidence could not be assessed due to incomplete reporting. As a result, the guideline panel could not assess the evidentiary value of the desirable effects.

ACLS | The literature that was found on the use of ACLS for frail older adults does not contain any evidence on content validity, structural validity, intercultural validity, measurement error, criterion validity and responsiveness. The inter-rater reliability was rated as adequate and the test-retest reliability as poor, while the quality of the evidence could not be assessed. The areas of criterion validity and construct validity were found to be adequate and the quality was rated by means of GRADE as respectively high and fair. The guideline panel rates the evidentiary value of the desirable effects as fair.

PRPP | The literature that was found on the use of PRPP for frail older adults does not contain any evidence on content validity, structural validity, intercultural validity, measurement error, criterion validity and responsiveness. In the literature that was found, no evidence was reported either for internal consistency for Phase 1 of the PRPP. The internal consistency and intra-rater reliability of the total score for Phase 2 are adequate. The inter-rater reliability is not adequate for single intake, but may be when the average of several intakes is taken. The intra-rater reliability varies or is inadequate for various subscales of phase 1 of the PRPP. The quality of the evidence is rated as low using GRADE. This applies to all scored areas of PRPP. The guideline panel assesses the evidentiary value of the desirable effects as low.

Balance of desirable and undesirable effects of the test

AMPS-P | The guideline panel considers that the desirable effects probably outweigh the undesirable effects. The quality of the evidence is predominantly very low. Nevertheless, several clinimetric characteristics were found adequate in the literature, including construct validity with a high quality of evidence.

A-ONE | The guideline panel considers that in the literature that was found there is insufficient evidence for weighing up the balance of desirable and undesirable effects of the test.

ACLS | The guideline panel considers that the desirable effects probably outweigh the undesirable effects based on the available data. The majority of the clinimetric characteristics were not assessed in the literature that was found. The inter-rater reliability, criterion validity and construct validity which were found adequate weigh heavier in this consideration, partly due to the fair evidentiary value. The poor assessment of the test-retest reliability can be explained by the learning effect that occurs during the test. The ACLS can therefore only be taken once.

PRPP | The guideline panel considers that the desirable effects are very likely to outweigh the undesirable effects. The results show that several clinimetric areas were found adequate. Due to the low quality of evidence and a number of fluctuating outcomes, no certainty can be offered. This can partly be explained by the fact that PRPP is a relatively new instrument and that more research must be done on the clinimetric characteristics of the instrument.

Values and preferences of clients and professionals

AMPS-P | The guideline panel considers that frail older adults attach reasonable value to the instrument. The duration of the test depends on the chosen tasks and the action speed of the older adult. There is a wide variety of tasks to be chosen from. These tasks are standardised, but can be adapted. Before the test is taken, the older adult and the occupational therapist together draw up a standardised contract on how the older adult is used to performing the task. The instrument will therefore mostly be in keeping with the values and preferences of the older adult in terms of acting meaningfully. The task is furthermore mostly performed in a familiar environment and the joint decision-making about the task helps to limit the burden to the wishes of the older adult. The instrument is suitable for each level of functioning.

The guideline panel considers that occupational therapists attach reasonable value to the instrument. The instrument can be used repeatedly and the clear outcome measures are easy to share with other healthcare professionals. In addition, the outcomes effectively indicate which cognitive strategies a person has/can use and whether they can perform certain actions. The instrument, moreover, offers a worthwhile substantiation for indicating whether or not a person can continue to live at home. On the other hand, training and possessing a gauged certificate are essential for being able to use the instrument. The results must also be processed first in order to obtain a correct interpretation. Necessary equipment includes a score form, a computer with AMPS software, the gauged certificate and possibly other equipment that is needed for the activity. The instrument is no longer available, as no training in it is given at present. The duration of the test, preparation time, scoring and calculation take approximately 2.5 hours.

A-ONE | The guideline panel considers that frail older adults attach reasonable value to the instrument. The duration of the test is approximately one hour, depending on the action speed of the older adult. The instrument can be implemented effectively since it is based on activities of daily living (ADL) such as washing and dressing, transfers and eating and drinking. The skills needed depend on the basic ADL that will be performed. Doing the test requires both physical and mental effort.

The guideline panel considers that occupational therapists attach reasonable value to the instrument. The instrument is suitable for people with moderate to severe cognitive problems and is often used in the initial phase of treatment. The instrument can be used repeatedly to monitor cognitive functioning. Training is essential and the results must be

interpreted quite specifically (with the location of the injury in the brain and the behavioural neurology disorders). This requires knowledge, experience and time. The score form is available in digital and in physical format. The materials needed consist of equipment for basic ADL, which the older adult usually has in their possession. A-ONE training is no longer offered in the Netherlands. The score forms are, however, still available and no use is made of software. The duration of the test is approximately one hour and it can be completed during a single observation or during various ADL observations. Preparation and processing also take about one hour.

ACLS | The guideline panel considers that frail older adults attach reasonable value to the instrument. The duration of the test is short, which means that the mental load is limited. The test must, however, be combined with observations of daily actions, so that the total testing time takes approximately 1.5 hours for the older adult. The test requires fair functioning of at least one hand and of vision and hearing. When sight is reduced, another variant of ACLS can be done, namely LACLS. Doing the test with a leather eye patch is not meaningful for everyone and men especially are often not immediately convinced of the envisaged goal. Since the instrument is combined with an observation of actions in daily life, the goal can, however, be explained clearly. An extended version of the test is also available, with more options than the leather patch. (An) appropriate (set of) activities/tasks can thus be offered to each older adult that is suited to each one's level of functioning.

The guideline panel considers that occupational therapists attach great value to this instrument since the duration of the test is short. It takes about two hours on average to do the test and process the results. ACLS may not be done on its own. The instrument must be combined with two observations to take care that people do not get a low score on account of reluctance to do the test. Training in the form of a half-day workshop is needed before the test can be implemented. In addition, the occupational therapist immediately gets an understanding of the older adult's level of cognitive functioning at the time of doing the test. The score indicates a degree of autonomy and learning curve. Feedback can be given to the informal caregiver in the form of an approach guideline. A possible disadvantage is the availability of the instrument. The ACLS manual is in English and no official Dutch translation is available. Moreover, the ACLS can only be done once due to a possible learning effect. It is also has a floor and a ceiling effect.

PRPP | The guideline panel considers that older adults attach reasonable value to the instrument. The instrument can be used effectively because the older adult may and can do their own activities. Depending on the activity that is chosen, the instrument requires physical and/or mental effort. The duration of the test depends on the chosen task (role, routine, subtask) and takes about 1.5 hour on average. Depending on the load capacity of the older adult, it can be spread out over several takes. A great advantage is the fact that the test perfectly fits in with a person's values and preferences. The instrument is furthermore suited to each level of functioning.

The guideline panel considers that occupational therapists attach reasonable value to the instrument. As an occupational therapist you need to have followed the training and be certified. The instrument can be used repeatedly and the results are fairly easy to interpret, depending on how much experience the occupational therapist has. This could explain the inadequate inter-rater reliability if it is taken only once. A score form is needed, digital or otherwise. Equipment is also needed to do the activity. The instrument/score form with login code will be given to you after you have done the training. The duration of the test depends on the activity or activities that is/are chosen; sometimes multiple processing is needed since a verdict can only be made once at least three activities have been done. The time it takes to process all the data obtained will partly depend on the experience/skill of the occupational therapist. It takes about two hours on average to do the test and process the results. The PRPP effectively indicates which cognitive strategies a person can use/have and whether they can perform certain actions. The instrument, moreover, offers a worthwhile substantiation for indicating whether or not a person can continue to live at home.

Economic considerations and cost-effectiveness

AMPS-P | The guideline panel rates the need for resources to use the instrument as high. Relatively high training costs are involved before the instrument can be used. However, since no training is currently available, it is still unclear whether these costs will cease to apply and there is no possibility at present for potential new users to obtain the instrument. For therapists who are already trained and experienced, the time investment is relatively substantial due to the preparation, duration and processing time. This could be disadvantageous considering the ten hours of occupational therapy covered by basic healthcare insurance.

A-ONE | The guideline panel considers the resources needed for the instrument as cost-saving, since they give a relatively fast understanding of the autonomy store and behavioural neurology score. There are costs associated with the training and application for a score form. However, since training is no longer available, these costs no longer apply and it is no longer possible for potential new users to obtain the instrument. The instrument is probably cost-effective for therapists who have already received training. Depending on the experience, it will take more or less time compared to what is delivered.

ACLS | The guideline panel rates the need for resources to use the instrument as cost-effective. The instrument is probably cost-effective due to the fact that there are one-off costs involved in the training and purchasing of the equipment (leather patch, mosaic).
Due to the short duration of the test, the instrument delivers a relatively fast, reliable result. Since more insight has been gained regarding learning capacity, the follow-up therapy can be better adjusted and customised, which will increase the efficiency of the treatment.

PRPP | The guideline panel rates the need for resources to use the instrument as high due to the high training costs. However, the instrument is probably cost-effective due to the useful and effective outcomes. Depending on experience, processing the data will take more or less time. The instrument gives tools for treatment, which increases the impact of the treatment.

Equality

AMPS-P | The guideline panel expects that the instrument will lead to an increase in health equality. The instrument can be used with people regardless of their socio-economic status. Moreover, the test can be done either at home or at a facility and can be used anywhere, provided that the purpose is to identify process capabilities through observation of (i) ADL activities.

A-ONE | The guideline panel expects that the instrument will lead to an increase in health equality. The instrument can be used for people with cortical brain injuries regardless of socio-economic status and can be used anywhere provided that the purpose is to identify cognitive disorders through observation of basic ADL activities.

ACLS | The guideline panel expects that the instrument will lead to an increase in health equality. Various versions of ACLS are available, including a disposable packaging for people with infection-control issues and a larger version for people with sight and coordination problems (LACLS).The instrument can be used regardless of the socio-economic status or location.

PRPP | The guideline panel expects that the instrument will lead to an increase in health equality. The instrument can be used with all diagnoses/ages and cultures regardless of socio-economic status. The PRPP test can be done anywhere, provided that the purpose is to identify (cognitive) information processing in the brain through observation of each (sub) task/routine or role that is meaningful to the older adult.

Acceptability

AMPS-P | The guideline panel expects that acceptance of the instrument will vary among key stakeholders since training is no longer provided. For occupational therapists who have already been trained, the instrument is acceptable and the outcomes can explain problems because a clear cut-off point is generated and the outcomes can explain problems regarding actions, which can be clarifying for everyone involved. Scores above the cut-off point indicate that the older adult is capable of living autonomously and performing everyday activities. Scores below the cut-off point are divided into gradations, where the score indicates what type of help the older adult needs. In addition, the software checks whether the data is imported correctly by continuously calibrating the imported scores. Minus points are the execution of a standardised activity and the duration of the test.

A-ONE | The guideline panel expects that acceptance of the instrument will vary among key stakeholders since training is no longer provided. For occupational therapists who have already been trained, the instrument is acceptable; it is used on activities that the older adult already performs and makes it specifically clear what behavioural neurology disorders are impacting their actions. Only a score form is needed for this. It is essential for the occupational therapist to have knowledge of score and score-list/medical terminology.

ACLS | The guideline panel expects that the instrument will be accepted by the majority of key stakeholders. The instrument does not seem to be client-oriented at first; not everyone will find it meaningful to make stitches on a piece of leather. Other variations have, however, been develop to create wider support. Since the use of the instrument is followed by an observation of a meaningful everyday action, the underlying purpose is also more concrete. It is important for the older adult to be aware of the underlying purpose. Due to the short duration of the test and the link to daily living, the instrument will be well accepted.

PRPP | The guideline panel expects that the instrument will be accepted by all key stakeholders. A proficiency level is generated, which makes it clear what percentage the older adult still has to acquire or on which points help must be given. It makes it clear which cognitive processes are impacting their actions. A major advantage is the fact that the instrument can be used anywhere, that the older adult can do the activity in their own environment (client-oriented) and that targeted interventions can be deduced from it. It is essential for the therapist to have followed training and to acquire/have expertise in score interpretation.

Feasibility

AMPS-P | The implementation of the AMPS is rated as uncertain by the guideline panel, especially because training is no longer provided since the beginning of 2023. At the time of writing this guideline, international consultation is taking place to discuss the option of restarting AMPS training. There is an internationally shared desire to restart this training, but it is unclear whether and when this will be feasible.

A-ONE | The implementation of A-ONE is rated as unrealistic by the guideline panel, especially because training has no longer been provided for a number of years. The instrument can therefore only be used by occupational therapists who are currently trained in A-ONE, provided that the certificate can continue to be calibrated.

ACLS | The implementation of ACLS is regarded as realistic by the guideline panel. Training is offered several times a year as a post-professional higher education workshop for occupational therapists and takes half a day. ACLS can easily be done anywhere, without much equipment. The test must, however, always be combined with at least two observations of daily activities. These do not have to be related.

PRPP | The implementation of PRPP is regarded as realistic by the guideline panel. Training is needed to be able to use PRPP. Training is offered several times a year, both in assessment and in intervention. Both of these training courses take one whole week with a follow-up day.

Potential additional considerations

Focus areas for implementation

A-ONE training is no longer provided. As a result, only occupational therapists who have already been trained for it can use this instrument. The continuity of AMPS training is currently uncertain. Opportunities are examined to restart it.

Knowledge gaps

From the literature review it appears that several areas of the clinimetric characteristics of AMPS, A-ONE, ACLS and PRPP have not (recently) been examined and assessed. The guideline panel advises reviewing the search in order to find more relevant studies. The use of COSMIN criteria is, moreover, a relatively new method for determining the clinimetric characteristics of measurement instruments and only a limited number of studies have already dealt with this method. Further research is essential to contribute to the assessment of the quality of these measurement instruments by means of COSMIN criteria.

The guideline panel advises examining the CoCo-P in a future update or revision of the module.

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D.3 Occupational-therapy approaches and interventions

Literature: search and select

Research question

A systematic review was performed to answer the following research question (PICO):

Which (effective) interventions can the occupational therapist use in the treatment and supervision of frail older adults and/or loved ones who live with them in order to reach the targeted goals of maintaining or improving mutual reliance and self-reliance, the performance of meaningful activities and (social) participation?

P (Population) | frail older adults and/or frail older adults and their loved ones (social network, loved ones)
I (Intervention) | interventions aimed at maintaining and/or improving:
- self-reliance or mutual reliance and/or
- performance of meaningful activities and/or
- participation

C (Control) | no requirements for control group
O (Outcome) | outcomes regarding:
- self- or joint management and/or
- performance of meaningful activities and/or
- participation and/or
- quality of life and/or
- wellbeing

These outcomes may relate both to the frail older adult and to the primary loved one.

Relevant outcome measures

The guideline panel considers the performance of meaningful activities and self- or joint management as crucial outcome measures for decision-making and participation, quality of life and wellbeing as important outcome measures for decision-making. The guideline panel identified no outcome measures as undesirable effects. Considering the broad and exploratory nature of the clinical question, the guideline panel defines each reported effect as important.

Search

To answer the (broad) clinical question, a systematic review of the systematic reviews was carried out.

On 30-6-2022 an information specialist conducted a systematic search in Medline, PsycInfo and Cinahl (see Appendix D.3.1 for the search justification). This systematic search produced 599 unique results. After screening the titles and abstracts based on the inclusion criteria (see table below), 447 articles were excluded. The remaining 148 articles were screened in full. Eventually the search yielded 26 systematic reviews of systematic reviews. For pragmatic reasons, 20 of the 26 studies included were selected for a quantitative analysis (Barber 2021; Bennett 2019; Berger 2018; Chase 2012; Cuevas-Lara 2019; Dopp 2021; Fletcher-Smith 2013; Golisz 2014; Justiss 2013; Lan 2017; Lee 2019; Liu 2020; Liu 2018; Nastasi 2020; Smallfield 2018b; Spargo 2021; Spiliotopoulou 2012; Stark 2017; Wang 2021; Welsby 2019). See Appendix D.3.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix D.3.3 (including references).

Inclusion criteria

Types of studies	systematic reviews (reviews with a systematic search in at least two electronic databases)
Types of patients	frail older adults and/or their loved ones all older adults (> 65 years old) receiving occupational therapy due to a chronic disease or complex problem, were regarded as frail
Type of intervention	occupational-therapy interventions
Type of comparison	all comparisons were included and control groups could consist of people receiving usual care, other occupational-therapy intervention(s) or no intervention
Type of outcome	performance of meaningful activities, participation, quality of life, self- or joint management or wellbeing
Type of timeline	publications since 2012

Characteristics of the included studies

The 20 analysed studies were all systematic reviews of systematic reviews and included in total 136,303 patients who fell under the population of frail older adults. Participants fell partly under a specific sub-population, for example, people with Parkinson's disease, dementia, reduced sight, following hospitalisation, a stroke or lower-leg amputation. The content of the studies was aimed at comparing the effect of the aforementioned outcome measures of various occupational-therapy interventions. The age of participants varied between 40 and 99 and participants' gender percentage was not or hardly specified. Appendix D.3.4 lists the included studies. Appendix D.3.5 shows the characteristics of the included studies.

Individual study quality (RoB)

The set-up and execution of the systematic reviews were rated by an assessor of Cochrane Netherlands with the help of the AMSTAR 2 tool (Higgins 2011). The verdict on the various items was discussed with a second reviewer of Cochrane Netherlands, after which consensus was reached. An overall verdict was then given to each systematic review based on all the items that were indicated as critical. The authors of the AMSTAR 2 tool indicated seven items as potentially critical (items 2, 4, 7, 9, 11, 13 and 15) and advise assessors to determine for themselves which items are critical in the specific context in which reviews are assessed. For the present overview of systematic reviews, items 4, 9 and 13 were seen as critical. An overall verdict was determined based on the guidelines below (Shea 2017):

- **High** | Maximum one 'not met' score for non-critical items: The systematic review gives a precise and extensive summary of the results of the available studies that deal with the question of importance.
- **Fair** | Maximum one 'not met' score for non-critical items*: The systematic review had more than one weak point, but no critical shortcomings. The review possibly gave a precise summary of the results of the available studies that were included in the review.
- **Low** | One 'not met' score for a critical item, whether or not in combination with 'not met' scores for non-critical items: The review has a critical shortcoming and may not give a precise and extensive summary of the available studies that deal with the question of importance.
- **Critically low** | More than one 'not met' score for critical items, whether or not in combination with 'not met' scores for non-critical items: The review had several critical shortcomings and should not be used for giving a precise and extensive summary of available studies.

* Note: Several 'not met' scores can reduce the confidence in the review and it might be appropriate to change the overall verdict from 'fair' to 'low'.

An overview of the quality of each systematic review is provided in Appendix D.3.6.

Effectiveness and evidentiary value

The interventions were first of all classified by researchers from Cochrane Netherlands based on diagnosis. Occupational therapy does not focus on the disease, but on day-to-day functioning. This classification was abandoned and the data was instead divided into 12 areas according to type of approach, intervention and intervention element. Considering the broad and exploratory nature of the clinical question, it is not possible to compare interventions based on outcome measure.

From evidence to recommendation

The quality of evidence was assessed using different classification systems. This is indicated for each area in a table with outcomes. For each area and outcome measure, the following aspects are also shown in the table: the intervention, the review and the results. The component 'from evidence to recommendation' contains nine criteria that are listed below per area. Additional considerations, if any, are then given.

Criteria

Occupational therapy in the living environment

Evidence Table D.3.1

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Performance of meaningful activities			
Home visits or treatment at home (older adults living at home)	Liu 2018 (low)	5 (3 RCTs, 1 level II and 1 level III study) of the 6 studies found a significant effect in older adults with ADL impairments	Strong (US Preventive Services Task Force 2014)
Occupational therapy (in the broad sense) in the home environment or primary care setting (own living environment)	De Coninck 2017 (fair)	Meta-analysis of 6 RCTs (*n*=1,841): occupational therapy was more effective than the control interventions (SMD: -0.30; 95%-RI: -0.50 to -0.11); there was considerable heterogeneity (I^2 = 74%)	Low (GRADE)[1]
Occupational therapy in own living environment (dementia)	Bennett 2019 (fair)	Meta-analysis of 5 RCTs: occupational therapy was more effective than standard care or *attention control* (SMD 0.61; 95%-RI: 0.16 to 1.05)	Low (GRADE)
Participation			
Occupational therapy (in the broad sense) in the home environment or primary care setting (older adults living at home)	De Coninck 2017 (fair)	Meta-analysis of 2 RCTs (*n*=245): occupational therapy was more effective than the control interventions (SMD: -0.44; 95%-RI: -0.69 to -0.19); there was no question of heterogeneity (I^2 = 0%)	Low (GRADE)[1]
Quality of life of frail older adults			
Occupational therapy given in own living environment (dementia)	Bennett 2019 (fair)	Meta-analysis of 6 RCTs: occupational therapy led to a higher quality of life (compared to control group (SMD 0.76; 95%-RI: 0.28 to 1.24); in the 7th RCT, which could not be included in the meta-analysis, no difference was found	Low (GRADE)

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Quality of life of loved one			
Occupational therapy given in own living environment (dementia)	Bennett 2019 (fair)	Meta-analysis of 2 RCTs: occupational therapy led to a higher quality of life (compared to control group (SMD 0.99; 95%-RI: 0.66 to 1.33); in the 3rd RCT, which could not be included in the meta-analysis, no difference was found	Fair (GRADE)
Wellbeing of loved ones			
Occupational therapy given in own living environment (dementia)	Bennett 2019 (fair)	Meta-analysis of 4 RCTs: no difference with regard to burden on loved one (family carer burden) between occupational-therapy group and control group (SMD -0.06; 95%-RI: -0.31 to 0.18)	Low (GRADE)
		As a measure of burden, the number of hours that loved ones provided care was looked at in 3 RCTs: no difference was found between the occupational-therapy and the control group (SMD -0.20; 95%-RI: -0.46 to 0.06)	Low (GRADE)
		The same 3 RCTs examined the number of hours that loved ones did something for (or gave attention to) the person with dementia; no difference was found in favour of occupational therapy (SMD -0.33; 95%-RI: -0.58 to -0.07)	Low (GRADE)

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living; SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

Occupational therapy in the own living environment leads to a small to average effect with regard to an improvement in performance of meaningful activities of daily living. The effect on participation is small. For older adults with dementia, occupational therapy in their own living environment has an average effect on the quality of life of the frail older adult and a large to small effect on the wellbeing and quality of life of their loved one.
The guideline panel rates the desirable effects of occupational therapy in the own living environment as moderate compared to treatment in a clinic or other comparable setting.

Undesirable effects

Various effects were found of occupational therapy in the own living environment on the wellbeing of the loved one. The study by Bennett (2019) showed both a positive effect and no effect were demonstrated. This contradiction is hard to explain, according to the guideline panel.

Quality of evidence

The quality of evidence with regard to improvement in the performance of meaningful activities and participation is low. The quality of evidence with regard to the quality-of-life outcome measure varied from fair to low. The guideline panel rates the evidentiary value of the desirable effects as moderate. The guideline panel rates the evidentiary value of the undesirable effects as very low and more as unclear.

Client values and preferences

A feeling of safety in the own living environment has a positive effect on treatment. No transfer is necessary from the situation in the clinic to the own living environment. The own living environment is the place where the frail older adult carries out most of their activities of daily living (ADL). The improvement in ADL is the crux of occupational-therapy treatment. It is not necessary to travel to the occupational-therapy practice, which limits the burden on the frail older adult (and loved one). The frail older adult feels safe and secure at home. This is mostly true also when it is a temporary living environment. The guideline panel assesses that frail older adults attach great value to treatment at home and that there is little variation among frail older adults in this regard.

Balance between desirable and undesirable effects

The guideline panel came to the following assessment: the advantages of occupational therapy in the own living environment outweigh the possible disadvantages. Despite the variation in effect size and evidentiary value, the guideline panel believes that the information should be included in the formulation of recommendations. The values and preferences of the frail older adult, moreover, account for much in this belief. The guideline panel believes treatment in the own living environment to be one of the strengths of occupational therapy.

Economic considerations and cost-effectiveness

The guideline panel considers the necessary resources for treatment in the own living environment to be cost-effective. The frail older adult and loved one do not need to pay any travel costs. The occupational therapist on the other hand does have travel costs. Healthcare insurance provides a reimbursement for this in a primary care setting. The guideline panel considers that the efficiency that is achieved by treatment in the own living environment more than justifies the costs of the time that the occupational therapist spends travelling. In addition, some studies on the cost-effectiveness of interventions at home suggest that these save costs (Clarkson 2017; Graff 2008; Lammers 2014). The guideline panel therefore considers treatment in the own living environment to be cost-effective.

Equality

The guideline panel expects that treatment in the own living environment will lead to a possible increase in health equality. Since the frail older adult and loved one do not have any travel costs, people with a lower income can more easily follow occupational-therapy treatment without any financial burden.

Acceptability

The guideline panel expects that treatment in the own living environment will be accepted by all key stakeholders. Treatment in the own living environment is already done by occupational therapists. The travel costs are negligible compared to the cost-effectiveness of an efficient treatment at home.

Feasibility

The implementation of treatment in the own living environment is regarded as realistic by the guideline panel. Treatment in context forms part of the current way of working, and care in a primary setting geared to this by means of a travel allowance for the occupational therapist. From an organisational point of view, it can be a challenge to work in an interdisciplinary way and coordinate the planning with other healthcare professionals, while keeping in mind the burden on the frail older adult and the various agendas. It requires large set of organisational and planning skills from the healthcare professionals in question who provide treatment in the own living environment.

Possible additional considerations

Seeing that planning and multidisciplinary cooperation can be a barrier to the feasibility of treatment in the own living environment, attention must be given to this. Interdisciplinary collaboration falls under the general component of the Paramedical Guideline on Frail Older Adults. See Module B.3 'Organisation of care' for information and recommendations.

An important intervention that the search did not highlight but that is important for this topic in the guideline is the EDOMAH programme (Graff 2010). It is an evidence-based occupational-therapy guideline for the diagnosis and treatment of older adults with dementia in their own living environment. This intervention is preferably done by EDOMAH-trained occupational therapists.

Knowledge gaps

In order to make more detailed recommendations, a systematic review based on primary studies will be needed in a future update of this guideline. In addition, the collected data on quality of living and wellbeing come from reviews that focus solely on people with dementia and their loved ones.

Problem-solving and behavioural activation approach

Evidence Table D.3.2

Intervention	Review(s) (AMSTAR 2 assessment)	Results	Quality of evidence (classification system)
Quality of life of frail older adults			
Problem-solving approach (people with visual impairment and mental problems)	Barber 2021 (fair)	3 RCTs: a problem-solving approach aimed at improving functional and mental health outcomes, in combination with the usual approach to visual impairment (visual rehabilitation, programme-specific training), leads to better quality of life and fewer symptoms of depression	Fair (American Occupational Therapy Association's Systematic Review Guidelines 2020)
Behavioural activation approach (people with visual impairment and mental problems)	Barber 2021 (fair)	2 RCTs: implementing a behavioural activation approach can help older adults to cope with challenges in the field of mental health	Fair (American Occupational Therapy Association's Systematic Review Guidelines 2020)
Participation			
Problem-solving approach (people with visual impairment)	Nastasi 2020 (low)	1 SR, 1 additional non-controlled observational study: positive effect for both	High (US Preventive Services Task Force 2008)

RCT: randomised controlled trial; SR: systematic review

Desirable effects

The problem-solving approach as a supplement the usual approach has a positive effect (see table) on functional and mental health outcomes (including reduced symptoms of depression) and on the quality of life of frail older adults. This approach furthermore has a positive effect on social participation. The behavioural activation approach has a positive effect on coping with challenges with regard to mental health.

For both these approaches, the evidence found applies to people who are visually impaired. The guideline panel rates the desirable effects of the problems-solving approach and behavioural activation approach as fair.

Undesirable effects

The scientific literature reports no undesirable effects.

Quality of evidence

The guideline panel rated the effect of the problem-solving approach on functional and mental health outcomes and on quality of life as fair. Both the quality of the evidence and the quality of the review were rated as fair.
The guideline panel rated the effect of the problem-solving approach on social participation as fair. The quality of the evidence was rated as high. However, the quality of the review was rated as low. The guideline panel rates the evidentiary value of the desirable effects as fair.

Client values and preferences

The guideline panel considers, based on experiences, that older adults attach value to a problem-solving and behavioural activation approach, provided that it is applied to older adults for whom such methods are suitable.

Balance between desirable and undesirable effects

The guideline panel rates the desirable effects as determining. From the evidence, no negative effects were reported. Although the evidence only applies to people who are visually impaired and/or experience functional or mental problems, the guideline panel knows that these approaches can also be used effectively with other target groups within the group of frail older adults.
Caution is, however, recommended in the use of this intervention for older adults with cognitive problems. When the method is not sufficiently adapted to the person's capabilities, it can lead to unnecessary confrontation and frustration. Involving the loved one can be helpful in this regard.

Economic considerations and cost-effectiveness

The evidence found gives no information on cost-effectiveness. The approach can be applied within regular occupational-therapy treatment and does not require any additional training. No extra funding is needed for this. When properly applied, the approach can lead to reduced resistance on the part of frail older adults, because it taps into the older adult's own problem-solving abilities. It is also possible that the older adult will use their own problem-solving abilities the next time they encounter a problem, without the need to ask for further care. The guideline panel believes that the use of this approach might lead to savings.

Equality

The guideline panel expects that this approach will have no impact on health equality. This approach can be used in various circumstances. It is up to the occupational therapist to apply the approach in such a way that it is suited to older adults with various levels of health literacy.

Acceptability

The guideline panel expects that the intervention will be accepted by the majority of key stakeholders.

Feasibility

The implementation of the problem-solving approach and the behavioural activation approach is assessed by the guideline panel as realistic. At present, training is already offered for similar approaches (for example problem-solving discussions, motivating discussions and solution-oriented coaching). In addition, the approaches are in line with the philosophy of occupational therapy to focus on opportunities and the furthering of self-management in people, which increases the chances of implementation.

Possible additional considerations

A recent systematic review (Nielsen 2023) found that in 4 of the 5 studies, occupational therapy with a problem-solving approach showed better results than the control intervention. The interventions consisted of defining the problem, analysing the problem, devising a strategy and using the strategy to help solve the problem.

Knowledge gaps

The clinical question was very broad. It did not focus on specific target groups or interventions, but on interventions in general that occupational therapists can use within the treatment phase for frail older adults and/or loved ones who live with them. The evidence found did not demonstrate whether these approaches were also useful for older adults with cognitive problems or dementia. This will require further (literature) review.

Occupational therapy with several components

In this module, occupational therapy consisting of various components is regarded as a compound of occupational-therapy treatment by combining various interventions or elements thereof. In the event of a complex problem or several problems, it may be desirable to focus the treatment on several treatment goals simultaneously.

Evidence Table D.3.3

Intervention	Review(s) (AMSTAR 2 assessment)	Results	Quality of evidence (classification system)
Performing meaningful activities			
Programmes consisting of several components (older adults living at home)	Liu 2018 (low)	2 studies (1 RCT, 1 level II study) found no significant effects of programmes consisting of several components on older adults with impairments in ADL	Low (US Preventive Services Task Force 2014)
		3 RCTs found contradictory effects on older adults without impairments in ADL	Low (US Preventive Services Task Force 2014)
Combination of classic education and training in a car behind the wheel (older adults living at home)	Golisz 2014 (low)	3 studies (level I) found strong evidence that driving performance improved	Strong (classification system not reported)
Multifactor approach to fall prevention (older adults living at home)	Chase 2012 (critically low)	Strong evidence for the effectiveness on impairments in ADL and IADL based on 10 RCTs	Strong (classification system not reported)
Participation			
Use of a combination of interventions (older adults living at home)	Nastasi 2020 (low)	1 SR, 1 additional non-controlled observational study: positive effect	Fair (US Preventive Services Task Force 2008)
Quality of life of older adult			
Lifestyle intervention: other group interventions consisting of goal-setting and psycho-education (older adults living at home)	Berger 2018 (low)	3 RCTs, where the intervention also contained training of activities, found a significant effect; 1 non-controlled observational study found no significant effect	Strong (classification system not reported)

Intervention	Review(s) (AMSTAR 2 assessment)	Results	Quality of evidence (classification system)
Quality of life of loved ones			
Education in combination with social support (loved one, dementia)	Wang 2021 (low)	6 RCTs with education and social support as common component reported favourable effects, for example, on quality of life	Unclear[1]
Education and training (dementia)	Wang 2021 (low)	9 out of 10 RCTs with education and training as a common intervention component reported advantages for loved ones, such as improved quality of life	Unclear[1]

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living

Desirable effects

Interventions consisting of several components that focus on falling have a strong positive effect on the performance of meaningful activities. A strong positive effect was also found for a combination of education and training on driving proficiency.

A combination of interventions had positive effects on the participation of older adults.

Group interventions consisting of the components goal-setting and psycho-education showed positive effects on the quality of life of older adults living at home, particularly when activities were also trained. Lastly, positive effects were found from interventions that contain social support and education or education and training, on the quality of life of loved ones.

The guideline panel assesses the desirable effects of interventions consisting of several components as fair to strong in general.

Undesirable effects

One systematic review of interventions with several components aimed at older adults living at home in general (Liu 2018) showed contradictory effects with regard to activities of daily living. The guideline panel rates the undesirable effects as low due to the contradictory results.

Quality of evidence

The evidence with regard to the effect of interventions consisting of several components aimed specifically at falls was considered strong, while the quality of the systematic review was considered critically low. The guideline panel rates the evidentiary value as fair.

The evidence with regard to the effect of interventions consisting of education and training and focusing specifically on driving abilities was considered strong, while the quality of the systematic review was considered low. The guideline panel rates the evidentiary value as fair.

The evidence with regard to the effect of interventions consisting of several components on participation is fair, while the quality of the systematic review was considered low. The guideline panel rates the evidentiary value as low.

The evidence with regard to the effect of group interventions consisting of goal-setting, psycho-education and training of activities among other things on the quality of life of the older adult is strong, while the quality of the systematic review was considered low. The guideline panel rates the evidentiary value as fair.

The evidence with regard to the effect of interventions aimed at loved ones where education and training or social support and education were combined could not be assessed in terms of quality. The quality of the studies was rated as good, but no (quantitative) results were available for the assessment of all GRADE items. The quality of the review was rated as low.

Client values and preferences

Occupational therapy already works with several components in treatment. Prior to the intervention, individual goals are set. This is in line with the evidence that goal-setting is an important component. In this way, customised treatment can be offered and various components can be used to reach a goal. For example, first informing through psycho-education, followed by actual training in activities of daily living that are meaningful to the older adult. Frail older adults are in general very satisfied with this.

Balance between desirable and undesirable effects

The guideline panel came to the conclusion that the desirable effects outweigh the undesirable effects when it comes to performance of activities of daily living, the quality of life of the older adult, and the quality of life of the loved one. No negative effects were reported from the evidence. The evidence is furthermore applicable to all frail older adults in their own living environment and with various types of problems. No evidence was found for an intramural setting. In addition to the evidence in the evidence table, another systematic review showed that interventions based on activities and actions and which consist of several components help to reduce the experience of functional impairments in older adults, improve self-confidence and increase autonomy in instrumental activities and greatly improve the performance of activities compared to older adults who do not receive such an intervention (Orellano 2012).

Economic considerations and cost-effectiveness

The evidence found provides no quantitative information on cost-effectiveness. Setting personal goals and using several components that match the older adult's goals already form part of occupational-therapy treatment. The costs of occupational therapy are covered. However, frail older adults are often people with a complex set of medical and functional challenges. The hours that are reimbursed are often not sufficient to deliver satisfactory care. The personal goals of the loved one that arise from caring for the frail older adult can often be achieved within the given number of hours of occupational therapy for the benefit of the loved one. Often a lot can be achieved by combining hours of treatment for the older adult as well as the loved one. The guideline panel expects that an earlier start of an occupational-therapy treatment and the possibility to put in extra hours with complex problems under basic healthcare insurance will lead to savings and better care and therefore also better outcomes (including the prevention of more expensive care). The need to find a solution is growing increasingly, as older adults continue to live at home for longer.

Equality

The guideline panel indicates that the use of several components within an intervention has no impact on health equality, since it is already practised in occupational therapy. However, it is possible that people with a low socio-economic status only have basic healthcare insurance and no budget to pay for supplementary treatment themselves, compared to older adults who have a higher socio-economic status. For people with complex problems, this will cause inequality based on economic status.

Acceptability

The guideline panel expects that the intervention will be accepted by all key stakeholders. With the effective use of interventions for people with complex problems, resistance is, however, expected from healthcare insurers when extra financing is need for additional hours.

Feasibility

This method is already applied in occupational therapy. The use of several components always comes down to customisation. The therapist must take account of the opportunities and personal goals of the older adult as well as their capabilities when choosing the best components for the situation in hand. This does require the therapist to reason in a professional way, weigh up the choices and discuss these with the older adult. The implementation of the use of several components is considered realistic by the guideline panel.

Knowledge gaps

The evidence found gives a general overview of effectiveness. To get a clearer picture of the mechanisms at work in the effectiveness or non-effectiveness of an intervention consisting of several components, a more targeted (literature) review is needed. More specific recommendations can then also be made.

Self-management and lifestyle interventions

Evidence Table D.3.4

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Participation			
Self-management programmes for chronic diseases	Smallfield 2018 (fair)	Fair evidence for the effectiveness on participation in leisure activities; no effect size reported	Fair (US Preventive Services Task Force 2014)
Quality of life of older adult			
Self-management intervention (dementia)	Döpp 2021 (critically low)	3 studies (2 RCTs and 1 qualitative): improved quality of life in the intervention group compared to the control group; no effect size reported	Unclear[1]
Group intervention (self-management with visual impairment)	Barber 2021 (fair)	2 RCTs, 1 controlled observational study: group intervention (mainly aimed at self-management for people with visual impairment) can help older adults to deal with challenges regarding mental health in relation to their visual impairment; no effect size reported	Fair (American Occupational Therapy Association's Systematic Review Guidelines 2020)
Chronic Disease Self-Management Programme (older adults living at home)	Berger 2018 (low)	3 studies (2 RCTs and 1 non-controlled observational study) showed significant results; the other 6 studies (RCTs and observational studies) found no significant effect; no effect size reported	Contradictory (classification system not reported)
Other group interventions consisting of goal-setting and psycho-education (older adults living at home)	Berger 2018 (low)	3 RCTs, where the intervention also contained training of activities, found a significant effect; 1 non-controlled observational study found no significant effect; no effect size reported	Strong (classification system not reported)
Individual interventions (older adults living at home)	Berger 2018 (low)	6 studies: 2 RCTs found positive results on quality of life and 4 studies (1 RCT and 3 observational studies) found no significant effect; no effect size reported	Contradictory (classification system not reported)
Own/joint control			
Self-management intervention (dementia)	Döpp 2021 (critically low)	4 RCTs: no significant differences in terms of self-management; no effect size reported	Unclear[1]

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Wellbeing of older adults			
Self-management intervention(dementia)	Döpp 2021 (critically low)	3 studies (2 RCTs and 1 qualitative): improved psychosocial wellbeing; no effect size reported	Unclear[1]
Performing meaningful activities			
Self-management approach (people who are visually impaired)	Liu 2020 (fair)	3 RCTs, 3 non-controlled observational studies: no advantage of self-management approach or not in combination with usual rehabilitation for visual impairment in the improvement in activities of daily living; no effect size reported	Low (US Preventive Services Task Force 2014)

* insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living; SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

An improvement in wellbeing is noted after a self-management intervention. The use of self-management has a fair impact on social participation. No effect of self-management is generally reported on the performance of meaningful activities of daily living, own/joint control and the quality of life of older adults. The guideline panel considers the desirable effects of self-management and lifestyle interventions to be moderate.

Undesirable effects

No undesirable effects were reported. However, no (significant) effect was found, for example, of self-management for visually impaired older adults in terms of meaningful daily activities. Moreover, no significant effects were found of self-management on own control.

Quality of evidence

Self-management programmes for chronic diseases lead to an improvement in social participation with a fair quality of evidence (Smallfield 2018b). Studies on the effect of self-management on quality of life in older adults give contradictory results with an unclear, contradictory to strong quality of evidence. Due to the low or unclear quality of evidence, the results regarding the effect of self-management on own/joint control, the wellbeing of older adults and the performance of meaningful activities of daily living could not be interpreted. The guideline panel rates the evidentiary value of the desired effects as very low.

Client values and preferences

Having, maintaining and/or developing self-management is very important for many frail older adults. Working towards more self-reliance, participation and an understanding of their own role in their health situation are regarded as essential by the guideline panel. Loved ones are furthermore often involved in this intervention, which is positive for the treatment. The guideline panel assesses that frail older adults attach great value to the intervention and that there is little variation among people in this regard.

Balance between desirable and undesirable effects

The guideline panel came to the following assessment: only desirable effects were reported. The guideline panel indicates that self-management interventions are implemented with success in practice and that there is also a need for this among frail older adults. There is, however, very little concrete scientific evidence to substantiate it.

Economic considerations and cost-effectiveness

The guideline panel considers the necessary resources for the intervention to be negligible. Self-management programmes fall under the duties of occupational therapists. The intervention will therefore not require high costs in terms of training or software.

The intervention is probably cost-effective. There are, however, no studies available to demonstrate this. In the long term, the use of self-management interventions for the purposes of prevention could be cost-effective. When frail older adults remain self-reliant for longer through the preventive use of self-management, it ensures a lower care burden. This results in lower healthcare costs in the long term.

Equality

The guideline panel expects that the intervention will have a positive effect on health equality. Frail older adults with a small or no social network mostly have to rely on themselves or on paid care. Furthering self-management through interventions can improve the participation of this sub-target group.

Acceptability

The guideline panel expects that the intervention will be accepted by all key stakeholders. Frail older adults have a need for self-management, which is in line with social developments in the field of healthcare. The government's aim is to have people live at home and be self-reliant for as long as possible.

Feasibility

The implementation of self-management programmes is regarded as realistic by the guideline panel. The intervention is already used and requires no drastic changes for those involved, apart from increasing the frail older adult's awareness and taking steps to reach the goals.

Knowledge gaps

More qualitative evidence is needed in order to make a recommendation.

Adjustments in the living environment

Evidence Table D.3.5

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Meaningful activities of daily living			
Adjustments in the living environment (older adults living at home)	Stark 2017 (fair)	Strong evidence for the effectiveness of interventions that focus on adapting the living environment A more extensive treatment consisting of identifying the person's capacities, own living environment and occupational-therapy goals, drawing up a plan to overcome barriers, which includes implementation and support and training of the older adult and loved one, are more effective than less extensive interventions; no effect size reported	Strong (US Preventive Services Task Force 2012)
Adjustments in the living environment aimed at preventing falls. (older adults living at home)	Chase 2012 (critically low)	Fair evidence for the maintenance and improvement in ADL and IADL based on 7 studies, including 5 RCTs; no effect size reported	Fair (classification system not reported)

Social participation			
Adapting the living environment (older adults living at home)	Nastasi 2020 (low)	1 SR: contradictory evidence; 2 additional non-controlled observational studies: beneficial effect; no effect size reported	(Very) low[1]

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living; SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

The form of intervention where adjustments to the living environment are advised results in a positive effect on the performance of meaningful activities of daily living. The study by Nastasi (2020) shows contradictory evidence and a beneficial effect of adjustments to the living environment on social participation. The guideline panel considers that the desirable effects of advising on how to adapt the living environment are significant.

Undesirable effects

The guideline panel considers that there are no undesirable effects with regard to giving advice on how to adapt the living environment.

Quality of evidence

The quality of the evidence with regard to meaningful activities of daily living varies from strong to fair and the quality of the review from fair to critically low. The quality of the evidence regarding social participation is (very) low. The quality of the systematic review is rated as low. The guideline panel therefore rates the evidentiary value of the desirable effects as moderate.

Client values and preferences

Most of the needs for assistance of frail older adults pertain to their actions in their living environment. Adjustments to the living environment are important to prevent falls and improve the performance of daily actions and can, according to the guideline panel, improve participation. Despite the fact that no effect was demonstrated of home adjustments on social participation, the guideline panel considers that there may well be an effect. It may be that the study only looked at participation outside the home, but participation can also increase within the own living environment. The occupational therapist's duties are often performed in the own living environment, which is an environment where the older adult feels at ease. This feeling contributes to the effect of the treatment, as is also described in the area of 'treatments in the own living environment'. This positive effect also plays a role in making adjustments to the living environment. A large proportion of the older adult's need for assistance is related to actions in the own living environment. By analysing the home and giving advice on how to adapt it, the need for assistance may be solved (in part). On the other hand, home adjustments may look unattractive or decrease the value of the house. This can be undesirable for the older adult and/or loved ones. The guideline panel assesses that frail older adults attach great value to the intervention and that there is a fair amount of variation among people in this regard.

Balance between desirable and undesirable effects

No undesirable effects were found and the guideline panel considers the desirable effects as very meaningful.

Economic considerations and cost-effectiveness

Treatment in the own living environment is one of the current duties of occupational therapists. Making home adjustments entails no extra costs in that regard. The consequence of advising on home adjustments does, however, entail costs, for the older adult or another party and, home adjustment can affect the value of the home. On the other hand, adjustments

that are advised by an occupational therapist are very likely to be effective. Without such an analysis, for example, at the initiative of the older adult themselves, home adjustments may sometimes be ineffective and not cost-effective. The guideline panel therefore considers occupational-therapy advice on home adjustments to be cost-effective. If home adjustments are needed that fall under the Dutch law on social support (Wmo), resources must be financed by the municipality. The authorities are aiming for increased autonomy and self-reliance among (frail) older adults. By making adjustments to the home, frail older adults can live there longer; thanks to this they may either need less care or do not have to move to a facility. This is considered by the guideline panel to be a substantial saving in the healthcare system, hence the intervention is regarded as being cost-effective.

Equality

The Wmo regulations differ from one municipality to another. There are also demographic differences between municipalities, which means that different budgets are available per inhabitant for these types of arrangements. This is a direct cause of inequality in the Netherlands. In addition, the guideline panel notes that it is becoming increasingly difficult in practice for people to get a Wmo application approved. When it is not approved, an older adult may choose to purchase the aid on their own. Given the costs of certain aids, not everyone is able to do so. This can contribute to a decrease in socio-economic equality. If this trend continues, the guideline panel expects to see a decrease in health equality.

Acceptability

Since the intervention is already used in practice, the guideline panel expects that it will be accepted by all key stakeholders.

Feasibility

The implementation of adjustments in the living environment is considered realistic by the guideline panel. It is important to monitor whether socio-economic equality is decreasing due to the limited supply of aids under the Wmo. If the application is approved, there is often a long waiting period
before the aids arrive from the supplier. To achieve the desirable effect of the intervention, it is important that this improves. There is also a housing shortage due to regulations in various municipalities. Frail older adults among others are prevented from moving to a suitable dwelling or nursing home. The questions around home adjustments can become more complex. This aggravates matters in the professional field of occupational therapy. There is also a shortage of active occupational therapists, which means that older adults sometimes have to wait a long time before they get treatment. Time is of the essence in the treatment of frail older adults. The situation can deteriorate to such an extent that the costs increase, since other healthcare will have to be provided during the waiting period.

Possible additional considerations

The value of the occupational therapist's advice on home adjustments and aids is recognised. The Landelijk normenkader hulpmiddelen (national standard framework for aids) (2020) explicitly states that: '*The municipality and supplier shall take the functional advice of an occupational therapist into consideration in the choice of an aid. The functional advice of the rehabilitation team shall be a leading factor, unless...*' (p. 8). Handreiking Ergotherapeutisch Huisbezoek (2022) provides occupational therapists with a uniform method for identifying the living situation. This contributes to the practical feasibility of the intervention.

Knowledge gaps

In order to make more detailed recommendations in a future update, the clinical question should be fine-tuned and an analysis should be made of systematic reviews based on primary studies.

Fall prevention

Evidence Table D.3.6

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Meaningful activities of daily living			
Multifactor approach aimed at fall prevention (older adults living at home)	Chase 2012 (critically low)	Strong evidence for the effectiveness on impairments in ADL and IADL based on 10 RCTs; no effect size reported	Strong (classification system not reported)
Physical activity aimed at fall prevention (older adults living at home)	Chase 2012 (critically low)	Fair evidence for the maintenance and improvement in ADL and IADL based on 19 RCTs; no effect size reported	Fair (classification system not reported)
Adjustments in the living environment aimed at fall prevention (older adults living at home)	Chase 2012 (critically low)	Fair evidence for the maintenance and improvement in ADL and IADL based on 7 studies, including 5 RCTs; no effect size reported	Fair (classification system not reported)
Quality of life of older adult			
Education aimed at fall prevention	Chase 2012 (critically low)	No overall conclusion at review level regarding quality of life; 1 RCT found a significant increase in the physical component of quality-of-life scores for education compared to physical training and safety assessment of the living environment; no effect size reported	Very low (GRADE)[1]

1. insufficient information for making an estimate; RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living; SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

The use of the fall-prevention intervention had a positive effect on the performance of meaningful daily activities. As for education on fall prevention, no unequivocal effect on quality of life was found. The fact of once more or better being able to perform ADL has an indirect effect on the participation, wellbeing and quality of life of the frail older adult. The guideline panel therefore considers the desirable effects of fall prevention to be considerable.

Undesirable effects

No undesirable effects are reported.

Quality of evidence

The quality of the evidence with regard to the performance of meaningful activities of daily living varies from fair to strong and the quality of the review is considered to be critically low. The quality of the evidence regarding quality of life is very low. The guideline panel rates the evidentiary value of the desirable effects as fair.

Client values and preferences

The guideline panel assesses that frail older adults attach reasonable value to the intervention and that there is significant variation among older adults in this regard. Older adults are not always open to an intervention aimed at fall prevention. This is often linked to a limited understanding of their own disease profile.

Balance between desirable and undesirable effects

The guideline panel came to the following assessment: the desirable effects are determining. No undesirable effects are reported in the literature. There is a risk that the frail older adult may show resistance. It is important for an occupational therapist to identify the motivation of the older adult and any possible resistance to fall prevention. Fall prevention is applied in practice. The occupational-therapy approach has so far not been examined much. The guideline panel considers the value of occupational-therapy fall prevention to be high, as it can be combined with other interventions, such as adjustments in the living environment.

Economic considerations and cost-effectiveness

The guideline panel considers the necessary resources for the intervention to be negligible. Fall prevention is in fact already used. If there is a preference for using a specific treatment method, there may be training costs involved.
The intervention is cost-effective, as fall prevention ensures that people fall less. Falling less will, for instance, reduce the healthcare costs related to hospitalisation after a fall. VeiligheidNL developed a fall-prevention calculator (Rekenhulp Valpreventie) to identify the cost-effectiveness of fall-prevention programmes for each region.

Equality

The guideline panel expects the intervention to have no effect on health equality.

Acceptability

The guideline panel expects that the intervention will be accepted by the majority of key stakeholders. The only resistance that is expected is that of older adults with an insufficient understanding of their own disease profile.

Feasibility

The implementation of fall prevention is considered realistic by the guideline panel, particularly since fall prevention is already applied. The guideline panel furthermore encourages collaboration with physical therapists to make the fall-prevention programme as effective and comprehensive as possible to the frail older adult. The occupational therapist analyses the living environment and ADL while the exercise/physical therapist will look more at the physical capabilities of the frail older adult.

Possible additional considerations

With a multi- or interdisciplinary approach it is important to make it clear to those involved which healthcare professionals are responsible for which aspects. This will avoid confusion for the frail older adult as well as among healthcare professionals. Whether a fall-prevention intervention can be desirable or effective can be assessed by means of the fall-analysis tool Valanalyse (VeiligheidNL 2023). This tool was developed by VeiligheidNL, is recognised by the Rijksinstituut voor Volksgezondheid en Milieu or RIVM (Dutch National Institute for Public Health and the Environment) as well substantiated, and is based among other things on the World Falls Guideline (Montero-Odasso 2022). The fall-analysis tool can be used by healthcare professionals, including occupational therapists, to identify the caused of the falls risk. The Occupational Therapy Guideline on Fall Prevention (Ergotherapierichtlijn Valpreventie, 2016) gives detailed information on when and how an occupational therapist can implement fall prevention as in intervention in the treatment.
In the advisory report 'Preventie eenzijdige valongevallen ouderen buitenshuis' (2022) of VeiligheidNL the importance of fall prevention and the implementation of the Stroll Safe programme in the Netherlands are discussed. The Stroll Safe programme is a scientifically substantiated occupational-therapy programme with proven effectiveness aimed at fall prevention outdoors (Chippendale 2019; Chippendale 2022; Chippendale 2023). The programme consists of group sessions every seven weeks where participants are informed and where actual exercises are done outdoors using strategies. The focus here is both on the physical and the social environment and on personal factors that contribute to falls.
Research among older adults who have already had outdoor falls or who are scared of falling shows that the Stroll Safe programme significantly improves knowledge on the falls risk outside and the use of strategies to move around outdoors. In any event, the effects remained visible up to six weeks after the programme was completed (Chippendale 2022).

Participating older adults experienced the programme as positive. They experienced a change in their behaviour and enjoyed following the programme (Chippendale 2023). The advisory report indicates that the evidence-based programme is also suitable to be adapted for implementation in the Netherlands. The project to implement it started in 2023.

Knowledge gaps

In order to make more detailed recommendations in a future update of this guideline, a systematic review based on primary studies will be desirable.

Only one systematic review that met the selection criteria was found in the field of fail older adults and fall prevention.

Skill training

Skill training comprises interventions that focus on a wide range of skills such as driving abilities, physical competencies, visual capabilities, cognitive functioning and resistance to stress.

Evidence Table D.3.7

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Performance of meaningful activities by older adults			
Physical training (older adults living at home)	Liu 2018 (low)	3 of the 6 RCTs with frail older adults found a significant improvement in ADL immediately after the intervention, but found different results in the long term	Fair (US Preventive Services Task Force 2014)
		3 RCTs found no added effects of multimodal physical training compared to other types of training or movement education for older adults with impairments in ADL.	Low (US Preventive Services Task Force 2014)
		1 RCT and 1 non-controlled observational study found significant differences in task-specific training for older adults with impairments in ADL.	Fair (US Preventive Services Task Force 2014)
		4 studies found no significant effect of physical training for older adults without impairments in ADL. No effect size reported	Low (US Preventive Services Task Force 2014)
Driving-simulator training (older adults living at home)	Golisz 2014 (low)	Can improve driving behaviour and driving proficiency; no effect size reported	Unclear[2]
Training behind the wheel (older adults living at home)	Golisz 2014 (low)	Can improve driving behaviour and driving proficiency; can in combination with education reduce the number of critical mistakes; no effect size reported	Unclear[2]
Driving-proficiency training (simulator/road) and/or visual training (older adults living at home)	Spargo 2021 (fair)	1 RCT, 4 (uncontrolled) observational studies: occupational therapy possibly leads to improved driving proficiency; no effect size reported	Low (US Preventive Services Task Force 2012)

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Driving-simulator training (people with visual impairment)	Justiss 2013 (low)	1 RCT (73 participants aged under 75, of which < 25% with visual impairment following a cerebrovascular accident): simulation-based performance results improved: significant reduction of collisions, collisions with pedestrians and overall mistakes	(Very) low (GRADE)[1]
Physical training (older adults during or after hospitalisation)	Liu 2018 (low)	2 RCTs that compared multimodal physical training with placebo activities or standard healthcare for older adults discharged after hospitalisation found no significant effects.	Low (US Preventive Services Task Force 2014)
		2 RCTs compared training (progressive resistance training of lower extremity or multimodal physical training) with no intervention or a written home-exercise programme for older adults with a previous hip fracture; 1 study found a significant improvement in getting in and out of bed, while another study found no differences. No effect size reported	Low (US Preventive Services Task Force 2014)
Performance of meaningful activities by loved ones			
Training (various capabilities and competencies), whether or not in combination with other interventions (dementia)	Wang 2021 (low)	3 RCTs with only training as intervention, found significant effects, such as an increased sense of self-efficacy in the provision of care 10 out of 12 studies with training as a common intervention component reported significant effects for loved ones, such as improved self-efficacy No effect size reported	Unclear[1]
Quality of life of loved ones			
Training (dementia)	Wang 2021 (low)	10 out of 12 RCTs with training as a common intervention component reported significant effectiveness including improved quality of life no effect size reported	Unclear[1]
Wellbeing of loved ones			
Training (dementia)	Wang 2021 (low)	10 out of 12 RCTs with training as a common intervention component reported significant effectiveness including lower burden no effect size reported	Unclear[1]
Participation			
Capability training (people with visual impairment)	Nastasi 2020 (low)	1 SR: contradictory evidence 2 additional non-controlled observational studies: beneficial effect No effect size reported	(Very) low[1]

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Quality of life of older adult			
Capability training (people with visual impairment)	Barber 2021 (fair)	3 RCTs: no improvement in mental health outcomes after (supplementary) capability training compared to the usual visual rehabilitation; no effect size reported	Fair (American Occupational Therapy Association's Systematic Review Guidelines 2020)

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); 2. insufficient information for making an estimate
RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living;SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

Capability training has a positive effect on the performance of meaningful activities both for the older adult and for the loved one. There is, moreover, an improvement in the quality of life and wellbeing of the loved one. For people with visual impairment, the training also has a positive effect on social participation.
The guideline panel believes that aforementioned evidence is recognisable in practice. The guideline panel furthermore indicates that based on practice, it also sees a positive effect on the wellbeing of the older adult when capabilities are trained.

Undesirable effects

The scientific literature reports no undesirable effects.

Quality of evidence

Meaningful activities for older adults: the quality of the evidence varies from low to high for effectiveness, but based on the AMSTAR 2 score, the confidence in the results of the reviews was low.
Meaningful activities for loved ones: there was insufficient information to make an estimate with regard to the quality of the evidence for effectiveness. The confidence in the results was low.
Quality of life of older adults: fair quality of evidence for effectiveness and the confidence in the results of the review was fair.
Quality of life of loved ones: there was insufficient information to make an estimate with regard to the quality of the evidence for effectiveness. The confidence in the results was low.
Participation: the effectiveness of the occupational-therapy interventions on social participation is uncertain ((very) low quality of evidence or the quality of the evidence is unclear).
Wellbeing of loved ones: there was insufficient information to make an estimate with regard to the quality of the evidence for effectiveness. The confidence in the results was low.

Client values and preferences

When it comes to self-reliance and self-management, frail older adults and their loved ones would like to be actively involved in their own treatment process. Part of it consists of training in (physical) capabilities with which a person can increase their self-management and self-reliance.
The guideline panel assesses that frail older adults attach great value to the intervention and that there is little variation among people in this regard.

Balance between desirable and undesirable effects

The guideline panel came to the following assessment: the desirable effects are the determining factor since no undesirable effects were reported. Further motivation for this is the fact that both the evidence and the experience of the guideline panel indicate that for frail older adults, this means that they can play a meaningful role and that it will contribute to their quality of life.

Economic considerations and cost-effectiveness

The guideline panel considers the necessary resources for the intervention to be negligible. The intervention is frequently applied in practice. The intervention is probably cost-effective. Thanks to this intervention, frail older adults can possibly continue participating and be active for longer. The timely use of the intervention will, for example, prevent hospitalisation or the need to make use of another intensive form of care.

Equality

The guideline panel expects that capability training will have no impact on health equality.

Acceptability

Capability training is customary in occupational therapy. The guideline panel expects that the intervention will be accepted by the majority of key stakeholders.

Feasibility

Capability training forms part of the occupational-therapy treatment and is at all times feasible, both at home and in the frail older adult's physical environment and in a practice/facility.
The implementation of capability training is considered realistic by the guideline panel.

Possible additional considerations

A systematic review of the improvement in actions by practising activities and tasks shows that occupational therapy that focuses on action, using cognitive, behavioural and environment strategies, can ensure a significant improvement in the day-to-day actions of older adults who live at home and who have physical problems (Nielsen 2017).

Knowledge gaps

The clinical question was very broad. The research did not focus on specific target groups or interventions.

Training driving proficiency

The studies that were found and included only looked at the training of driving proficiency.

Evidence Table D.3.7

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Meaningful activities of daily living			
Combination of classic education and training behind the wheel (older adults living at home)	Golisz 2014 (low)	3 studies (level I) found strong evidence that driving performance improved; no effect size reported	Strong (classification system not reported)
Cognitive perceptual training (older adults living at home)	Golisz 2014 (low)	Can improve driving proficiency, reduce the risk of collisions and increase the duration of driving and general mobility for people with general age-related reduced or stable cognition; no effect size reported	Unclear[2]
Treatment with regard to physical fitness (older adults living at home)	Golisz 2014 (low)	Can possibly stabilise driving proficiency and ensure fewer critical mistakes behind the wheel, better self-reported driving proficiency and self-confidence; no effect size reported	Unclear[2]

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Driving-simulator training (older adults living at home)	Golisz 2014 (low)	Can improve driving behaviour and driving proficiency; no effect size reported	Unclear[2]
Training behind the wheel (older adults living at home)	Golisz 2014 (low)	Can improve driving behaviour and driving proficiency; can in combination with education reduce the number of critical mistakes; no effect size reported	Unclear[2]
Driving-proficiency training (simulator/road) and/or visual training (mild cognitive impairments)	Spargo 2021 (fair)	1 RCT, 4 (uncontrolled) observational studies: occupational therapy possibly leads to improved driving proficiency; no effect size reported	Low (U.S. Preventive Services Task Force 2012)
Driving-simulator training (visual impairment)	Justiss 2013 (low)	1 RCT (73 participants aged under 75, of which < 25% with visual impairment following a cerebrovascular accident): simulation-based performance results improved: significant reduction in collisions, collisions with pedestrians and overall mistakes; no effect size reported	(Very) low (GRADE)[1]
Education (visual impairment)	Golisz 2014 (low)	1 review found limited evidence that education increased the driving proficiency and self-awareness of visually impaired drivers, but that it did not reduce the number of collisions; no effect size reported	Limited (classification system not reported)
Education/driver training (visual impairment)	Justiss 2013 (low)	2 RCTs (*n*=768): no significant effect on accidents; however, lower driving frequency; no effect size reported	Unclear[2]
Visual aids (biopic systems and prism lenses) (visual impairment)	Justiss 2013 (low)	1 RCT found a significant improvement in driving proficiency, 3 observational studies (2 controlled, 1 non-controlled) found no significant improvements; no effect size reported	Unclear[2]
Combination of classic education and training behind the wheel (after a stroke)	Golisz 2014 (low)	1 study of poor quality on people after a stroke found significant effects on knowledge of traffic theory and driving proficiency	(Very) low (GRADE)[1]
Self-management or joint control			
Group intervention for loved ones consisting of a support group and written material (older adults living at home)	Golisz 2014 (low)	Fair evidence for the effectiveness of group interventions for loved ones on self-efficacy, awareness and discussion on whether to limit and/or stop driving and giving driving instructions.; no effect size reported	Fair (classification not reported)

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); 2. insufficient information for making an estimate
RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living;
SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

Occupational therapy had a positive effect on driving proficiency and therefore on the performance of meaningful activities where mobility is important. In addition, a group intervention for loved ones had a positive effect on self-management or joint control with regard to driving a car.
The guideline panel considers the desirable effects of driving-proficiency training to be considerable.

Undesirable effects

The scientific literature reports no undesirable outcomes.

Quality of evidence

Performing meaningful activities: varied from low to high quality of evidence for effectiveness, but based on AMSTAR 2, the confidence in the results of the reviews was low.
Self-management or joint control: fair to high quality of evidence for effectiveness, but based on AMSTAR 2, the confidence in the results of the review was low.

Client values and preferences

Due to a lack of knowledge on the driving-proficiency training intervention, the guideline panel cannot make any statements on the values and preferences of frail older adults.

Balance between desirable and undesirable effects

Only a few desirable effects were reported. The guideline panel indicates that in the Netherlands driving-proficiency training is not (yet) part of the occupational therapist's duties. The guideline panel indicates that there is almost no experience in driving-proficiency training, because this is organised differently in the Netherlands. It therefore does not identify with the found evidence.

Economic considerations and cost-effectiveness

The guideline panel indicates that considering the current lack of knowledge of and experience in this intervention, it would be desirable to develop specific training or a guideline. The development costs of such a guideline or training are considerable. The question that must first be answered, is whether training in driving proficiency should be a responsibility of the occupational therapist. The guideline panel considers that the resources needed for this intervention are considerable and to the knowledge of the guideline panel, no studies are available on the cost-effectiveness thereof.

Equality

The guideline panel expects that the intervention will not lead to a change in health equality.

Acceptability

At present, training in driving proficiency is not a task or responsibility of the occupational therapist. If needed, the person is referred to a specialised driving school. The guideline panel expects resistance from the professional field, since it would be an extension of the tasks of the occupational therapist that would require further training or another form of education of the professional field. As regards road safety, resistance is to be expected from CBR and/or the authorities. Before occupational therapists are competent and have the necessary means at their disposal to give driving lessons, other developments are first of all necessary. The guideline panel expects that the intervention will not be accepted by all key stakeholders.

Feasibility

At present, occupational therapists are not competent to give driving lessons. The implementation of training in driving proficiency by occupational therapists is not regarded as realistic by the guideline panel.

Possible additional considerations

The evidence is based on research on driving-proficiency training in a car. A great deal of research has been done on this abroad, but it cannot directly be generalised to the population in the Netherlands. It could be a worthwhile development to add driving-proficiency training to the occupational therapist's duties. In Australia for instance, occupational therapists are competent to do this. Moreover, occupational therapists are already competent in driving-proficiency training with regard to participation in traffic in a wheelchair, on a tricycle and with a mobility scooter.

Knowledge gaps

Evidence of the effect of driving-proficiency training for frail older adults currently comes from other countries. The outcomes of these studies cannot be generalised to the Dutch population, since there are significant differences between countries in terms of driving culture, urban planning and regulations.

Occupational therapy in which the loved one is explicitly involved

Evidence Table D.3.8

Intervention	Quality of the review (AMSTAR 2)	Results	Quality of evidence (classification system)
Meaningful activities of daily living for loved ones			
Training (various capabilities and competencies), whether or not in combination with other interventions (early dementia)	Wang 2021 (low)	3 RCTs with only training as intervention found significant effects, such as an increased sense of self-efficacy in the provision of care 10 out of 12 studies with training as a common intervention component reported significant effects for loved ones, such as improved self-efficacy	Unclear[1]
Quality of life of loved one			
Occupational therapy given in own living environment (dementia)	Bennett 2019 (fair)	Meta-analysis of 2 RCTs: occupational therapy led to a higher quality of life (compared to control group (SMD 0.99; 95%-RI: 0.66 to 1.33); in 3rd RCT, which could not be included in the meta-analysis, no difference was found	Fair (GRADE)
Training (dementia)	Wang 2021 (low)	10 out of 12 RCTs with training as a common intervention component reported significant effectiveness including improved quality of life	Unclear[1]
Education (dementia)	Wang 2021 (low)	14 out of 16 RCTs with education as common intervention component reported advantages for loved ones, such as improved quality of life	Unclear[1]
Education in combination with social support (dementia)	Wang 2021 (low)	6 RCTs with education and social support as a joint component reported favourable effects, for example, on quality of life	Unclear[1]
Education and training (dementia)	Wang 2021 (low)	9 out of 10 RCTs with education and training as a common intervention component reported advantages for loved ones, such as improved quality of life	Unclear[1]

Intervention	Quality of the review (AMSTAR 2)	Results	Quality of evidence (classification system)
Wellbeing of loved ones			
Occupational therapy provided in the own living environment for the purpose of improving activities of daily living (dementia)	Bennett 2019 (fair)	Meta-analysis of 4 RCTs: no difference with regard to burden on loved one (family carer burden) between occupational-therapy group and control group (SMD -0.06; 95%-RI: -0.31 to 0.18) Of 2 RCTs that could not be included in the meta-analysis, 1 study found no difference, while the other reported that loved ones who receive occupational therapy scored lower on the burdening of loved ones	Low (GRADE)
		As a measure of burden, the number of hours that loved ones provided care was looked at in 3 RCTs: no difference was found between occupational therapy and the control group (SMD -0.20; 95%-RI: -0.46 to 0.06)	Low (GRADE)
		The same 3 RCTs examined the number of hours that loved ones did something for (or gave attention to) the person with dementia: no difference was found in favour of occupational therapy (SMD -0.33; 95%-RI: -0.58 to -0.07)	Low (GRADE)
Training aimed at the loved one (dementia)	Wang 2021 (low)	10 out of 12 RCTs with training as a common intervention component reported significant effectiveness including lower burden.	Unclear[1]
Education aimed at the loved one (dementia)	Wang 2021 (low)	14 out of 16 RCTs with education as a common intervention component reported advantages for loved ones, such as improved wellbeing and lower burden	Unclear[1]
Education in combination with social support aimed at the loved one (dementia)	Wang 2021 (low)	6 RCTs with education and social support as a joint component reported beneficial effects on feelings of depression, mental health and experienced burden	Unclear[1]
Education and training aimed at the loved one (dementia)	Wang 2021 (low)	9 out of 10 RCTs with education and training as a common intervention component reported advantages for loved ones, such as lower burden	Unclear[1]

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); RCT: randomised controlled trial; ADL: activities of daily living; IADL: instrumental activities of daily living; SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

Training of loved ones had a positive effect on the performance of meaningful activities of daily living for the loved ones of people with early dementia. Occupational therapy provided in the own living environment had a large effect on the quality of living of the loved one of a person with dementia. Other reviews where training and education were used for loved ones also found a positive effect on the quality of life of the loved ones of people with dementia. The majority of the included RCTs of reviews found that occupational therapy that involved the love one had a positive effect on the wellbeing of the loved one of a person with dementia. They scored lower, for example, on experienced burden. All the studies pertained to loved ones of people with dementia who live at home, based on two different systematic reviews.

Undesirable effects

No undesirable effects were reported.

Quality of evidence

The information is insufficient for properly assessing the quality of the evidence with regard to interventions aimed at loved ones and the effect on the performance of meaningful activities. The quality of the studies was rated as good, but no quantitative results were available for the assessment of GRADE items. The quality of the review was low. The guideline panel rates the evidentiary value as low to fair.

Quality of life and wellbeing: one review relies on the evidence of fair quality and the quality of evidence was also considered to be fair. The evidence on which the other review is based, could not be assessed (see evidence table) and the review itself was rated low. The guideline panel rates the evidentiary value as low to fair.

Client values and preferences

The guideline panel recognises the effect of occupational-therapy interventions on the wellbeing of the loved one. It is important for heir own wellbeing that the loved one should feel good. It is furthermore important (and definitely in the case of cognitive impairments) that the loved one should not become overburdened, so that the older adult can continue living in their own environment. Although the evidence is limited to loved ones of people with dementia, the guideline panel believes that supervision and support for the loved one could also apply in other situations. It is important to take account of the (cultural) background of the frail older adult.

The guideline panel considers that loved ones of frail older adults in general attach value to supervision when they have a need for assistance with regard to burden/load capacity and quality of life.

Balance between desirable and undesirable effects

The desirable effect is the determining factor since no undesirable effects were reported. In addition, the evidence leans towards the positive side when it comes to the effect of interventions aimed at the loved one on the performance of daily activities, quality of life and wellbeing. This evidence in particular applies to loved ones of people with dementia. The experience, however, is that this also applies to loved ones of frail older adults in general, if they have a need for assistance.

Economic considerations and cost-effectiveness

The evidence found gives no information on cost-effectiveness. The treatment or guidance of loved ones of frail older adults can also be financed from within the regular costing structure. Often overburdening of the direct loved one is reported too late, so that the help of an occupational therapist is introduced too late as well. Starting earlier would prevent problems due to overburdening (often combined with the loved one's own medical problems) and the more expensive healthcare that goes with it. Think, for instance, of psychological care or hospitalisation due to a fall or acute hospitalisation due to the postponement of own healthcare needs while taking care of the loved one.

Equality

The guideline panel expects that this approach will have a positive impact on health equality. The involvement of loved ones with frail older adults in the family can differ. This depends on cultural background and social norms and values. By involving the loved ones in the treatment, more people will possibly be mobilised in supporting frail older adults in their social circle.

Acceptability

The guideline panel expects that the intervention will be accepted by the majority of key stakeholders.

Feasibility

This intervention is already applied in practice by occupational therapists and is considered to be realistic, particularly in a primary care setting. Part of this process is, after all, the setting of goals prior to the intervention. The occupational

therapist must take the opportunities and personal goals of the loved one as well as their own capabilities into account when choosing the best intervention for the situation in hand.

Possible additional considerations

In the V&VN guideline on informal care (Richtlijn Mantelzorg van V&VN (2021)), frequent mention is made of the EDOMAH programme (Graff 2010). Besides the V&VN guideline on informal care, the EDOMAH programme is a valuable reference work that deals with communication with loved ones, identifying capabilities and workload and interventions aimed at preventing or reducing overburdening.

The Informal Care Toolkit for paramedics (Toolkit Mantelzorg voor paramedici) outlines concrete guideline measures for the way in which occupational therapists can cooperate with loved ones and support them in caring for the frail older adult (Mantelzorg 2016). The toolkit was developed on the basis of practical experience, literature and the needs of paramedics and loved ones.

Knowledge gaps

Strikingly, limited evidence was found. The clinical question was very broad. It did not focus specifically on interventions for loved ones, but on interventions in general that occupational therapists can use within the treatment phase for frail older adults and/or loved ones who live with them. Further (literature) studies are needed to find out which elements are the most relevant for the successful supervision of the loved ones of frail older adults.

Occupational therapy and hospitalisation

Evidence Table D.3.9

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Meaningful activities of daily living			
Physical training (older adults during or after hospitalisation)	Liu 2018 (low)	2 RCTs that compared multimodal physical training with placebo activities or standard care for older adults discharged after hospitalisation found no significant effects.	Low (US Preventive Services Task Force 2014)
		2 RCTs compared training (progressive resistance training of lower extremity or multimodal physical training) with no intervention or a written home-exercise programme for older adults with a previous hip fracture; 1 study found a significant improvement in getting in and out of bed, while another study found no differences. No effect size reported	Low (US Preventive Services Task Force 2014)
Clinical rehabilitation programmes (older adults during or after hospitalisation)	Liu 2018 (low)	For older adults who are discharged and go back home after hospitalisation, 2 RCTs compared occupational-therapy data in a clinical setting with no occupational therapy and found contradictory results; 1 level II study compared a clinical rehabilitation programme including home visits by an occupational therapist with standard care and found no difference; no effect size reported	Low (US Preventive Services Task Force 2014)

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Occupational therapy during acute hospitalisation (older adults during or after hospitalisation)	Cuevas-Lara 2019 (fair)	5 of the 6 RCTs found a better functional score in the intervention group compared to the control group, but not all the differences were statistically significant; no effect size reported	Level 1b (Oxford Centre for Evidence-Based Medicine Scale) = good quality
Only occupational therapy after an operation due to a hip fracture (older adults during or after hospitalisation)	Lee 2019 (fair)	Meta-analysis of 3 RCTs: occupational therapy seems to improve functioning in ADL compared to interventions without occupational therapy, but this was not statistically significant (SMD: 0.761, 95%-RI: -0,306 to 1,829)	Unclear[1]
Quality of life of older adult			
Occupational therapy during acute hospitalisation	Cuevas-Lara 2019 (fair)	1 RCT found no difference in quality of life between the intervention group and the control group; no effect size reported	Level 1b (Oxford Centre for Evidence-Based Medicine Scale) = good quality

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items); RCT: randomised controlled trial; SMD: Standardised Mean Difference; 95%-RI: 95% reliability interval

Desirable effects

Mostly no significant effects of occupational therapy during hospitalisation were reported in studies on the performance of meaningful activities. In five of the six included RCTs, only the study by Cuevas-Lara (2019) demonstrated a better functional score after occupational therapy during acute hospitalisation compared to the control group. Not all the effects were significant. Furthermore, no effect was demonstrated of occupational therapy during hospitalisation on the quality of life of older adults.

The guideline panel recognises these desirable effects. In the acute phase, any improvement is valuable. Occupational therapy can play an important role in this. In a non-acute hospital setting, practically no occupational therapy is administered. Only at a later stage is occupational therapy introduced, often following a referral.

Undesirable effects

No undesirable effects are reported.

Quality of evidence

The quality of the evidence mostly gets a low score. The study by Cueva-Lara (2019) is the only one that is rated as good in terms of quality on the Oxford Centre for Evidence-Based Medicine Scale.

Due to the lack of clear evidence, the guideline panel considers the evidentiary value of the desirable effects to be very low.

Client values and preferences

The guideline panel assesses that frail older adults attach fair to great value to occupational therapy in a hospital setting and that there is little variation among people in this regard. Older adults are keen to go home as quickly as possible and occupational therapy can be of help in this. The loved one can already in the hospital be involved in the treatment. This will make it clear both for the frail older adult and for their loved one what the possibilities are for being sufficiently self-reliant at home.

Balance between desirable and undesirable effects

There is insufficient evidence of desirable and undesirable effects and there are insufficient echoes from the field for the guideline panel to reach a verdict on the intervention.

Economic considerations and cost-effectiveness

The guideline panel considers the necessary resources for the intervention to be cost-saving. Through the effect of occupational therapy in the hospital, the duration of hospitalisation can be shortened. The frail older adult can then safely go home earlier. This saves the high healthcare costs of hospitalisation. There are no studies available on the cost-effectiveness. The economic considerations are an estimate by the guideline panel.

Equality

The guideline panel expects that the intervention will not bring any change in terms of health equality.

Acceptability

The guideline panel expects that the intervention will probably be accepted by the majority of key stakeholders. Since the evidence is limited and not unequivocal, the guideline panel expects that there will be resistance from hospitals and healthcare insurers. Should the beneficial economic aspects be demonstrated, the guideline panel expects that the acceptability will increase. Older adults are keen to shorten their stay in hospital and are open to anything that might possibly help in this regard.

Feasibility

The implementation of occupational therapy in hospital is considered to be probably realistic by the guideline panel. In Switzerland, occupational therapy is introduced immediately when a frail older adult arrives in the geriatric unit. Their functioning is identified to support the choice of the treatment.

Possible additional considerations

Occupational therapy can be of great value to identify the level of functioning. It helps to estimate the frail older adult's condition and to set up an appropriate rehabilitation programme.
The short duration of hospitalisation in the Netherlands is a barrier to the implementation of occupational therapy in the hospital. The question is whether there is room for starting with occupational-therapy treatment, keeping in mind the load capacity of the frail older adults and the priority of other healthcare actions. The expectations of the rehabilitation team must be discussed thoroughly beforehand to avoid unrealistic expectations.

Knowledge gaps

In order to make more detailed recommendations in a future update of this guideline, a systematic review based on primary studies will be needed.

Cooperation with other disciplines

Evidence Table D.3.10

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Meaningful activities of daily living			
Multidisciplinary care at home focusing on recovery* (older adults living at home)	Liu 2018 (low)	Out of 2 RCTs, 1 showed a marginally significant effect on self-care scores in older adults who received multidisciplinary home care due to the risk of hospitalisation or functional deterioration; no effect size reported	Low (US Preventive Services Task Force 2014)
Multidisciplinary rehabilitation programme aimed at outdoor mobility (visual impairment)	Justiss 2013 (low)	1 non-controlled observational study (*n*=192 participants aged 18 to > 90): improved quality of life after the intervention; no effect size reported	(Very) low (GRADE)[1]

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items);

Desirable effects

The effect of cooperating with other disciplines on the performance of meaningful activities of daily living leans towards positive. Liu (2018) demonstrated a marginally significant effect on self-care scores of older adults after interdisciplinary care. In the study by Justiss (2013), improvement in quality of life after the intervention is reported in one non-controlled observational study. The study focused on visually impaired older adults. This outcome cannot be generalised to the population of frail older adults. The guideline panel considers that there is insufficient evidence of the desirable effects of cooperation with other disciplines.

Undesirable effects

No undesirable effects are reported.

Quality of evidence

The quality of the included studies and the quality of the evidence were scored as low. The guideline panel rates the evidentiary value of the desired effects as very low.

Client values and preferences

There is a wish among frail older adults and there loved ones to receive well coordinated multidisciplinary healthcare. The guideline panel assesses that frail older adults attach reasonable value to the intervention and that there is little variation among people in this regard.

Balance between desirable and undesirable effects

The guideline panel came to the following assessment: there is insufficient evidence for making a judgement on the effect of cooperation with other disciplines.

Despite the small amount of evidence from the studies, the guideline panel considers cooperation with other disciplines to be essential in the treatment of frail older adults. The care must be coordinated and in order to deliver care, it is necessary for healthcare professionals to be up to date on the way in which the frail older adult's care path is given shape.

Economic considerations and cost-effectiveness

The guideline panel considers the amount of resources needed for the intervention to be moderate. Software is needed to make electronic client records accessible and safe to use for all healthcare professionals who are involved in the care of a client.

If it is implemented successfully, the intervention will probably be cost-effective. There will be less overlap, and mutual coordination between healthcare professionals will ensure more clarity on the treatment of the frail older adult.

Equality

The guideline panel expects that the intervention will not lead to any change in health equality.

Acceptability

The guideline panel expects that the intervention will be accepted by all key stakeholders. Coordination and mutual consultation are desirable in practice.

Feasibility

The guideline panel considers that the implementation of coordination with other disciplines is probably realistic. It is, however, a difficult task to combine all electronic client records in one whole. The feasibility and cooperation in a primary care setting are furthermore limited by the fact that these are not financed.

Knowledge gaps

In order to make more detailed recommendations in a future update of this guideline, a systematic review based on primary studies is needed.

Life review

Life review includes the recording of a life story, consisting of positive and negative memories from a person's life, which can offer support in difficult times.

Evidence Table D.3.11

Intervention	Review(s) (AMSTAR 2)	Results	Quality of evidence (classification system)
Quality of life			
Life-review interventions (older adults living at home)	Lan 2017 (fair)	Meta-analysis of 2 RCTs (*n*=119): no significant differences between life-review intervention and standard care or supporting supervision (SMD: 0.15; 95%-RI: 0.96 to 0.66)	Low (GRADE)[1]
Wellbeing			
Life-review interventions (older adults living at home)	Lan 2017 (fair)	Meta-analysis of 2 RCTs (*n*=59): no significant difference between life-review intervention and the control group (SMD: 0.54; 95%-RI: 0.01 to 1.06)	Low (GRADE)[1]

1. insufficient information for making an estimate (the quality of the studies was considered good, but no (quantitative) results were available to assess the remaining GRADE items);

Desirable effects

No significant effect was demonstrated of life review on the quality of life of frail older adults living at home. The effect of life-review interventions on the wellbeing of frail older adults who live at home is moderate. The guideline panel considers the desirable effects of personal factors to be slight. The guideline panel is not very familiar with this intervention.

Undesirable effects

No undesirable effects of life review are reported.

Quality of evidence

The evidence comes from one systematic review, whose quality is fair. The quality of the evidence is low. The guideline panel rates the evidentiary value of the desired effects as very low.

Client values and preferences

The guideline panel cannot give any verdict on the values and preferences of frail older adults.

Balance between desirable and undesirable effects

There is insufficient information from research and practice to be able to give a verdict on the desirable and undesirable effects of the life-review intervention.

Economic considerations and cost-effectiveness

The guideline panel considers the amount of resources needed for the intervention to be moderate. Training is needed to offer this intervention to occupational therapists. There are no studies available on the cost-effectiveness.

Equality

The guideline panel expects that the intervention will have no effect on health equality.

Acceptability

The guideline panel expects that the intervention will probably be accepted by the majority of key stakeholders. Only occupational therapists must get further training in the implementation of this intervention. This could impact accessibility.

Feasibility

The guideline panel considers that the implementation of life review is probably not realistic due to a lack of scientific substantiation and knowledge based on practice.

Possible additional considerations

Life review currently forms part of psychological treatment. In the Netherlands, little is known about this intervention for frail older adults.

Knowledge gaps

In order to make more detailed recommendations in a future update of this guideline, a systematic review based on primary studies will be needed.

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E Skin therapy

E.1 Observation of skin tears

Literature: search and select

Research question

To answer the clinical question, a systematic review was carried out for the following research question: Which predictive factors are related to the risk of skin tears occurring in frail older adults?

P | frail older adults
I | observation of predictive factors
O | the occurrence of skin tears

Relevant outcome measures

The guideline panel considers the occurrence or not of a skin tear as a crucial outcome measure for decision-making. The link between the predictive risk factor and the occurrence of skin tears is defined as: the factor is not linked or the link cannot be determined with certainty (OR/RR ≤1- ≤2) or the factor seems to be linked (OR/RR >2, clinically relevant). These threshold values are based on (Hartvigsen 2004; Hemingway 1999).

Search

To answer the clinical question, a systematic review was carried out for the research question. On 15 July 2022 an information specialist, H.W.J. Deurenberg conducted a systematic search in Medline, Cochrane Library, and Psychinfo (see Appendix E.1.1 for the search justification). This systematic search produced 27 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 17 articles were excluded. For 10 articles, the full article was then screened. Eventually the search yielded 4 usable studies (LeBlanc 2021; Lewin 2016; Rayner 2019; Soh 2019). The screening of the reference list produced another 4 articles (Bermark 2018; Newall 2017; Sanada 2015; Van Tiggelen 2019). Finally, 8 studies were included for further analysis. See Appendix 2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reason for the exclusion are listed in Appendix E.1.3 (Lopez 2011;Rayner 2020;Strazzieri-Pulido 2017;Serra 2018; Rayner 2019).

Inclusion criteria

Types of studies	• systematic reviews • cohort studies • cross-sectional • RCT • multivariate analysis, where associations are determined • Articles written in Dutch or in English
Types of patients	frail older adults with (a risk of occurrence of) skin tears
Type of intervention	screening and observation
Type of comparison	n/a
Type of outcome	the occurrence or not of skin tears
Type of timeline	n/a
Type of setting	older adults living at home, nursing-home care

Characteristics of the included studies

Eight included studies with a total of 3,369 patients identified risk factors that are related to the occurrence of skin tears. The characteristics of the included studies are provided in Appendix 4: overview table of characteristics of included studies. The average age of the patients varied between 70.7 and 87.7 years and the percentage of women varied from 49.3 to 74.5%. In total, 17 prognostic factors were identified.

Individual study quality (RoB)

The design and execution of the individual studies (risk of bias, RoB) were scored by MvZ and FdV with the help of the QUIPS tool (Higgins 2011). The assessment of the various items was discussed, after which consensus was reached. An overview of the study quality assessment (RoB) per study is provided in Appendix E.1.6. Risk-of-bias table.

Effectiveness and evidentiary value

17 predictive factors that were linked to the risk of the occurrence of skin tears in frail older adults were described in 8 studies (Bermark 2018; LeBlanc 2021; Lewin 2016; Newall 2017; Rayner 2019; Sanada 2015; Soh 2019; Van Tiggelen 2019). An overview of the characteristics of each study is shown in Appendix E.1.4: Characteristics of the included studies For the establishment of the 17 prognostic factors, the following system was used. First of all a systematic review was performed, which led to a set of 34 prognostic factors that might be associated with the occurrence of skin tears. The set was then reduced to include only prognostic factors that are mentioned in multiple studies and that are included in a multi-variate analysis. Finally, the remaining factors were submitted to members of the guideline panel, asking them to transfer these to factors that are seen in skin-therapy practice. Based on this, 17 factors remained to be developed further in the guideline. Other factors prioritised by the guideline panel will have to be investigated further and
are therefore included as knowledge gaps. An overview of the establishment of the 17 prognostic factors is given in Appendix E.1.5: Overview of prognostic factors based on a guideline-panel, uni- and multi-variate analysis.

Predictive factors for the occurrence of skin tears

In total, 17 prognostic factors are described, including 6 clinically visible skin factors and 11 other factors.

Factor 1 | Ecchymosis

In the studies by Lewin (2016) and Bermark (2018) the factor of ecchymosis seems to be associated with the risk of the occurrence of skin tears. The effect size that was found to indicate the presence of ecchymosis and the occurrence of skin tears is large and clinically relevant for both studies (Bermark 2018; Lewin 2016) (OR 5.6 CI 1.4-23.2) (OR 6.24 CI 3.243 -12.011). However, due to imprecision in the results and the risk of bias, the evidentiary value is regarded as low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value

Factor 2 | Purpura

In the studies by Lewin (2016), Newall (2017) and LeBlanc (2021), the factor of purpura seems to be associated with the risk of the occurrence of skin tears. The effect size according to all three studies was found to be large (Lewin 2016) (OR 2.657 CI 1.466-4.814), (Newall 2017) (OR 2.316 CI 1.38-3.90), (LeBlanc 2021) (RR 1.60 CI 1.43-1.79). Although the studies all point in the same direction, there is some risk of bias (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 3 | Elastosis

In the study by Rayner (2019) the factor of elastosis seems to be associated with the risk of the occurrence of skin tears. The effect size was found to be large (OR 3.19 CI 1.38-7.38). There is, however, some risk of bias. There is also an amount of imprecision (the results were based on 1 study with a broad reliability interval). The evidentiary value of the factor is therefore low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 4 | Haematoma
In the studies by Newall (2017) and Lewin (2016) the factor of haematoma seems to be associated with the risk of the occurrence of skin tears. The effect size that was found is large (Newall 2017) (OR 3.596 CI 2.40-5.39), (Lewin 2016) (OR 2.259 CI 1.296-3.938). Although the studies point in the same direction, there is some risk of bias. The evidentiary value of the factor is therefore fair (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 5: Oedema
In the study by Lewin (2016) the factor of oedema seems to be associated with the risk of the occurrence of skin tears. The effect size was found to be large (OR 3.011 C1.617-5.605). There is some risk of bias and some imprecision due to the fact that the results are based on only one study. The evidentiary value of the factor is therefore low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 6 | Skin changes linked with ageing of the skin (purpura, stellate pseudoscars, atrophy, xerosis)
In the study by LeBlanc (2021) the factor of skin changes seems to be related to skin ageing associated with the risk of the occurrence of skin tears. The effect size was found to be small (RR 1.60 1.43-1.79). There is some imprecision due to the fact that the results are based on only one study. The evidentiary value of the factor is fair (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 7 | Age
The factor of advanced age in the occurrence of skin tears was identified by the studies by Soh (2019), (Sanada (2015) and Van Tiggelen (2019) with conflicting directions in the effect size that was found. In the study by Soh (2019), age is not associated with the occurrence of skin tears (OR 0.261 CI 0.12-0.56). In the studies by Newall (2017) and Sanada (2015), on the other hand, the factor of age is associated with the occurrence of skin tears (Newall 2017) (OR 1.030 CI 1.01-1.05), (Sanada 2015) (OR 1.04 CI 0.96-1.12). The effect is, however, small. In the study by Van Tiggelen (2019) the effect size is large (OR 4.03 CI 1.29-12.61). Due to the risk of bias and inconsistency related to the diverging outcomes, the evidentiary value of identifying the factor of age is low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 8 | History of skin tears
In the studies by Bermark (2018) (OR 9.3 CI 2.6-33.4), Sanada (2015) (OR 15.42 CI 3.53-67.43), Van Tiggelen (2019) (OR 3.83 CI 1.30-11.32), Newall (2017) (OR 1.568 CI 1.01-2.42), Lewin (2016) (OR 5.416 CI 2.709-10.829) and Rayner (2019)(OR 3.82 CI 1.64-8.90) the factor of having a history of skin tears seems to be associated with the risk of the occurrence of skin tears. The effect sizes found in all studies are large and point in the same direction. Due to the risk of bias and imprecision related to the broad reliability intervals, the evidentiary value for identifying the factor of age is low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 9 | Adhesive dressings
The factor of adhesive dressings in the occurrence of new skin tears is associated in the study by Van Tiggelen (2019) with the risk of the occurrence of skin tears. The effect size is large (OR 7.05 CI 2.74-18.14). There is some imprecision due to the fact that the results are based on one single study and due to a broad reliability interval. There are also some concerns about the risk of bias. The evidentiary value of the factor is therefore low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 10 | Falls risk
In the studies by Bermark 2018) (OR 3.8 CI 1.2-12.0) and Rayner (2019) (OR 3.37 CI 1.54-7.41) the factor of falls risk seems to be associated with the risk of the occurrence of skin tears. The effect sizes are large and point in the same direction. There are a few concerns about the risk of bias, a few concerns about indirectness due to the broad age range of 19-99 years and a few concerns about imprecision due to the broad reliability intervals. The evidentiary value for the factor is therefore very low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 11 | Medication/polypharmacy

The factor of drug use is defined by Sanada (2015) as the use of steroids. Van Tiggelen (2019) defines the factor as polypharmacy: use of > 5 types of medicine. The effect size found for the use of medication and the occurrence of skin tears appears to be large for both studies (Sanada 2015) (OR 6.31 CI 0.90-44.18), (Van Tiggelen 2019) (OR 2.96 CI 1.06-8.53). However, the directions of the effect sizes that were found seem to be conflicting based on the reliability intervals. Due to the risk of bias and inconsistency related to the diverging outcomes, the evidentiary value for identifying the factor of medication is low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 12 | TEWL on forearms and lower legs

In the study by Rayner (2019) the factor of TEWL on forearms and lower legs seems to be associated with the risk of the occurrence of skin tears. The effect size is small (OR 1.14 CI 1.01-1.28). Due to a lack of more studies and the risk of bias, the evidentiary value is regarded as low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 13 | Performance in activities of daily living (ADL)

The factor of performance in ADL is defined by (LeBlanc 2021) as the score (0-28) of seven items, which are mobility in bed, transfers, motor skills, getting dressed, eating, toilet use and personal hygiene. Higher scores for those items indicate a deterioration of performance in ADL and a greater dependence on others for daily care. The effect size for reduced performance in ADL on the occurrence of skin tears is found to be small (RR 1.13 1.08-1.18). The evidentiary value is fair (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 14 | Dementia

In the study by Soh (2019) the factor of dementia seems to be associated with the risk of the occurrence of skin tears. The effect size was found to be large (OR 3.287 CI 1.19-9.11). There are some concerns about the risk of bias. There are also broad reliability intervals and a small survey population, hence concerns about impression. The evidentiary value of the factor is therefore low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 15 | Low Body-Mass Index (BMI)

The BMI factor is defined by Soh (2019) as a suboptimal nutritional and hydration status resulting in weight loss, a lack of appetite and a low BMI. A BMI of < 20 is regarded as a low BMI. The effect size found for a low BMI and the occurrence of a skin tear seems to be large. BMI < 18.5 OR 5.053 (CI 1.21-21.13), BMI >18.5-23 OR 3.935 (CI 1.73-8.96). However, due to a lack of more studies (the results are based on only 1 study) and the risk of bias, the evidentiary value is regarded as low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 16 | Unable to change position or move without help

The factor of not being able to change position or move without help is defined by the studies by Lewin (2016) and Newall (2017) as the need for repeated manual assistance to change positions of and/or move the patient. Repositioning/moving leads to an increased potential for skin trauma. The effect size was found to be small for Newall (2017) (OR 1.682 CI 1.08-2.62) and large for Lewin (2016) (OR 2.307 CI 1.317- 4.041). Due to the risk of bias, the evidentiary value for identifying this factor is fair (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

Factor 17 | Gender

In the studies by Rayner (2019) and Sanada (2015), the factor of male gender seems to be associated with the risk of the occurrence of skin tears. (Sanada 2015) (OR 2.21 CI 0.60-8.18), (Rayner 2019) (OR 3.19 CI 1.38-7.38). However, the directions of the effect size that was found seem to be conflicting based on the reliability intervals. Due to the risk of bias and inconsistency related to the diverging outcomes, the evidentiary value of identifying the factor of gender is low (see Appendix E.1.7: Overview table of effectiveness and evidentiary value).

From evidence to recommendation

The quality of the evidence was assessed by means of the GRADE method. The resulting considerations are based on a review of scientific literature, as well as clinical expertise from the field (expert opinion), represented by the guideline panel. The guideline panel consists of five skin therapists and a subject-matter expert with demonstrable knowledge and experience in the field of frail older adults/geriatric care. The guideline panel is further supported by a nurse who is specialised in complex wound care and works in geriatric care, and a dermatologist (for further justification of the guideline-panel characteristics, see: Paramedical Guideline on Frail Older Adults (general information) A.1 Guideline Panel for Skin Therapy). The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects

A systematic analysis of the literature revealed no studies that construed an internally or externally validated prediction model with prognostic factors that predict the occurrence of skin tears. Based on clinical expertise from the field (expert opinion), the guideline panel considers that observation based on prognostic factors may contribute to more justifiably positive and justifiably negative estimates of the occurrence of skin tears, which has a preventive impact on the occurrence of skin tears.

Undesirable effects

The guideline panel considers that the following effects could be undesirable in observation based on prognostic factors:

- Incorrect (unjustifiably positive or negative) estimates, leading to unjustifiable referrals to other healthcare providers.
- Observing based on identified factors can cause physical and/or emotional stress for the patient (see the section on Patient Preferences).
- Observing based on identified factors can lead to changes in the organisation of healthcare, including referral and interdisciplinary collaboration, which might be accompanied by increased time investment and work pressure for healthcare providers (see the section on Acceptability).
- The factors of falls risk, low BMI, reduced performance in ADL, dementia and not being able to change positions without help, fall outside the professional field of the skin therapist and require follow-up actions and referral to and/or additional support from other (paramedical) healthcare professionals (see the section on Feasibility).

Quality of evidence

The guideline panel considers the evidentiary value as reasonable for the following factors: purpura, haematoma, age-related skin changes, reduced ADL performance and needing assistance to change position or move around.

The guideline panel considers the evidentiary value as low for the following factors: ecchymosis, elastosis, oedema, history of skin tears, adhesive dressings, polypharmacy, TEWL on forearms and lower legs, dementia and low BMI.

The guideline panel considers the evidentiary value to be very low for the following factors: falls risk, male gender.

Values and patient preferences

The guideline panel believes that observation forms part of preventive healthcare, as a result of which the occurrence of skin tears and (severe) complications can possibly be prevented. This is conducive to the quality of life of this patient population. The guideline panel estimates that the observation of predictive factors causes little stress for patients, which is why patients attach reasonable value to observation based on the prognostic factor. The guideline panel further observes that there is in all likelihood little variation between patients. However, no qualitative study has been conducted on the values and preferences of patients, meaning that no definite verdict can be given.

The guideline panel mentions exceptions to the following factors:

- Adhesive dressing | The guideline panel estimates that the use of adhesive dressings on members causes few problems for patients. Many frail older adults wear compression materials, such as therapeutic elastic stockings and bandages. Putting them on and taking them off for observation purposes could be experienced as cumbersome. Preventive observation when dressings/elastic stockings are taken off or put on can be stressful.
- Unassisted repositioning/moving | It is not always possible to improve the ability to change position or move without assistance, which is why observation may cause stress.
- Dementia | The guideline panel believes that the identification of dementia could cause emotional stress for the patient. This does not apply to dementia that has already been established. Established dementia can be identified via the partner, informal caregiver or referrer.
- Low BMI | According to the guideline panel, it is not always easy to talk about abnormal weight. Achieving a healthy weight target without assistance is difficult. Offering extra help from other paramedics, such as dietitians, is desirable in this case. Not all older adults are even aware of their weight and the impact it has on their health, which is why observation can be stressful.

Balance of desirable and undesirable effects

Provided that justifiable positive and justifiable negative estimates are made, the observation based on prognostic factors can have a preventive effect on the occurrence of skin tears. The actual observation based on prognostic factors is therefore expected to outweigh non-observation due to the negative consequences mentioned above.

Economic considerations and cost-effectiveness

The guideline panel considers that the resources needed to identify prognostic factors are negligible. The observation based on prognostic factors is expected to be cost-effective. The guideline panel considers that the identification of prognostic factors could eliminate or reduce the occurrence of skin tears, increasing the likelihood of cost savings in healthcare. However, no cost-effectiveness studies followed from the evidence synthesis on the basis of which a definite verdict can be given on the added value that observation could have on healthcare equality.

Equality

The guideline panel expects that the observation based on prognostic factors will lead to an increase in health equality, seeing that observation is practicable in all subgroups of frail older adults, including intramural/extramural care, male/female, frail older adults with dementia or low/healthy BMI. However, the evidence synthesis found no qualitative studies on cost-effectiveness on the basis of which a definite verdict can be given on the added value of observation by health equality.

Acceptability

The guideline panel expects that the observation based on prognostic factors will be accepted by the stakeholders involved. It is important to distinguish between preventive observation by skin therapists and diagnostic observation/screening by (general) practitioners. Skin therapists can play a larger role in identifying risk factors than they have done so far. Due to a high influx of patients from a primary to a secondary care setting, it has become essential to increase integrated care and multidisciplinary collaboration. Observation by skin therapists can contribute to this. The guideline panel is, however, aware that the moment a risk factor has been identified, additional steps in the healthcare process become desirable. Interdisciplinary collaboration, for example, with the general practitioner, can, however, be time-consuming, which might make it less acceptable to the stakeholders involved (general practitioners/dermatologists). The perception that the stakeholders involved might have of observing factors is, however, lacking, which means that there is insufficient information on which to base a definite statement.

Feasibility

To assess the feasibility of observation based on prognostic factors to prevent the occurrence of skin tears, an implementation plan was drawn up according to the methodological steps for the development of an implementation strategy. Based on these results, the guideline panel considers the feasibility to be realistic. The guideline panel mentions exceptions on the following factors:

- **Falls risk** | The fact that it is easy to identify the risk of falling leads the guideline panel to consider it as a low stress factor for patients and healthcare providers. Identifying the falls risk, however, falls outside the professional field of the skin therapist. A multidisciplinary setting with the possibility of referral to and/or additional support from other (paramedical) healthcare professionals, such as occupational, exercise and physical therapists, could be desirable.
- **TEWL on forearms and lower legs** | A measurement instrument is needed to identify TEWL, which makes this factor somewhat less easy to identify in all skin-therapy practices.
- **Low BMI** | Identifying BMI may fall outside the professional field of the skin therapist. A multidisciplinary setting with the possibility of referral to and/or additional support from other (paramedical) healthcare professionals, for example, a dietitian, could be desirable.
- **Reduced performance in ADL** | Identifying ADL may fall outside the professional field of the skin therapist. A multidisciplinary setting with the possibility of referral to and/or additional support from other (paramedical) healthcare professionals, such as occupational, exercise and physical therapists, could be desirable.
- **Dementia** | The guideline panel believes that the identification of dementia could cause emotional stress for the patient and that it is not always feasible within the professional field of the skin therapist. This does not apply to dementia that has already been established. Established dementia can be identified via the partner, informal caregiver or referrer. Casual observation of dementia is possible. Additional support from (para)medical professionals is desirable.
- **Unable to change position/move around without assistance** | The guideline panel believes that the observation based on someone's inability to change position or move around without assistance is not always feasible within the professional field of the skin therapist and that a multidisciplinary setting with the possibility to refer to and/or get additional support from another (paramedical) healthcare professional, such as an occupational, exercise or physical therapist, may be advisable.

Possible additional considerations

The guideline panel stresses the importance of multidisciplinary collaborations to improve healthcare throughout the chain. Referral must also be weighed up on a case-by-case basis, since it is not always necessary or feasible to increase the pressure on the healthcare chain.

Knowledge gaps

Following the literature review as well as clinical expertise from the field (expert opinion), it is noted that the following knowledge gaps exist on account of which (further) scientific research is considered important.

The guideline panel indicates that the following factors are frequently seen in day-to-day practice as factors that might be linked to the occurrence of skin tears. In the literature however, no evidence of this is found or the factors were not investigated. The following factors are therefore cited as knowledge gaps:

- smoking
- general malaise
- use of (too many) dehydrating substances
- putting on/taking off therapeutic elastic stockings
- itching
- foot problems, leading to reduced mobility and an increased risk of falling

The separately identified prognostic factors also appear from various multivariate analyses and can for this reason not be implemented together as an intervention in the form of a diagnostic tool in skin-therapy practice. This emphasises the need for further research on the development and approval of a prediction model or risk-taxation instrument (decision tree), in which a set of prognostic factors together can predict which patients are associated with a bigger risk of the occurrence of skin tears.

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E.2 Self-management interventions

Literature: search and select

Research question

What are effective self-management interventions for frail older adults who have an indication for decongestant therapy?

To answer the clinical question, a systematic literature analysis was performed for the following research question (PICO):

P | frail older adults (with an indication for decongestant therapy)
I | effective self-management interventions
C | usual care
O | quality of life + activities of daily living (ADL)

Relevant outcome measures

The guideline panel considered 'quality of life' and 'activities of daily living (ADL)' as crucial outcome measures for decision-making. 'Costs in healthcare' and 'health literacy' were considered to be important outcome measures. The guideline panel defined the following threshold values for determining the size of the effect:

- Does have an effect (SMD ≥ 0.5, which is also considered as a clinically relevant cut-off point) and no effect or the effect found cannot be determined with certainty (SMD < 0.5).

Search

To answer the clinical question, a systematic literature review was carried out on the research question. On 9 December 2022 an information specialist, H.W.J. Deurenberg, conducted a systematic search in PubMed, Medline and Psychinfo (see Appendix E.2.1 for the search justification). This systematic search produced 233 unique hits. After screening of the title and the abstract, 203 articles were excluded based on the predefined inclusion criteria (see the table below). Of 30 articles the full article was assessed. Finally the search produced 1 systematic review with meta-analysis (Wong 2018). See Appendix E.1.2 for the flowchart of the exclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix E.1.3 (Alavijeh 2021; Anuruang 2014; Arbesman 2012; Chalfont 2021; Chen 2020; Corbett 2020; Evangelista 2015; Farahmand 2019; French 2014; Goransson 2017; Hu 2022; Jonker 2015; Lawless 2021; LeBlanc 2018b; Lommi 2015; Panagioti; Patel 2016; Smith 2017; Soderlund; Tan 2015; Tavakkoli Oskuei 2022; van Het Bolscher-Niehuis 2016; Van Truong 2021; Warner 2019; Wong 2022; Wong 2019; Zarrin 2020; Zavertnik 2014).

Inclusion criteria

Types of studies	RCT or systematic review/meta-analysis
Types of patients	frail older adults (who are receiving decongestant therapy)
Type of intervention	self-management interventions
Type of comparison	regular care
Type of outcome	quality of life + activities of daily living

Characteristics of the included studies

A systematic review with a meta-analysis, based on 22 randomised controlled trials (RCTs), was included. In total, 14,364 patients underwent self-management interventions for various conditions (Wong 2018). The review focuses specifically on complex interventions to improve self-care/self-management for (frail) older adults living at home, where complex interventions are compared with usual care. Usual care is not defined separately for each study and may include something slightly different in each study. The average age of the patients varies between 71 and 86 years. The included studies were carried out in various countries in the period between 2007 and 2016. The characteristics of the included studies, as well as the complex self-management interventions that were investigated, are shown in Appendix E.2.4. Overview table of characteristics

Individual study quality (RoB)

The included systematic review by Wong (2018) was assessed with AMSTAR 2 (A Measurement Tool to Assess systematic Reviews 2) (Higgins 2019), where the quality of the systematic review was scored independently by MvZ and FdV on the basis of 16 items. The assessment of the various items was discussed, and consensus was reached. An overview of the study quality assessment is provided in Appendix E.2.5: Risk-of-bias table /AMSTAR Checklist of systematic reviews.

The assessment of the 22 studies, incorporated in the included systematic review by Wong (2018), were scored by 2 independent reviewers using the Cochrane Risk-of-Bias tool (Higgins 2019). The overview table, including the opinion of the reviewers with regard to the assessment of the study quality, was taken over from the systematic review and is shown in Appendix E.2.5: Risk-of-bias table (taken from Wong (2018)).

Effectiveness and evidentiary value

Based on the systematic literature search, no articles were identified that directly provided an answer to the research question on effective self-management interventions for frail older adults receiving decongestant therapy. For this reason, the guideline panel deviated from the 'frail older adults receiving decongestant therapy' patient population and opted for a broader approach to the population, by removing decongestant therapy from the inclusion criteria and focusing on frail older adults with chronic conditions that are not disease-specific. Based on the selected literature the guideline panel translated this themselves to the relevant patient group that had an indication for decongestant therapy.

The included systematic review by Wong (2018) describes the effectiveness of complex interventions to improve self-management in frail older adults living at home and who suffer from various chronic conditions. The furthering of self-management interventions for frail older adults seems to require an intensive approach from the person providing the treatment, which includes more than merely informing the patient. Optimal supervision of frail older adults has the best chance of succeeding if it is offered in various sub-areas of self-management; the so-called multi-component or complex-intervention approach (van Het Bolscher-Niehuis 2016; Wong 2018). Complex interventions can be defined as a combination of at least two of the three mutually interactive components that support the implementation of self-management and self-care, consisting of the core components described below. Detailed information on the complex self-management interventions, as included in the review, can be found in Appendix E.2.4: Characteristics and results.

- **Assessment** | Asking about and identifying the person and context in an individual assessment aimed at identifying the physical, psychological and environment factors of the frail older adult. Exploring the patient's situation, wishes and needs.
- **Development of customised care** | Adjusting an individual care plan to the unique patient situation in which goals and agreements for the (provision of) care are established. With a patient-oriented approach, the frail older adult's ability to manage their health, medical needs and physical, mental and emotional wellbeing on their own, is maintained or improved.

- **Information and advice plus education** | providing personalised information enables patients to play a larger role in taking self-management. It is an interactive process between the patient and therapist, with the goal of changing the patient's thoughts or behaviour in relation to their health. Information and advice plus education consist of disease-specific information and advice, the learning of knowledge and skills aimed at promoting health, coaching and social support through communication with like-minded people and professionals and functional training/exercises to further behavioural changes or problem-solving.

Note: The core components described above present parallels with theoretical models that are developed to support healthcare providers in the supervision of the self-management process. For more information and applicable tools for skin-therapy practice, refer to the 5A model included in the KNGF Self-Management guideline (KNGF 2022).

Positive outcomes when self-management in complex decongestant therapy is successful are: putting on and taking off compression material without assistance, unassisted care (skincare), unassisted (subjective) complaint management (putting legs up, self-massage, relaxation, manual lymph drainage), applying preventive measures unassisted (preventing wounds, disinfecting small wounds, self-observation, etc.) and motivation to integrate (short) moments of mobility without assistance.

The guideline panel determined the following two patient-relevant outcome measures beforehand as 'crucial' outcome measures: quality of life and activities of daily living (ADL)

Effectiveness of outcome measure 1: Quality of life

10 studies (10/22), included in the systematic review by Wong, evaluated the effectiveness of complex self-management interventions on the outcome measure 'quality of life'. The 10 studies were found to be significantly heterogeneous (χ^2 = 147.03, I^2 = 97%, p < 0.001), for which a sensitivity analysis was performed. The results of the overall score for quality of life showed a pooled standardised mean difference (SDM) of 0.52, 95%-CI -0.16-1.21. The results show no statistically significant result between the intervention group and the control group. Based on the previously defined threshold value for clinical relevance of SMD > 0.5, the results were, however, found to be clinically relevant.

Effectiveness of outcome measure 2: Activities of daily living (ADL)

11 studies (11/22), included in the systematic review by Wong, evaluated the effectiveness of complex self-management interventions in which the status of physical functioning/activities of daily living was taken as an outcome measure. The 11 studies were found to be significantly heterogeneous (χ^2 =20.43, I^2 = 51%, p = 0.03). The results showed a pooled standardised mean effect (SDM) on activities of daily living of SMD 0.04, 95%-CI -0.05-0.14. The results show no statistically significant result between the intervention group and the control group. The effect also did not exceed the previously defined threshold value for clinical relevance of SMD > 0.5.

From evidence to recommendation

The quality of the evidence was assessed by means of the GRADE method.The considerations that follow from this are based on a review of scientific literature, as well as clinical expertise from the field (expert opinion), represented by the guideline panel. The guideline panel consists of five skin therapists and a subject-matter expert with demonstrable knowledge and experience in the field of frail older adults/geriatric care.
The guideline panel is further supported by a nurse who is specialised in complex wound care and works in geriatric care, and a dermatologist (for further justification of the guideline-panel characteristics, see: Paramedical Guideline on Frail Older Adults (general information) A.1 Guideline Panel for Skin Therapy). The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects

The guideline panel considers the desirable effects of complex self-management interventions on the outcome measures 'quality of life' and 'activities of daily living (ADL)' to be significant. The successful implementation of complex self-management interventions is expected to increase autonomy, self-management and self-reliance, which also has a positive impact on quality of life.

Undesirable effects

The guideline panel considers the desirable effects of receiving complex self-management interventions on quality of life to be small. Self-management in general makes an important contribution to quality of life. Nevertheless, if the self-management supervision is not successful, this can make the patient uncertain, which could prevent the achievement of the desired treatment results and reduce quality of life. At the same time, too much self-management could mean that advice is not followed correctly, for example, in taking care of wounds.

The guideline panel considers the desirable effects of receiving complex self-management interventions on ADL to be fair. In practice, resistance is sometimes also experienced when an older patient who is insufficiently capable of self-management is relieved of ADL tasks. This often comes from a reduced sense of autonomy and/or a feeling of qualm towards family, loved ones or informal caregivers. Certain parts of complex decongestant therapy are also less applicable to the implementation of self-management interventions or can even create risks if done negligently, for example, when bandaging without assistance.

Quality of evidence

The guideline panel assesses the evidentiary value of the desirable effect on quality of life to be very low (Appendix 7: GRADE). The guideline panel assesses the evidentiary value of the desirable effect on ADL to be moderate/fair (Appendix E.2.7: GRADE).

Patient values and preferences

The guideline panel considers that patients attach great value to self-management, with one of the most important aspects being an increase in/maintenance of autonomy for the patient. Positive outcomes of successful self-management with complex decongestant therapy are: putting on and taking off compression material without assistance, unassisted skincare, unassisted (subjective) complaint management (putting legs up, self-massage, relaxation, applying preventive measures unassisted (preventing wounds, disinfecting small wounds, self-observation, etc.) and motivation to integrate (short) moments of moving without assistance. The teaching and supervision of these abilities can be entrusted to skin therapists and will have to be adapted to the physical and cognitive capabilities of the frail older adult (personalised care). People set great store by maintaining self-management and and are keen to keep a grip on their own lives, but do not always want to have full responsibility for this themselves. This also applies (to a great extent) to older adults. Support from healthcare providers, loved ones and informal caregivers can be desirable here.

The coping style of the patient and the quality of conversational techniques of the therapist have an impact on the success rate of implementation of self-management by the patient. With an unsuccessful implementation, the guideline panel considers that there is a risk of increased perception of disease. Ambivalence in the patient and the environment can also play a role in this. It is therefore important to apply behavioural change techniques both to the patient and to the immediate environment. Creating more autonomy through self-management will probably lead to less contact with the healthcare provider. Older adults can, however, set great store by contact with the healthcare provider thanks to the social aspect. For this target group, it can play a large role. The guideline panel, moreover, considers it worthwhile to have periodic monitoring consultations to check whether symptoms have diminished, as well as assessing whether certain

information should be reviewed. There are many assumptions and/or disinformation around patients, coming from the people involved, healthcare providers and the Internet. This, too, can be confusing, which may increase uncertainty with regard to personal functioning.

One of the main focal points in self-management in general, but possibly more so in the target group of frail older adults, is the person- and context-centred adjustment of the (complex) intervention to the patient. It should therefore be possible to integrate self-management in the life of the patient, keeping in mind the overall context, in which loved ones and informal care-givers also play a role. The guideline panel considers that there is a moderate variation between patients, for example, in terms of motivation for self-management. However, no qualitative study has been conducted on the values and preferences of patients, meaning that no definite verdict can be given.

Balance of desirable and undesirable effects

The desirable effects outweigh the undesirable effects, provided that there is due regard for the person, context and feasibility of implementing the self-management intervention. The guideline panel believes that every form of increasing autonomy and self-management is likely to contribute to a positive effect both on ADL and on quality of life.

Economic considerations and cost-effectiveness

Whether complex self-management interventions are cost-effective in the long term cannot be concluded with certainty. It does, however, appear likely that the resources needed for self-management interventions will lead to possible savings in the long term, and the guideline panel estimates that the intervention will probably be cost-effective. Implementing self-management interventions in the short term will probably cost more money and time, for example, to give explanations, evaluate and buy aids. The guideline panel nevertheless estimates that it is likely that the implementation of self-management interventions in the long term will lead to less (needs for) healthcare. The alternative for learning self-management in complex decongestant therapy is ongoing decongestant therapy care and/or therapy dependence. It is likely that self-management support from a skin therapist, for example, giving instructions for putting on and taking off therapeutic elastic stockings instead of home care twice a day is more cost-effective. Even if complete self-management is not achieved, it still appears to be cost-effective. However, no cost-effectiveness studies resulted from the evidence synthesis on the basis of which a definite verdict can be given on the added value that complex self-management interventions could have for healthcare expenditures.

Equality

The guideline panel expects that the intervention will lead to a possible increase in health equality. It is important here, however, not to lose sight of the diversity within the older-adults population in terms of education level, health literacy, socio-economic status, digital proficiency and limited physical capacity of the frail older adult. Patients may be under-insured or unable to find, pay for, understand or reach a suitable therapist. The digitisation of healthcare can also create a major barrier for this target group, and embarrassment about acknowledging this could play a role. Society has increasingly higher expectations of the implementation of self-management, and it is still unclear if this is in fact realistic/feasible for this target group. To ensure equality, the guideline panel considers it important to take these aspects into account when introducing (complex) self-management interventions. No qualitative studies on cost-effectiveness resulted from the evidence synthesis, meaning that no definite verdict can be given on the added value of complex self-management interventions for health equality.

Acceptability

The guideline panel expects that the intervention will probably be accepted by the majority of key stakeholders. It is in line with the changing mindset in healthcare; prevention rather than therapy, focusing on self-management and joint decision-making. Self-management can help to reduce the problem of staff shortage in healthcare. It provides a different view on healthcare, thereby changing the distribution of costs. The perception that the stakeholders involved might have of

complex self-management interventions is, however, lacking, which means that there is insufficient information on which to base a definite verdict.

Feasibility

To assess the feasibility of setting up complex self-management interventions, an implementation plan was drawn up according to the methodological steps for the development of an implementation strategy. Based on these results, the guideline panel considers that the feasibility is probably realistic. Some caution is, however, needed here, keeping in mind both the capabilities of the older adult and the capacities of the healthcare provider to implement the self-management intervention. It is advisable for healthcare providers to receive extra training in the use of coaching techniques, especially with complex target groups such as frail older adults. Thought must be given to the question of whether complex interventions to further self-management should be implemented as stand-alone interventions or whether they should form part of treatment that is already provided by the skin therapist. If it is desirable to offer it as a stand-alone intervention, reimbursement under basic healthcare insurance would be necessary.

Possible additional considerations

The following considerations have been added by the guideline panel: subgroups of frail older adults to whom specific recommendations may apply. The guideline panel refers to people who are not capable of self-management or unable to understand the implementation thereof due to physical or cognitive impairments or impediments originating from their environment. Examples are: frail older adults with, for instance, a low education level, low health literacy, low socio-economic status, low digital proficiency, limited physical capacities, non-congenital brain injury, dementia, a physical or mental handicap, mental condition or terminal patients. Considering how many exceptions there are, it is impossible to produce an exhaustive list. The skin therapist will, in consultation with the patient in the therapy room, make an estimate of the feasibility of making complex self-management interventions.

Focus areas for implementation

Under certain circumstances, self-management can be partially or completely partially infeasible or even undesirable. In these situations, the therapist (potentially in consultation with the healthcare providers/doctors involved) will assess what type of complex decongestant therapy will be desirable and meaningful. Examples of this are older adults with incipient dementia, older adults with reduced mobility and older adults with complicating factors in their living situation, social network or finances.

Knowledge gaps

Following the evidence synthesis, it is noted that the following knowledge gaps exist on the basis of which (further) scientific research is considered important.

- The effect of learning self-management interventions for frail older adults on other crucial and important outcome measures than quality of life and ADL, including the effects on self-efficacy, coping strategies, adherence, life satisfaction, health literacy and costs in healthcare.
- Modalities of self-management and the identification of effective components of complex self-management interventions. In other words, what component of the intervention is effective or what combination(s) of components is (are) effective.
- Cost-effectiveness studies of complex self-management interventions in the longer term.

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E.3 Lymphoedema in the presence of complicating factors

Literature: search and select

Research question

What effective and safe treatments can the skin therapist implement for frail older adults with lymphoedema (or chronic oedema) as well as the complicating factor of heart failure or arterial insufficiency?

To answer the clinical question, a systematic literature analysis was carried out for the following research question (PICO):

P | frail older adults with lymphoedema (or chronic oedema) as well as the complicating factor of heart failure or arterial insufficiency where regular CDT treatment cannot be applied
I | adapted intervention
C | no intervention/regular treatment
O | haemodynamic parameters (cardiac output, heart rate, average arterial pressure, arterial inflow of the calf, arm/ankle index, volume of blood pumped per heartbeat, blood pressure)

Relevant outcome measures

The guideline panel considers the outcome measures of haemodynamic parameters (cardiac output, heart rate, average arterial pressure, arterial inflow of the calf, arm/ankle index, volume of blood pumped per heartbeat, blood pressure) and quality of life as crucial outcome measures for decision-making. Mobility and (wearing) comfort were regarded as important outcome measures.

Search

To answer the clinical question, a systematic literature review was performed on the research question. On 28 June 2023 an information specialist, L.J. Wieberdink, conducted a systematic search in Medline and Cinahl (see Appendix E.3.1 for the search justification). This systematic search produced 170 unique hits. Based on the literature supplied via experts, 4 more articles were included. After screening of the title and abstract, 15 articles were included for screening of the full text. The articles that were included based on full text and the reasons for exclusion are listed in Appendix E.3.3. Exclusion based on the full article (Bowering 1998; Cooper 2011; Cooper 2016; Green 2019; Konecne 2004; McCardell 1999; Pierce 2009; Ringley 2001; Tessari 2018; Vaassen 2015).

Inclusion criteria

Types of studies	randomised controlled trial (RCT), systematic review/meta-analysis, other comparable research (e.g. case control, prospective cohort study)
Types of patients	frail older adults with lymphoedema (or chronic oedema) who receive decongestant therapy and are also dealing with the complicating factor of heart failure or arterial diseases
Type of intervention	regular therapy/no therapy
Type of comparison	adapted treatment/alternative treatment
Type of outcome	haemodynamic parameters, quality of life, mobility and (wearing) comfort

Characteristics of the included studies

A total of 5 articles were included. A prospective analysis b Stucker (2020), a prospective case series by Rother (2020), a prospective RCT by Delis (2005), a prospective clinical study by Leduc (2011) and a prospective cohort study by Wilputte (2005). Stucker (2020) studied the safety and effectiveness of a therapeutic elastic stocking developed especially for the patient population with a pressure gradient that decreases from ankle to knee, in terms of safety and CVI symptoms. 50 patients CVI (CEAP classification C3-C5) and peripheral arterial disease (PAD) were included. Rother (2020) studied the influence of compression on microperfusion and safety in 94 patients with peripheral arterial disease (PAD) and diabetes mellitus. Delis (2005) studied 91 stable claudication patients of whom 20 patients received intermittent pneumatic compression (IPC) including aspirin (75 mg) and 21 patients who only received 75 mg of aspirin. Leduc (2011) studied the effect of 15 minutes of manual lymph drainage in 9 patients with oedema and class III-IV heart failure according to haemodynamic parameters. Wilputte (2005) studied the safety of multiple-layer bandaging in 5 patients with severe heart failure (class III-IV) according to various haemodynamic parameters. The mean age of the patients was 67 years (range 57-80). The included studies were carried out in Germany, Belgium and England in the period between 2005 and 2021.

Individual study quality (RoB)

The included studies were assessed with the ROBINS-I checklist for risk of bias in non-randomised studies (Higgins 2016), where the quality of the studies was scored independently by MvZ and FdV on the basis of 7 main items. The assessment of the various items was discussed, after which consensus was reached. An overview of the study quality assessment is provided in Appendix E.3.5: ROBINS-I Risk of Bias table.

Effectiveness and evidentiary value

Due to the lack of effect sizes in the included articles, the input was insufficient for determining the evidentiary value using the GRADE method. For this reason, the GRADE method was deviated from and the results are only presented in a descriptive way.

Description of literature

Stucker (2020) studied a newly developed therapeutic elastic stocking with lower compression for patients with arterial insufficiency. The stocking consists of 78% polyamide and 22% elastane and decreases in pressure from the ankle to the knee. In a resting position, the pressure corresponds to that of a class-I stocking (18-21 mmHg) and under work pressure, the compression corresponds to that of a class-III stocking (34-46 mmHg). There is hardly any compression in the foot part. Patients were monitored for 14 days, in which 3 measurements took place at intervals. During the first measurement (T0), the legs were measured digitally. After 7 to 10 days, stockings made to measure were available that were tried on during the second visit (T1). During 14 days, the stockings were worn from the morning till the evening. After 14 days, the patients were measured again (T3). During all 3 visits, the following parameters were assessed:

- Arterial pressure in the big toe while wearing the compression stocking in a standing position and once when lying on the back for 10 minutes
- Assessment of the symptom diary for varicose veins (VVSymQ score), as a total score and as individual scores (values between 0 and 25 points)
- Pain when walking more than 50 m in the last 7 days prior to the study (visual analogue scale 0-100)
- Lower-leg volume (Bodytronic 600)
- Visual assessment of oedema on a scale of 0-3 (0 no oedema, 1 mild oedema, 2 moderate oedema, 3 severe oedema)
- Skin lesions, such as dry skin, erythema, dermatitis, contraction/constriction, haematoma, hyperpigmentation, necrosis
- Ease of putting on as assessed by the research nurse (visual analogue scale 0-100: 0 very easy, 100 extremely difficult)
- Ease of taking off as assessed by the research nurse (visual analogue scale 0-100: 0 very easy, 100 extremely difficult)
- Ease of putting on as assessed by the patient (visual analogue scale 0-100: 0 very easy, 100 extremely difficult)
- Ease of taking off as assessed by the patient (visual analogue scale 0-100: 0 very easy, 100 extremely difficult)

- Interface pressure at the ankle (measuring point B)
- Interface pressure at the start of the Achilles tendon (measuring point B1)

Rother (2020) studied therapeutic elastic stockings with different pressure ratings on the microperfusion in patients with arterial insufficiency. First, a compression class I (18-21 mmHg) was measured and then compression class II (23-32 mmHg). The stockings were then worn for 3 hours. The microperfusion was measured before, during and after compression using a combined method of Laser-Doppler Flowmetry and white-light tissue spectrometry. Before measuring, probes were placed underneath the compression stockings. Measurements were taken on the big toe (M1), ankle (M2) and back of the calf (M3). Measurements were taken in various postures. Measurements were taken at 5 different moments. First a baseline measurement for each patient without stockings (base). Immediately afterwards, a second measurement was taken immediately after putting on the stocking and the third measurement was taken after 3 hours while the patient was still wearing the stocking. The measurement procedure was then repeated with class-II compression stockings. In addition, the wearing comfort of the compression stockings was assessed with a Likert scale (1-10, where 1 indicates optimal wearing comfort and 10 enormous limitations).

Delis (2005) studied two randomised groups of patients with arterial insufficiency/claudication, where group 1 received intermittent pneumatic compression (IPC) with 75 mg of aspirin and group 2 75 mg of aspirin only. The IPC was used for 5 months, 2.5 hours each day. The cuffs were placed around the foot and ankle with 120 mmHG, inflation 4 seconds with 3 impulses per minute and with a calf inflation delay of 1 second. Both groups received the advice to continue exercising/moving alongside the therapy. The following parameters were assessed:

- Initial Claudication Distance (ICD)
- Absolute Claudication Distance (ACD)
- Ankle-brachial indices (ABI)
- Popliteal Artery Volume Flow
- Quality of Life

Leduc (2011) studied the effect of manual lymph drainage (MLD) in 9 patients with oedema and class III-IV heart failure. MLD was applied for 15 minutes on the lower extremities, while a resorption technique was administered for most of the time. Various haemodynamic parameters were measured at the same time with the duplex left and right of the heart. Measurements were taken at baseline (control), T1 (after 5 minutes of MLD) and T2 (after completing MLD). The following parameters were assessed:

- Parameters measured on the left side of the heart at the level of the mitral valve
- Parameter measured at the level of the aortic valve/cardiac flow
- Parameter measured at the level of the ventricles
- Parameters measured on the right side of the heart at the level of the tricuspid valve
- Parameters measured at the level of the vena cava inferior
- Measurements of the lower extremities

Wilputte (2005) studied the safety of multiple-layer bandages for patients with severe heart failure (class III-IV) according to various haemodynamic parameters. Multiple layers of bandages were applied from the toe to the hip. Patients had to lie down for 1 hour during the examination. To measure the pressure, a pressure gauge was placed on the distal part of the leg. To optimise the effect of the bandages, patients were asked to move around during the examination. The following parameters were measured:

- Heartbeat
- Cardiac output
- Systolic and diastolic blood pressure (SDP, DBP)
- Mean blood pressure (MBP)

- Right atrial pressure (RAP)
- Cardiac index (CI)
- Systolic index (SI)
- Systemic vascular resistance (SVR)
- Pulmonary arterial systolic pressure (PASP)
- Diastolic pressure (PADP)
- Mean pulmonary arterial pressure (MPAP)
- Pulmonary wedge pressure (PWP)
- Pulmonary vascular resistance (PVR)
- Respiratory rate.

The haemodynamic parameters were measured before, during and after the examination according to the following diagram.

Timing of measurements:
- T1 | Basic measurements 30 ankle movements (dorsiflexion)
- T2 | 15th movement: measurements, 5 minutes of rest
- T3 | Measure during rest with multiple-layer bandaging - 5 minutes of rest
- T4 | Measure during rest with bandages, 30 ankle movements (dorsiflexion)
- T5 | 15th movement: measure with bandages, 5 minutes of rest
- T6 | Measure during rest with bandages, 10 minutes of rest after removing
- T7 | Resting measurements of bandages

Outcome measure 1: Quality of life

The outcome measure 'quality of life' was examined in the study by Delis (2005) in which the effect of intermittent pneumatic compression therapy was studied. The intervention group showed an improved quality of life in all SF-36 areas after 5 months compared to the control group (P<0.01). No effect size was, however, reported.

Outcome measure 2: Haemodynamic parameters (cardiac output, heart rate, average arterial pressure, arterial inflow of the calf, arm/ankle index and volume of blood pumped per heartbeat, blood pressure)

Cardiovascular-related outcome measures were examined in all three of the included studied. The primary parameter in Stucker (2020) was arterial pressure in the big toe. The arterial pressure in the big toe increased immediately from 83.3 ± 27.6 mmHg to 90.8 ± 24.1 mmHg (p=0.03) after putting on the compression stocking. After 14 consecutive days of using the therapeutic elastic stocking, the systolic pressure was measured in the big toe while wearing the stocking (80.6 ± 25.2 mmHg). These values did not deviate from the pressure at baseline measurement. In five patients, the systolic pressure in the big toe was between 37 mmHg and 48 mmHg before the compression stocking was put on. In 3 of these patients, the arterial pressure in the big toe rose to above 50 mmHg after putting it on; in 1 patient, the pressure remained the same; and in 1 patient the pressure went down from 48 mmHg to 33 mmHg. None of the patients showed clinical signs of ischaemia, such as pain, blueish discolouration or paleness of the toe. It is unclear to what extent the results are based on studies where financial or commercial interest were involved (intervention: TEK supplied by Bauerfeind and Medi). Due to the fact that the patients were not blinded during the intervention and the small size of the study populations, the quality of the study is questionable and the evidentiary value therefore low.

The study by Rother 2020) examined microperfusion before, during and after compression in different postures in patients with peripheral arterial disease.

- Seated: for the parameters oxygen saturation of haemoglobin (sO2, in %) and flow, no significant changes were found at the big toe compression location (M1). At the compression location on the lateral side of the ankle (M2) a significant improvement was, however, found under the influence of compression class (CC) I and II (sO2 M2: CCLI: p=0.03, CCLII: p=0.06; flow M2: CCLI: p=0.01, CCLII: P<0.01).

- Standing: the mean values for So2 and flow at compression location M1 showed comparable results and a deterioration of the perfusion. At compression location M2 on the other hand, significant improvement was observed under the influence of compression class I and II (sO2 M2: CCLI: *p*=0.01, CCLII: *p*=0.04; flow M2: CCLI: *p*=0.07, CCLII: *p*=0.03).
- Raised position: lifting the leg seems to have the greatest impact on the perfusion under the influence of compression therapy. In both locations that were measured (M1 and M2) and for both compression classes, pressure is decreased and flow is increased (sO2 M1: CCLI: *p*<0.001, CCLII: *p*<0.001; M2:CCLI: P<0.001, CCLII: *p*<0.001; flow M1: CCLI: *p*=0.04, CCLII: *p*=0.02; M2: CCLI: *p*=0.09, CCLII: *p*=n.s).

It is unclear to what extent the results are based on studies where financial or commercial interest were involved (intervention: TEK supplied by Bauerfeind and Medi). Due to the fact that the patients were not blinded during the intervention and the small size of the study populations, the quality of the study is questionable and the evidentiary value therefore low.

In the study by Delis (2005), the absolute and resting ankle-brachial index (ABI and r-ABI) was measured. The r-ABI in group 1 improved from a median of 0.59 (iq range 0.546-0.669) at baseline to 0.69 (0.639-0.754) at the end of the third month (*p*<0.005; 95%-RI: 0.08-0.16). After 5 months, the r-ABI in the IPC intervention group was 0.69 (0.625-0.754) (*p*<0.005; 95% RI: 0.08-0.15). The r-ABI in group 2 did not change (*p*>0.05). Group 1 already had a better r-ABI at the end the third month compared to control group 2 (*p*=0.0127; 95% RI: 0.0188- 0.191). At the end of the fifth month, 95%-RI of the difference of 0.006-0.2 was in favour of group 1 (*p*=0.03). 12 months after the end of the treatment, the IPC intervention group shows a r-ABI of 0.658 (iq 0,.0-0.735), which corresponds to the r-ABI measured after 5 months (*p*=0.2; 95% RI: -0.03-0.005). The Popliteal Artery Volume Flow in a horizontal position showed a median of 77 (iq range 68.5-138) ml/min at baseline in group 1 and was 79 (62-147) ml/min after 5 months (*p*=0.65). None of the changes in Popliteal Artery Volume Flow during one year of IPC treatments were significant (*p*=0.2). Not even when compared with control group 2. The fact that the patients were not blinded during the intervention and the small size of the study populations mean that the quality of the study is questionable and the evidentiary value therefore low.

The study by Leduc (2011) demonstrated that MLD treatment significantly reduces the circumference of the lower extremities; (mean ± SD baseline (=100%) to T2) 98 ± 0.83, *p*=0.0004. Although the heart rate went down after MLD (Cardiac rhythm 87 ± 34, *p*=0.02), all other haemodynamic parameters remained unchanged compared to the baseline measurement (Mitral E wave; 97 ± 14, *p*=0.81; Mitral A wave 98 ± 22, *p*=0.91; VTI aortic 106 ± 26, *p*=0.27; Tricuspid E wave 87 ± 28, *p*=0.19; Tricuspid A wave; 92 ± 35, *p*=0.72; Vena Cava Inferior 164 ± 172, *p*=0.70). The results therefore suggest that MLD is not a contraindication for patients with heart failure and oedema in the lower extremities. The small amount of information on patient characteristics, the possible risk of bias due to confounding and the small population mean that the quality of the study is questionable and the evidentiary value therefore low.

The study by Wilputte (2005) showed that multiple-layer bandages deteriorate the right and left ventricular functions, with an increase in preload as well as afterload. The use of several layers of bandages is therefore contraindicated for patients with severe heart failure (class III-IV). Wilputte demonstrated that multiple-layer bandages cause an increase in the right atrial pressure (RAP). The increase can be explained by an improved venous return to the right atrium. Heart rate, cardiac index and systolic pressure remained stable during the study, which suggests that patients with heart failure cannot adjust to an increased preload. An increase was observed in the mean pulmonary blood pressure (MPAP) (T2: 30.8 mmHg, *p*<0.05), on the systolic pulmonary artery pressure (SPAP) (T2: 48.6 mmHg; T5: 50.2 mmHG) and on the diastolic pulmonary artery pressure (DPAP) (T2: 22.2 mmHg). There was also a significant increase in pulmonary wedge pressure (PWP) (T2: 23.6 mmHg, *p*<0.001; T5: 23 mmHg; *p*<0.001), which could be an indication of an amplified left ventricular preload. In one case the PWP even reached the level of a pulmonary oedema (PWP > 25 mmHg). Vascular resistance (VR) did not change significantly while systemic vascular resistance (SVR) did increase significantly at the T5 measurement (1664 dynes.sec.cm-5).

The respiratory frequency increased at T2 (29.6 thoracic movement/min, with an initial value of 22.4). At T7 all altered haemodynamic variables returned to the initial values. The scant information on patient characteristics, the possible risk of bias and the small population mean that the quality of the study is questionable and the evidentiary value therefore low.

Outcome measure 3: Mobility/walking distance

Delis (2005) studied the initial claudication distance (ICD) where the ICD in group 1 increased from an initial 77.5 metres (ig-range 47.5-112.5) to 225 metres (ig-range 140-395) after 3 months of IPC therapy (p<0.005; 95% RI: 108-245 metres). Following completion of the treatment after 5 months, the ICD was 230 metres (iq-range 148-400), which is an increase of 197% (p<0.005; 95% RI: 115-330 metres). No significant ICD changes were observed in group 2 (p>0.05). Looking at the difference in ICD between the intervention and the control group, a significant difference was already observed after 3 months in favour of the IPC intervention group (p=0.005; 95% RI: 28-150 metres). Mobility/walking distance was still maintained 1 year after stopping the IPC treatment.

The absolute claudication distance (ACD) in group 1 rose from 137.5 metres (iq-range 100-235) on day 0 to 380.5 metres (iq-range 247-656) after the end of the third month (p=0.005; 95% RI: 144-496 metres). After 5 months, the ACD was 429 metres (iq-range 275-672), with an overall improvement of 212% (p<0.005; 95% RI: 200-624 metres). All ACD improvements in group 1 from the first to the fourth month were statistically significant (p<0.01). The ACD in group 2 did not change during the study period (p=0.05). When comparing the two groups, group 1 already performed better in the second month (p=0.01; 95% RI: 23-239 metres). At the end of the fifth month, the difference of the 95% RI was 97-413 metres in favour of group 1 (p=0.0002). 12 months after the treatment, the ACD in the intervention group no longer differed from the improvement after 5 months (p=0.75, 95%-RI: 34-32 metres). The fact that the patients were not blinded during the intervention and the small size of the study populations mean that the quality of the study is questionable and the evidentiary value low.

Outcome measure 4: (Wearing) comfort

Rother (2020) studied the wearing comfort of the class I and II therapeutic elastic stockings. Patients rated the wearing comfort of class I with an average of 1.84 (SD 0.84) and class II with an average of 2.10 (STD 0.92) on a scale of 1-10, where 1 indicates optimal wearing comfort and 10 enormous restrictions. None of the patients showed any significant skin lesions, grazes or skin damage related to pressure. Stucker (2020) studied the difficulty of putting on and taking off and the general wearing comfort of the elastic stocking with lower compression. Putting on and taking off was considered easy by both the research nurse and the patient, with scores of 8.5 and 7.8 respectively; 13.3 and 16.3 (0-100; 0 not difficult to put on and take off; 100 extremely difficult to put on and take off). 39 of the 50 patients reported mild pain (15.3 ± 24.6) with an improvement after 2 weeks of daily use (10.8 ± 17.9; p=0.153). 22 of the 50 patients had less pain when wearing the stockings than when they did not wear them. 26 patients reported no difference and 2 patients said that they had more pain. Considering the questionable quality of the included studies and the small patient populations, the evidentiary value of the results is low.

From evidence to recommendation

The quality of the evidence was assessed by means of the GRADE method. Due to the lack of effect sizes in the included articles, the input was insufficient for the component of determining the evidentiary value. The rest of the GRADE method was, however, maintained. The considerations that follow from this are based on a review of scientific literature, as well as clinical expertise from the field (expert opinion), represented by the guideline panel. The guideline panel consists of five skin therapists and a subject-matter expert with demonstrable knowledge and experience in the field of frail older adults/ geriatric care. The guideline panel is further supported by a nurse who is specialised in complex wound care and works in geriatric care, and a dermatologist (for further justification of the guideline-panel characteristics, see: Paramedical Guideline on Frail Older Adults (general information) A.1 Guideline Panel for Skin Therapy). The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects

The guideline panel considers the desirable effects of intermittent pneumatic compression therapy (IPC) for frail older adults with lymphoedema (or chronic oedema) and the complicating factor of heart failure or arterial insufficiency to be trivial to small. A condition for using IPC in a home setting is monitoring by a therapist and an implementation in combination with other modes of decongestant therapy, such as bandaging, therapeutic elastic stockings and movement.
IPC) is mainly effective for frail older adults with lymphoedema (or chronic oedema) and the complicating factor of arterial insufficiency when other co-morbidities are also present, such as complicated wounds or immobility/dependence/ orthostatic oedema. A temporary decrease in complaints might be observable, for example, a decrease in tension, pain and swelling. These effects, however, seldom last for long when IPC is administered as a monotherapy. IPC may, however, well have a positive impact on the tolerance of compression therapy (TEK/bandaging) and can therefore be given as a supplement to compression therapy.
The guideline panel considers the desirable effects of adapted therapeutic elastic stockings to be fair. In this regard, the guideline panel believes that wearing therapeutic elastic stockings with a lower compression is in many cases preferable to not wearing any therapeutic elastic stockings. The guideline panel, however, believes that the stocking studied by Stucker (2020) is a newly developed therapeutic elastic stocking that is not widespread in skin-therapy practice. The guideline panel therefore advises wearing a class 1 adapted therapeutic elastic stocking, preferably with a high degree of stiffness.

The guideline panel considers the desirable effects of MLD to be fair. A condition for MLD is to apply it in combination with other modes of decongestant therapy such as bandaging, therapeutic elastic stockings and movement.

The guideline panel considers that bandaging with several layers of bandage for frail older adults with severe heart failure (class III-IV) is contraindicated due to a deterioration of the haemodynamic parameters. There were no desirable effects here. The description of the article by Wilputte (2005), however, lacks a concrete definition of bandaging with 'several layers' of bandages.

Undesirable effects

The guideline panel considers the undesirable effects of IPC for frail older adults with lymphoedema (or chronic oedema) and the complicating factor of heart failure or arterial insufficiency to be fair. If the patient's context is incorrectly estimated, this can lead to the unnecessary (undesirable) use of expensive equipment and unnecessary supervision by therapists.

The guideline panel considers the undesirable effects of therapeutic elastic stockings with adapted pressure to be small, provided that proper monitoring and/or supervision are continued with regard to undesirable (skin) reactions.

The guideline panel considers the undesirable effects of manual lymph drainage as small. Manual lymph drainage is, however, only indicated during the initial phase.

The guideline panel considers that bandaging with several layers of bandage for frail older adults with severe heart failure (class III-IV) is contraindicated due to a deterioration of the haemodynamic parameters. The use of multiple-layer bandages for patients with severe heart failure (class III-IV) furthermore leads to an undesirable effect.

Quality of evidence

Due to the absence of effect measures in the included studies, the quality of the evidence was not assessed according to the GRADE method. Based on the available results, the guideline panel nevertheless considers the quality of the evidence to be low. This is based on the risk of bias in all the included studies. The possibility of financial or commercial interests, the fact that participants could not be blinded, the absence of control groups and the small study populations meant that the quality of the included studies was low.

Patient values and preferences

The guideline panel considers that patients attach reasonable value to the implementation of the studied decongestant therapy methods (IPC, TEK, MLD and bandaging). An important aspect is the increase in and/or maintenance of the patient's autonomy. The interventions can increase a person's confidence in their own health and self-reliance. Older adults attach great value to maintaining self-management and are keen to keep a grip on their own lives, but do not always want to bear full responsibility for this themselves. Support in this regard can be desirable and necessary. There is presumably little variation between patients, provided that the comfort is sufficient and that there are no side effects. However, no qualitative study has been conducted on the values and preferences of patients, meaning that no definite verdict can be given.

Balance of desirable and undesirable effects

The guideline panel considers that the desirable and undesirable effects of IPC are probably equal. The motivation for this is that due to costs, a lack of time and sometimes unrealistic expectations from the patient, IPC at home should be done with caution. On the other hand, IPC can sometimes also lead to better adherence and quality of life. The guideline panel believes the use of IPC in the initial phase in a practice setting to be complementary to other components of complex decongestant therapy.
The guideline panel considers that the desirable effects of fitting therapeutic elastic stockings with adapted pressure are likely to outweigh the undesirable effects thereof. The fact that a treatment can be implemented is a considerable desirable effect. The alternative is not giving any compression. The guideline panel furthermore believes that wearing therapeutic elastic stockings with a lower compression is in many cases preferable to not wearing any therapeutic elastic stockings.

The guideline panel considers that there will in all probability not be any undesirable effects if MLD is applied in the initial phase, provided that it is done as a complement to other modes of decongestant therapy.

The guideline panel considers a deterioration of haemodynamic parameters when multiple-layer bandaging is applied for frail older adults with severe heart failure (class III-IV) as undesirable. The desirable effects therefore do not outweigh the undesirable effects.

Economic considerations and cost-effectiveness

Although no cost-effectiveness studies are available, the guideline panel believes that the necessary resources and costs of IPC will be high. The costs, however, seem to vary. Healthcare providers must therefore take healthcare costs into consideration when setting up IPC at home. It is an expensive device and cannot just be set up for everyone. Moreover, healthcare facilities are not always willing to buy an IPC themselves. To ensure the correct use of IPC, periodic monitoring by a therapist is advisable. Naturally this will also entail costs. A positive effect may, however, be expected on the number of treatment interventions and therefore also a cost reduction if IPC is used as a complement to CDT in a practice setting. However, no cost-effectiveness studies resulted from the evidence synthesis on the basis of which a definite verdict can be given.
The guideline panel considers the resources needed for the implementation of MLD and the fitting of compression material (therapeutic elastic stockings/bandages) to be moderately cost-saving. The interventions, on the other hand, are probably cost-effective. The compression material is fitted, ordered from the supplier and the costs claimed from the healthcare insurance company. Two pairs of stockings can be claimed under basic healthcare insurance per year. However, no cost-effectiveness studies resulted from the evidence synthesis on the basis of which a definite verdict can be given.

Equality

The guideline panel expects that the intervention will lead to a possible decrease in health equality. In the experience of the guideline panel, not all home-care and healthcare facilities are willing to buy an IPC, provide support in the use thereof or train staff. Not all healthcare insurance companies will reimburse an IPC device, which means that not all patients have equal access to IPC.

The guideline panel expects that the use of compression material will lead to a possible increase in health equality. Compression material can be reimbursed under basic healthcare insurance. This means, however, that excess is used, which can pose a barrier for a certain population. Compression therapy must be done by an proficient therapist and the patient must be able to find the way to this therapist and to afford the associated costs. This also applies to the use of MLD.

However, no qualitative studies on cost-effectiveness resulted from the evidence synthesis on the basis of which a definite verdict can be given about the added value that the use of IPC, compressional material and MLD could have on healthcare equality.

Acceptability

It is not clear whether the IPC intervention will be accepted by the majority of the key stakeholders. For healthcare and home-care facilities, this will require investment in terms time, staff and costs. Healthcare insurers are, moreover, sparing when it comes to reimbursements due to the high costs and low evidentiary value.

The guideline panel expects that the fitting of compression material with reduced pressure will probably be accepted by the majority of the key stakeholders. The fitting of therapeutic elastic stockings is a therapy that is already done within the treatment scope of the skin therapist. It is easier to apply in everyday skin-therapy practice once the therapist knows what pressure is applicable for a patient with the complicating factors of arterial insufficiency and heart failure. According to the guideline panel, however, the intention is not to recommend specific brands.

The guideline panel expects that the use of MLD in the initial phase will probably be accepted by the majority of the key stakeholders. The user of MLD in the initial phase is an intervention that is already practised within the treatment scope of the skin therapist.

The perception of the stakeholders involved is, however, lacking, which means that there is not sufficient information on which to base a definite verdict.

Feasibility

The implementation of IPC for frail older adults with lymphoedema (or chronic oedema) as well as the complicating factor of heart failure or arterial insufficiency is considered by the guideline panel as probably not realistic. Due to the limiting factors, practical deployability, staff training, technical and organisational aspects and availability of the intervention, IPC is feasible only for a limited group of patients under the right conditions. The use of IPC often requires he help of healthcare providers. When a person who lives at home is dependent on home care, it is not always feasible to help the person get in and out of the equipment. Depending on the size of the cuff, it is not always practical to implement. In care facilities, it might possibly be more practical to implement an IPC.

The implementation of fitting therapeutic elastic stockings is regarded as realistic by the guideline panel. Skin therapists are trained to fit therapeutic elastic stockings and the guideline panel sees no barrier in this regard. Not every practice offers the opportunity to fit therapeutic elastic stockings, which can be a barrier for patients. However, skin therapists do in most cases have cooperation agreements with aid suppliers and/or bandage makers.

The implementation of MLD is regarded as realistic by the guideline panel. The use of MLD is an intervention that is already practised in the scope of skin-therapy treatment.

To assess its feasibility, an implementation plan was drawn up according to the methodological steps for the development of an implementation strategy.

Focus areas for implementation

The guideline panel points out that costs and reimbursement must always be kept in mind with the implementation of IPC and/or compression material. The advice is to estimate properly, prior to treatment, whether the material can also be used in the long term. The reimbursements are limited, which in practice means that once a specific treatment has been chosen, it is difficult to switch to another intervention or material.
Another focus area for implementation is good cooperation with a doctor. In complex cases where the complication factors of heart failure and arterial insufficiency are present, the diagnosis is made by a doctor or a medical specialist. The skin therapist must also discuss with the doctor/medical specialist involved the method of oedema reduction as well as the weighing up of normal or mitigated compression. This is because of the low evidentiary value of the available literature.

Knowledge gaps

Following the evidence synthesis, it is noted that the following knowledge gaps exist on the basis of which (further) scientific research is considered important.

- Study of the use of IPC for frail older adults with lymphoedema (or chronic oedema) and heart failure.
- Study of the use of compression (bandages and therapeutic elastic stockings) for frail older adults with lymphoedema (or chronic oedema) and heart failure.
- Study of the effect of compression therapy (bandages and therapeutic elastic stockings) for frail older adults with lymphoedema (or chronic oedema) and the complicating factor of arterial insufficiency and heart failure on the outcome measures quality of life and mobility.
- To be able to monitor the safety of the studied interventions in the skin-therapy practice, the skin therapist must be able to measure the outcome measures by themselves. It is, however, unclear which measurement instruments would be valid and reliable to use. A study of valid, reliable and (cost-)effective measurement instruments is desirable.

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F Dietetics

F.1 Factors of malnutrition and sarcopenia

Literature: search and select

Research question

Which factors have an impact on the nutritional status of frail older adults with (a risk of) malnutrition and/or sarcopenia?

P (Population) | (frail) older adults
E (Exposure) | risk factors for malnutrition and/or sarcopenia
O (Outcome) | malnutrition and/or sarcopenia

Relevant outcome measures

The guideline panel considers malnutrition and sarcopenia to be crucial outcome measures for decision-making. The guideline panel considered it important to take factors in various areas into consideration, without distinguishing between the various living situations.

Search

On 26 June 2022 an information specialist (H.W.J. Deurenberg, independent information specialist) performed a systematic search for systematic reviews starting from 2012 in MEDLINE, Cinahl and PsycInfo (see Appendix F.1.1 for the search strategy). This systematic search produced 325 unique hits. After screening the titles and abstracts based on the inclusion criteria (see table below), 307 articles were excluded. Of 18 articles, the full article was screened and a selection was made of systematic reviews whose factors were studied in several areas. Eventually the search yielded 8 systematic reviews (Algra 2021; Bardon 2021; Besora-Moreno 2020; Gao 2021; Hussein 2022; Kok 2022; O'Keeffe 2019; Shen 2019). See Appendix F.1.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix F.1.3 (Banda 2021; Bloom 2018; Crichton 2019; Fávaro Moreira 2016; Host 2016; Kramer 2022; Poggiogalle 2021; ter Borg 2015; Van de Pols-Vijlbrief 2014; Van Lancker 2012).

Inclusion criteria

Types of studies	systematic reviews of observational studies (cohort studies or cross-sectional studies)
Types of patients	(frail) older adults
Type of intervention	n/a
Type of comparison	n/a
Type of outcome	Factors associated with malnutrition and/or sarcopenia
Type of timeline	Since 2012

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix F.1.4a (malnutrition) and F.1.4b (sarcopenia). In total, 8 systematic reviews of observational studies were included. Since most of the systematic reviews only show the data of the significant associations, it was decided in this module also to look only at the significant results.

Malnutrition

With regard to malnutrition, 6 systematic reviews were included (Algra 2021; Bardon 2021; Besora-Moreno 2020; Hussein 2022; Kok 2022; O'Keeffe 2019).

Algra et al. (Algra 2021) carried out a systematic review on factors related to oral health that could be associated with malnutrition in older adults (≥60 years of age). In total, 12 studies were included (9,093 participants), of which 11 were cross-sectional studies and 1 was a longitudinal cohort study. Studies on
older adults with cancer, who were terminally ill, had problems with swallowing or chewing due to a medical condition (e.g. CVA or muscle disease) or who received (complete) enteral or parenteral nutrition, were excluded. Oral health as a research factor was operationalised as the condition of hard and soft oral tissue, hyposalivation, xerostomia and general (subjective) oral health (oral hygiene, pain in the mouth and oral-health-related quality of life). The outcome measure malnutrition was operationalised as at least one or more anthropometric measures (BMI, weight loss or non-fatty mass), preferably in combination with the use of a validated screening or assessment instrument for malnutrition in older adults. Descriptive analyses were further conducted for the 12 studies.

Bardon et al. (Bardon 2021) conducted a systematic review of factors associated with malnutrition in western older adults (≥65 years of age) predominantly (≥80%) living at home. 65 studies were included, of which 54 were cross-sectional and 11 longitudinal, as well as 2 systematic reviews and one meta-analysis. For specification, stratification took place according to stage of ageing, subdivided into 3 categories: 1. Successful ageing (independent, <40% is frail, low prevalence of polypharmacy and multimorbidity); 2. Normal ageing (mostly independent, <40% is frail, ≥50% regularly visit the general practitioner, ≥50% report polypharmacy or multimorbidity); 3. Accelerated ageing (often frail, functionally dependent, often dependent on home care, ≥50% had recently been hospitalised). Of the 65 studies, 28 could be classified in one of these three groups (the rest were not classified due to lack of information). Only data from these 28 studies was included in the description of the results. Outcome measures pertained to the area of malnutrition (for example the Mini Nutritional Assessment (MNA) or Mini Nutritional Assessment Short Form (MNA-SF), Malnutrition Universal Screening Tool (MUST) or another validated screening instrument for malnutrition in older adults or cut-off points for BMI or weight loss). Studies were included if multivariate analyses were carried out with (a risk of) malnutrition as a dependent variable and with 2 or more parameters out of the following 7 areas as independent variables: demographic factors (age, gender, education, marital status), factors of nutritional intake (appetite, missing teeth, being able to eat without assistance), lifestyle factors (no alcohol, smoking, reduced physical activity), social factors (poverty, living alone, social support), physical functioning (frailty, dependence, falls, mobility, handgrip strength), mental factors (depression, dementia, cognitive deterioration, anxiety), disease-related factors (polypharmacy, chronic disease, self-reported health, hospitalisation, acute disease, pain). Descriptive analyses were carried out for the 28 studies that could be categorised into stages of ageing. Since it was a descriptive analysis, the size of the described effects was not indicated in the review. Significant associations were, however, indicated in a table, stratified according to stage of ageing.
Due to the heterogeneity of the studies, no meta-analysis was performed.

Besora-Moreno et al. (Besora-Moreno 2020) performed a systematic review and a meta-analysis of observational studies to detect social and economic factors of malnutrition or a risk of malnutrition in older adults (≥ 60 years and older). Studies in all settings were included. Studies that that looked only at older adults with diseases or co-morbidity were excluded. A meta-analysis was conducted with factors in studies with malnutrition according to MNA as outcome measure. In total, 40 studies with 34,703 older adults were included, of which 16 were considered in the meta-analysis.

Hussein et al. (Hussein 2021) conducted a systematic review of oral health factors associated with malnutrition in older adults (≥65 years of age). In total, 33 studies (27,559 participants) were included, of which 28 were cross-sectional studies and 5 was a longitudinal cohort study. Studies with older adults <65 years of age and studies in which nothing was reported on the Mini Nutritional Assessment (MNA) or Mini Nutritional Assessment Short Form (MNA-SF) were excluded.

A meta-analysis was done if at least 2 studies reported the number of patients with or without a certain oral health variable (e.g. being edentulous (toothless)) and compared to various groups with regard to nutritional status based on MNA or MNA-SF (well nourished (normal), risk of malnutrition or malnourished). Finally, 6 studies were included in the meta-analysis.

Kok et al. (Kok 2022) conducted a systematic review of observational and intervention studies to identify the link between polypharmacy and malnutrition. Studies on 'frailty' and sarcopenia were excluded in order not to disturb the relationship between malnutrition and polypharmacy. All seven of the available studies were used, regardless of which definition of malnutrition they used. Studies on patients with cancer were also excluded, except where less than 20% of the population consisted of patients with cancer. Studies in the terminal or palliative phase and on people with enteral or parenteral nutrition or operations were also excluded.

O'Keeffe et al. (O'Keeffe 2019) investigated in a systematic review of prospective cohort studies, possible impressionable factors of malnutrition in older adults (>65 years of age) with or without co-morbidity in all settings. Outcome measures pertained to the area of malnutrition, such as BMI, percentage of weight loss and malnutrition measured with a screening instrument (for example MNA(-SF) (Mini Nutritional Assessment (Short Form)) or MUST (Malnutrition Universal Screening Tool)). 23 prospective cohort studies were included that examined the relationship between malnutrition and factors in the areas of oral health, psychosocial factors, medication and healthcare, health, physical functioning, lifestyle and eating. Due to the heterogeneity of the populations, settings, definitions of determinants and outcomes, no meta-analysis was performed and the results are presented descriptively.

Sarcopenia

With regard to sarcopenia, 2 systematic reviews were included (Gao 2021; Shen 2019).

Gao et al. (Gao 2021), in a systematic review with meta-analysis, examined factors linked to sarcopenia in older adults (≥60 years of age) living at home and without any serious diseases. With regard to sarcopenia as an outcome measure, no restrictions were applied in terms of measurement instruments and threshold values. 68 studies with a total of 98,502 older adults were included, in which the association between sarcopenia and socio-economic factors, behavioural factors and/or disease-related factors was examined.

Shen et al. (Shen 2019), in a systematic review with meta-analysis, investigated the prevalence of sarcopenia in nursing-home residents (≥60 year of age) and subsequently the factors linked to sarcopenia. Studies were included based on prevalence data and factors were examined in a second stage. The outcome measure was sarcopenia on the basis of diagnostic criteria. Studies in which sarcopenia was measured only with biomarkers or anthropometry were excluded. 16 studies were included in total, of which 8 were used in the meta-analysis of factors that are related to sarcopenia.

Individual study quality (RoB)

The design and performance of the systematic reviews (Risk of Bias, RoB) were consistently assessed by two authors (alternately MP, BM, HJW and MdvdS) by means of the ROBIS-tool. The opinion on the various items was discussed, after which consensus was achieved. An overview of the study-quality assessment (RoB) of each study is presented in Appendix F.1.5. Risk-of-bias table.

Effectiveness and evidentiary value

Below is a description of the results per area of the ICF model. The results for each factor are presented in Appendix F.1.6a (malnutrition) and Appendix F.1.6b (sarcopenia). For each factor, the results from the different reviews were put together and the link with malnutrition or sarcopenia was assessed based on the number of times that a significant association was found. If the number of significant associations in more than half of the results pointed in the same direction (protective or conducive), it was considered that the factor in question was associated with malnutrition or sarcopenia. If in various

studies a factor appeared as both protective (negative link) and conducive (positive link), it was indicated that the factor showed contradictory results. If no clearly significant results came to light, it was concluded that it was unclear whether the factor in question was important. It was also indicated here what the evidentiary value was. This evidentiary value starts at high, but can be downgraded on several levels (based on the risk of bias, inconsistency/heterogeneity, indirectness, inaccuracy and other possible factors). The different levels of evidentiary value in descending order are: high, fair, low and very low. None of the studied factors was rated as having a high evidentiary value.
Where a factor was studied in only one review and no significant association was found, it was not represented in an evidence table. These factors can be seen in Appendix F.1.4. In consultation with the guideline panel, it was decided hereafter to describe only factors for which there is fair or low evidence that they are linked to malnutrition or sarcopenia. The links for which the evidence was very low are nevertheless included in Appendix F.1.6, but are not described below. Factors that show no clear link to malnutrition or sarcopenia can be found in Appendix F.1.6, but are not described further.

Factors in malnutrition

Factors in the area of Functions and anatomical characteristics
A large number of factors were studied in this area. These were factors that had to do with chewing problems oral health, perceived health, appetite, physical impairments and (mental) conditions.

Chewing problems | Chewing problems as a factor was examined in 4 systematic reviews (Algra 2021; Bardon 2021; Hussein 2022; O'Keeffe 2019). Two reviews (Algra 2021; Hussein 2022) focused specifically on the relationship between oral problems and malnutrition and looked at various categories of factors in this regard. To avoid making the factors in the area of oral problems too specific, it was decided to combine the factors related to teeth and chewing problems in one category. Most of the primary studies that were included in the review show a link between chewing and dental problems and malnutrition. The evidentiary value was lowered by 2 levels from high to low due to the risk of bias in all four reviews and the heterogeneity between the primary studies.

Oral problems | The factor of oral problems includes poor oral health, mouth pain, gum problems and access to oral healthcare. This factor was studied in 4 reviews. In particular, the reviews that specifically examined the link between oral health and malnutrition (Algra 2021; Hussein 2022) showed a positive link between oral problems and malnutrition. The other two reviews (Bardon 2021; O'Keeffe 2019) showed no clear link, but included fewer primary studies to this end. Most of the primary studies showed a link between oral problems and malnutrition. The evidentiary value was lowered by 2 levels from high to low due to the risk of bias in all four reviews and the heterogeneity between the primary studies.

Depression or mental problems | The factor 'depression or mental problems' was examined in 2 reviews (Bardon 2021; O'Keeffe 2019). In the review by O'Keeffe, half of the primary studies show a link with malnutrition. Based on the review by Bardon, it was concluded that more than half of the primary studies presented a positive link to malnutrition. Since both reviews have a high risk of bias and because of the heterogeneity between the primary studies, the evidentiary value for this link was rated as low.

Not a good perception of health | Several primary studies investigated the link between subjectively perceived health and malnutrition. These studies were identified by O'Keeffe and Bardon (Bardon 2021; O'Keeffe 2019). Although no unequivocal link with malnutrition follows from the review by Bardon, the four studies included by O'Keeffe do show a significant link with malnutrition. It is therefore concluded that the factor 'not a good perception of health' is associated with malnutrition, with a low evidentiary value due to the risk of bias and heterogeneity.

Reduced appetite | Both in the review by O'Keeffe (O'Keeffe 2019) and that by Bardon (Bardon 2021), reduced appetite appears to be linked to malnutrition. The evidentiary value for this was downgraded by two points to low due to the risk of bias in the reviews and the heterogeneity between the primary studies.

Physical impairments

Various studies were included in the reviews by O'Keeffe (O'Keeffe 2019) and Bardon (Bardon 2021) that investigated whether there was a link between physical impairments and malnutrition. Impairments in activities of daily living in particular were examined. In a large proportion of the studies, these impairments appear to have a positive link with malnutrition. Due to the risk of bias and heterogeneity, the evidentiary value for this factor was rated as 'low'.

Factors in the area Activities | In this area, O'Keeffe (O'Keeffe 2019) and Bardon (Bardon 2021) identified which activities (or, in contrast, a lack thereof) were linked to malnutrition. Factors regarding lifestyle also fall under this.

Reduced physical activity | The factor 'reduced physical activity' was only included in the review by Bardon (Bardon 2021). It appeared from this that most of the studies show a link between a lack of physical activities and malnutrition or a link between healthy physical functioning and having a good nutritional status (no malnutrition). The evidentiary value for this factor is low due to the risk of bias in the review and the heterogeneity between the primary studies.

Eating meals at home | Both reviews show that the fact of having a meal service at home was positively linked to malnutrition. The evidentiary value for this is low, due to a high risk of bias and heterogeneity.

Assistance with eating | A majority of the primary studies in both reviews show a link between needing assistance with eating and malnutrition. This factor has a low evidentiary value due to the risk of bias and heterogeneity.

Factors in the area of participation

In this area, three reviews (Bardon 2021; Besora-Moreno 2020; O'Keeffe 2019) studied whether there was a link between having a social network or loneliness and malnutrition. The results of this review show a varying picture. In one study, loneliness appears to have a positive link with malnutrition, while another study actually shows a negative link. In the latter case, it appears that having malnutrition was associated with fewer feelings of loneliness.

External factors

External factors include, for instance, hospitalisation, use of medication and access to medical assistance. Of these factors, only hospitalisation appears to have a link with malnutrition. The link between polypharmacy and malnutrition appears to be unclear, as does the factor of irregular doctor's visits. Having social support can have both a positive and a negative link to malnutrition.

Hospitalisation | Older adults who have been hospitalised have a higher risk of malnutrition than older adults how have not been to hospital. This appears from 3 studies that were included in the review by O'Keeffe (O'Keeffe 2019). This factor has a low evidentiary value due to the risk of bias and heterogeneity.

Personal factors

This area includes factors such as age, gender, education level and living situation. These factors were studied specifically in the reviews by Bardon and Besora-Moreno (Bardon 2021; Besora-Moreno 2020). Age, gender and ethnicity do not show an unequivocal link to malnutrition.

Low education level | Besora-Moreno et al. (Besora-Moreno 2020) conducted a review with a meta-analysis of the link between having a low education level and malnutrition. The link was found to be positive. According to the review by Bardon (Bardon 2021), this link comes to light in some of the included studies. The evidentiary value for this factor was downgraded by 2 levels to low, due to the risk of bias and heterogeneity.

Living alone | From the meta-analysis by Besora-Moreno (Besora-Moreno 2020) it appears that older adults who live alone have a greater chance of being malnourished. A number of the studies included by Bardon et al. (Bardon 2021) also show this. The evidentiary value is low due to a risk of bias and heterogeneity.

Single | Single older adults (unmarried, divorced, widowed) have a higher risk of malnutrition, as appears from the reviews by Besora-Moreno and Bardon (Bardon 2021; Besora-Moreno 2020). The evidentiary value is low due to the risk of bias and heterogeneity.

Low income | A low income is associated with malnutrition, as appears from the reviews by Besora-Moreno and Bardon (Bardon 2021; Besora-Moreno 2020). The evidentiary value for this, however, is low, due to a high risk of bias and heterogeneity.

Factors related to sarcopenia

The systematic reviews in which sarcopenia was studied found no factors in the areas of participation and external factors.

Factors in the area of Functions and anatomical characteristics

In the two systematic reviews that investigated which factors were related to sarcopenia in frail older adults (Gao 2021; Shen 2019), several factors came to light in relation to functions and anatomical characteristics.

Underweight | The reviews by Gao and Shen (Gao 2021; Shen 2019) both showed a link between underweight and sarcopenia. The evidentiary value for this was considered fair and was therefore lowered by one level. The reason for this is that most of the studies of Gao et al. (Gao 2021) are of non-western origin.

(Risk of) malnutrition | Both reviews showed in a meta-analysis that malnutrition and the risk of malnutrition are linked to sarcopenia. The evidentiary value for this was downgraded by 1 level to fair. The reasons for this is the high number of non-western studies in the review by Gao et al. (Gao 2021).

Cognitive impairments | Gao et al. (Gao 2021) conducted a systematic review and meta-analysis to examine the link between cognitive impairments and sarcopenia. The link appears to be positive. The evidentiary value for this link was rated as fair. It was downgraded due to the large number of non-western studies that were included (indirect evidence).

Depression | Depression appeared to be linked to sarcopenia in a meta-analysis by Gao et al. (Gao 2021). Due to indirect evidence, the evidentiary value was downgraded by 1 level to fair.

Impairments in ADL | The fact of having impairments in activities of daily living appeared to be linked to sarcopenia. This link was demonstrated in a meta-analysis by Gao et al. (Gao 2021). The evidentiary value for this is regarded as fair. It was downgraded due to the large number of non-western studies.

Co-morbidities | A number of conditions showed a linked with sarcopenia. This includes the following conditions: osteopenia/osteoporosis, osteoarthritis, lung diseases and heart diseases. With the exception of the link between heart diseases and sarcopenia, the evidentiary value of the links was rated as fair. Indirect evidence was downgraded due to the large number of non-western studies. For the link between heart diseases and sarcopenia, the evidentiary value was downgraded even further, due to the fact that the OR reliability interval starts at 1.00. The factor of heart diseases on the other hand was assigned a fair evidentiary value.

Falls | The review and meta-analysis by Gao et al. (Gao 2021) demonstrated that there is a link between people who have fall incidents and sarcopenia. The quality of the evidence is fair. Downgrading took place due to indirect evidence.

Factors in the area of Activities

In this area, only inactivity seems to be a factor that can be linked to sarcopenia with at least a low evidentiary value.

Physical inactivity | Physical inactivity as a factor is important in sarcopenia studied by Gao et al. (Gao 2021). From the meta-analysis that was carried out, inactivity appears to be linked to sarcopenia. The evidentiary value for this was rated as fair. It was downgraded on the basis of indirectness, due to the large number of non-western studies on which the association is based.

Personal factors

Age, gender and other personal factors that may be linked to sarcopenia were examined by both systematic reviews.

High age | Gao et al. (Gao 2021) showed in their review that a high age is associated with sarcopenia. From this review, however, it is not clear from what age there is a higher risk of sarcopenia. The review by Shen et al. (Shen 2019) demonstrates no clear link between high age and sarcopenia. This factor was rated with a fair evidentiary value; the review by Gao included a large number of non-western studies.

Living alone | Gao et al. (Gao 2021) show in a meta-analysis that there is a link between living alone and sarcopenia. The evidentiary value of this factor is low, due to indirectness (a large number of non-western studies) and the fact that the OR reliability interval starts at 1.00.

Single | Single older adults have sarcopenia more often than those who are not single, as appears from the review with meta-analysis by Gao (Gao 2021). This factor was rated with a fair evidentiary value. It was downgraded by 1 level due to indirectness.

From evidence to recommendation

The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects

Based on the results of the included systematic reviews, the guideline panel considers the factors that show a significant link and a fair or low evidentiary value to be clinically relevant. With regard to malnutrition, this includes the following 13 factors: oral problems (including difficulties with chewing), depression or mental problems, not a good perception of health, reduced appetite, physical impairments, reduced physical activity, taking meals at home, needing help to eat, hospitalisation, low level of education, living alone, single, low income.
With regard to sarcopenia, it includes the following 11 factors: underweight, (risk of) malnutrition, cognitive impairments, depression, ADL impairments, co-morbidities (osteopenia/osteoporosis, osteoarthritis, diabetes, lung and'/or heart disorders, cancer), falls, inactivity, higher age, living alone, single.

Undesirable effects

Not applicable

Evidentiary value

The evidentiary value for the factors that were found was downgraded by 1 to 3 levels. All the included systematic reviews with regard to malnutrition had a high risk of bias. Only 1 systematic review in the field of sarcopenia (Gao 2021) had a low risk of bias. A large part of this review consisted of non-western studies (studies written in English and Chinese were included). Factors revealed in this review were then downgraded on account of indirectness.

Patient values and preferences

The guideline panel indicates that there are large individual differences in the group of frail older adults with malnutrition and/or sarcopenia. Many frail older adults will not find it a problem to be questioned about these factors. There will also be frail older adults and/or informal caregivers for whom questions about certain factors will be sensitive. This could include privacy-sensitive information such as income. In some cultures, certain diseases are not openly discussed; it might then be that the loved ones do not want the older adult to know that they are ill if they have, for instance, cancer of dementia. The guideline panel therefore considers it important to build up a good relationship with the older adult and/or their loved ones and to estimate for each individual and situation how these factors can be listed. Respectful communication is essential in this respect.

Balance between desirable and undesirable effects

Not applicable

Economic considerations and cost-effectiveness

The guideline panel expects that the identification of factors that play a role in malnutrition and/or sarcopenia is cost-effective, since optimal treatment geared to the older adult's personal situation can thus be implemented. A point meriting attention is the limit of three hours of dietetics covered under basic healthcare insurance. The guideline panel points out that in many cases more than three hours are needed to identify all factors and administer an appropriate dietary treatment.

Equality

By keeping account of culturally sensitive aspects and understanding factors such as education level and adapting the treatment accordingly, equality between groups can be reduced.

Acceptability

The guideline panel expects that the identification of factors by other healthcare providers surrounding the older adult will be accepted. Other professionals such as doctors and nurses (also represented in the guideline panel) also see the importance of identifying the factors in malnutrition and sarcopenia.

Feasibility

It is the work of dietitians to identify factors that can play a role in malnutrition and/or sarcopenia. By knowing what factors have an impact on the occurrence or maintenance of malnutrition and sarcopenia in frail older adults, these problems can be given targeted attention and customised treatment can be offered. Frequently, many of the factors will already have been identified by other professionals. The dietitian can find this data in EPD or the letter of referral or if necessary, ask the professionals involved. Good cooperation and transfer between healthcare providers throughout the care chain is important here.

Additional considerations

Focus areas for implementation

The guideline panel recommends the use of the ICF model to identify the factors. The factors can be included in the different areas of the ICF model and thus offer a handy instrument for use in practice.

Knowledge gaps

From the literature review it appears that no literature of good quality is available with which to give a comprehensive overview of factors that play a role in malnutrition and sarcopenia. The guideline panel believes that more factors play a role than those that follow from the literature.

Other considerations

Due to the limited availability of high-quality literature on several factors, the guideline panel advises on the basis of practical experience to identify the following factors as well in the event of malnutrition: difficulties with swallowing, ill-fitting denture, problems with flavour and taste, wounds, polypharmacy, cognitive impairments or dementia. According the the guideline panel, older adults are often not aware of problems with swallowing, although such problems do hold a risk in terms of poor nutritional condition and pneumonia. In the case of problems with swallowing, it is recommended to see a speech therapist. With an ill-fitting denture, chewing tends to be difficult or painful. Wounds can cause pain, which will reduce intake. The presence of wounds furthermore leads to a loss of nutrients through wound discharge. Extra proteins are also necessary for healing. The guideline panel indicates that polypharmacy is associated with many negative consequences such as a greater risk of side effects, increased morbidity, hospitalisations or admissions to a nursing home and even mortality. This also leads to a decrease in quality of life. Identifying cognitive impairments is important in order to adapt the intervention accordingly. In the event of cognitive impairments or a suspicion thereof, an occupational therapist or psychologist may be consulted. The general practitioner or treating doctor can also be consulted.
If sarcopenia is present, the guideline panel recommends, in addition to the factors from the literature, also to identify the following factors: cancer and loneliness. Sarcopenia often comes with a disease that demands a great deal of energy; cancer is one of the conditions to which this applies. Loneliness, in addition to living alone and being single, is according to the guideline panel another factor that can contribute to sarcopenia.

The Malnutrition in the Elderly Knowledge Hub (MaNuEL) is a European consortium of 22 research groups from 7 European countries that has brought together the possible determinants of malnutrition in the DoMap model. Some of the factors in this model correspond to those in the literature review for this module. The remaining factors in this model did not follow from the literature review, partly due to substandard quality of the evidentiary value and partly because the factors were not examined in the included studies. The model does, however, give an overview of the main mechanisms underlying malnutrition, the factors that directly or indirectly bring about these mechanisms and the background variables and age-related changes that increase the risk of malnutrition.

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F.2 Joint decision-making on dietary interventions and quality of life

Considerations

A personalised nutritional or dietary treatment is often developed in consultation with the patient and their loved ones. Whereas for younger patients it is often about the prevention and treatment of specific conditions, the principal goal with respect to frail older adults is mostly to maintain or improve function and quality of living.
Normally, various options are put before the patient so that they may choose which one suits them best. The same principle applies with frail older adults, but the decision process also depends greatly on the values and goals of the frail older adult and their loved ones. What is important here is for the dietitian to be aware of or, if necessary, identify the values and goals of the frail older adult and to discuss the available options for dietary treatment and the pros and cons thereof for the individual patient. It is also important for the dietitian to be able to properly balance the pros and cons of the different dietary interventions. And to verify how these options might or might not support the values and goals of the frail older adult.

European guidelines

The European Society for Clinical Nutrition and Metabolism (ESPEN) developed a 'Clinical nutrition in geriatrics' guideline (Volkert 2019). One of the clinical questions in this guideline focuses on whether or not to administer tube feeding to frail older adults: Should tube feeding be offered to older adults with malnutrition or a risk of malnutrition?
In this regard, it is noted that for any older adult with (a risk of) malnutrition, the following questions are important to answer so that a decision can be made on the basis thereof:

1 Is it likely that enteral nutrition will improve or maintain this patient's quality of life?
2 Is it likely that enteral nutrition will improve or maintain the patient's functions?
3 Is it likely that enteral nutrition will extend the survival (or life?) of the patient?
4 Is life extension desirable from the frail older adult's perspective?
5 Are the risks of introducing tube feeding and enteral nutrition outweighed by the expected benefit?

Although these questions focus on enteral nutrition, the same questions can also apply to fluid nutrition, (protein-)enriched nutrition or other dietary interventions for frail older adults.
Another ESPEN guideline that looks at whether or not to administer artificial feeding is the 'Ethical aspects of artificial nutrition and hydration' (Druml 2016). This guideline makes the following recommendations based on strong consensus:

- *Always take account of the quality of life in relation to any type of medical treatment, including artificial feeding.*
- *A medical treatment that offers no advantages or whose advantages are not proportional to the disadvantages can be ceased. Limiting the treatment can imply that the treatment is gradually stopped or that the administered dose is reduced to limit side effects.*

The clinical question in this module is related to Advanced Care Planning. The question also relates to the model for 'Joint decision-making with frail older adults', which is used by clinical geriatricians.

Advanced Care Planning

The Dutch association for specialists in geriatric medicine, Verenso, describes Advanced Care Planning as a process whereby frail older adults and their loved ones are supported, in regular dialogue with healthcare providers and based on their values and beliefs, to determine meaningful and feasible goals for their current and future care and treatment' (de Ruiter 2013). Based on the principle of Advanced Care Planning, it is determined what care and treatment will be appropriate in the current situation and in the future. It is important to have regular conversations with the older adult and/or loved ones and, where necessary, also to consult with the relevant healthcare providers in a multidisciplinary way. These conversations can be either formal or informal (Verenso 2017).

Together with the frail older adult (and their loved ones), it is discussed which care and treatment goals are in line with their values and beliefs and health. Subsequently, it is determined what type of care and treatment would be appropriate in the short term and what direction should be given to appropriate care and future treatment. Specific scenarios that could be anticipated may also be discussed.

Joint decision-making

An important aspect of advanced care planning is deciding together. Van de Pol et al. (van de Pol 2017) developed a model for joint decision-making with frail older adults. The model consists of 6 steps:

1 Preparation: lay out the previous history and current situation
2 Goals: discuss life goals and values and ask for a loved one of the frail older adult who can help to think and make decisions on behalf of the older adult.
3 Choices: summarise the previous steps and formulate a treatment goal
4 Options: name the different options with pros and cons for each and discuss the client's preferences
5 Decision-making: formulate a decision together
6 Evaluation: evaluate the decision-making process and draw up a treatment plan

To achieve goals together, Van de Pol et al. advise talking with the older adult about what is important for them in terms of quality of life and what they are most concerned about. Based on this, it can be discussed which (treatment) opportunities are available to reach the goals. The Nederlandse Vereniging voor Klinische Geriatrie (Dutch association for clinical geriatrics) indicates that it is the task of the professional to enable the frail older adult to be a cooperation partner in the joint decision-making process. The professional should furthermore make sure that the older adult can prepare themselves for the conversation and/or can think about it afterwards. This is about the values and goals of the frail older adult: what is important for the frail older adult and what are their goals?

Pel-Littel et al. (Pel-Littel 2021) conducted a systematic review of the inhibiting and facilitating factors in joint decision-making with older adults with multimorbidity. This review showed that joint decision-making with older adults is stimulated when the older adult is invited to share information on their values, preferences and priorities, as well as their functional status and quality of life. Recognition of the complex issue by the healthcare provider appears to be an important factor in joint decision-making. Limiting patient-related factors were, for example, poor health and cognitive problems. Factors related to the professional that have a limiting impact are a lack of good communication techniques and pressure due to a lack of time.
Anantapong et al. (Anantapong 2020) identified the decision-making process around nutrition and fluids with people who have dementia, based on available literature. The following 6 steps were distinguished:

1 Identify the decisions that need to be made; what nutritional problems are there and what are the options?
2 Share information; about the personal situation and dietary intervention with older adults, loved ones and healthcare providers
3 Explain values and preferences
4 Consider feasibility
5 Weigh up the preferences and the actual decision
6 Implement and evaluate the result.

These 6 steps partly correspond to the steps of the 'Joint decision-making with frail older adults' model. In both models, the aim is to determine the values and preferences of the older adult in question and to present the various options.

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F.3 Dietary interventions in the presence of (a risk of) malnutrition in combination with heart failure, chronic kidney damage or Parkinson's disease

Literature: search and select

Research question

To answer the clinical question, a systematic literature analysis was performed for the following research question (PICO): What is the optimal dietary intervention for frail older adults with (a risk of) malnutrition in combination with heart failure, chronic kidney damage or Parkinson's disease?

Relevant outcome measures

The guideline panel considers the quality of life and the nutritional status (based on relevant parameters for nutritional status, such as weight progress or muscle mass) to be crucial outcome measures for decision-making; and physical functioning as an important outcome measure for decision-making.
The guideline panel considers side effects that are demonstrably caused by the dietary intervention, an aggravation of complaints and unacceptable lab results related to the disease, as well as hospitalisation and mortality, as undesirable effects.

Search

On 31 March an information specialist (H.W.J. Deurenberg, independent information specialist) conducted a systematic search in Medline and Cinahl (see Appendix F.3.1 for the search justification). The systematic search produced no relevant articles. The search was therefore extended and the population of (frail) older adults was dropped. This search produced 227 unique hits. After screening the titles and abstracts based on the inclusion criteria (see table below), 213 articles were excluded. For 14 articles, the full article was screened; the search finally yielded 1 study related to heart failure (Habaybeh 2021). See Appendix F.3.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reason for the exclusion are listed in Appendix F.3.3 (Benner 2018; Bonilla-Palomas 2016; Cucca 2015; Hegazy 2013; Hernández Morante 2014; Matheson 2021; Molfino 2012; Nichols 2020; Pérez-Torres 2017; Pérez-Torres 2021; Ramiro-Ortega 2018; Satriyo Dwi 2021; Sezer 2014).

Inclusion criteria

Types of studies	systematic reviews or (if no SRs available) RCT, CCT, cohort studies
Types of patients	older adults with (a risk of) malnutrition as well as heart failure, chronic kidney damage or Parkinson's disease
Type of intervention	dietary treatment for malnutrition
Type of comparison	no requirements
Type of outcome	nutritional status, quality of life, disease-specific complaints
Type of timeline	no requirements

Characteristics of included study on malnutrition in combination with heart failure

The search brought up only one systematic review related to heart failure (Habaybeh 2021). The characteristics of this systematic review are shown in Appendix F.3.4. The systematic review included 4 RCTs and 1 study of which only pre- and post-measurements were reported. Since the latter is not a RCT, its results were not included in this module. The 4 RCTs included a total of 246 patients with heart failure and malnutrition, a risk of malnutrition or too low muscle mass. The patients were aged above 60 and 45% were women.

The inclusion criteria varied for each study. One study included patients with acute heart failure and malnutrition measured according to MNA (Mini Nutritional Assessment). In another study, patients had stable chronic heart failure, NYHA-II and NYHA-III (New York Heart Association) and reduced muscle mass, defined as an upper-arm circumference below the tenth percentile of standard values for their age and gender. One study included patients with stable chronic heart failure (NYHA-I – NYHA-IV), of 62% had too low a muscle mass according to a measurement of body composition by means of a bioelectrical impedance analysis (BIA). Lastly, a study was included in the review with patients who had severe chronic heart failure (NYHA-III and NYHA-IV) and where the majority had reduced physical function and low oxygen intake.

The intervention differed for each study. In one study, the intervention consisted of oral supplementation of essential amino acids (8 grams per day), for 2 months. In another study, the patients in the intervention group each received 500 ml fluid nutrition (750 kcal) per day, consisting of 30 grams of protein, 30 grams of fat and 88 grams of carbohydrates for 8 weeks. In one study the intervention consisted of individualised dietary intervention, adapted to personal needs, with fluid nutrition if the nutritional goals were not reached with regular nutrition, for 6 months and with 12 months' follow-up. In the last study, the intervention consisted of resistance training in combination with 10 grams of oral protein supplementation for 12 weeks.

Individual study quality (RoB)

The design and execution of the individual studies (Risk of Bias, RoB) were scored by two researchers, independently of each other, using AMSTAR-2 (Shea 2017). The opinion on the various items was discussed, after which consensus was reached. An overview of the assessment of the study quality (RoB) is given in Appendix F.3.5 Risk-of-bias table. The quality of the primary studies was assessed by the authors of the systematic review using the Cochrane Risk of Bias Tool for RCTs. The primary studies were assessed with a high risk of bias.

Effectiveness and evidentiary value

Quality of life

Quality of life was not studied in the included RCTs.

Nutritional status (anthropometry)

Weight | The effect that a protein-rich dietary intervention for malnutrition (protein supplements or energy- and protein-rich fluid nutrition) for patients with heart failure has on weight was studied by means of a meta-analysis of 3 studies with a total of 112 patients. The duration of the intervention differed per study: 8 weeks, 12 weeks and 2 months respectively. The average weighted difference between the groups after the intervention period was 3.83 kg (95%CI: 0.17-7.50; p=0.04). Due to a high risk of bias and indirectness, the evidentiary value was downgraded by 2 levels to low.

Body composition | One study among 66 patients with stable heart failure of which 62% had too low a muscle mass, showed no significant difference in body composition after 12 weeks of resistance training with oral protein supplements (10 grams of protein/day) compared to only resistance training. The evidentiary value for this is low.

Physical functioning

In one study of 38 patients with stable heart failure and low muscle mass (upper-arm circumference below the 10th percentile of normal values for the age and gender), the intervention group received an oral supplement of 8 grams of essential amino acids daily for 2 months, while the control group received no supplements. After 2 months, the physical function, measured with a 6-minute walk test, was 405 ± 130 metres for the intervention group and 310 ± 155 metres for the control group. This difference between the groups was significant (p<0.01). The evidentiary value for this is low, due to a high risk of bias and inaccuracy.

Rehospitalisation and mortality

The systematic review included a RCT with 120 malnourished patients who were hospitalised due to acute heart failure. The intervention group received an individualised dietary intervention, adjusted to personal needs, for 6 months in combination with a conventional treatment for heart failure. The control group only received the conventional treatment for heart failure. The personalised dietary intervention is based on the guidelines for healthy nutrition, adjusted where necessary for co-morbidities (such as diabetes mellitus and chronic kidney damage). In addition, dietary advice was given to people with reduced appetite or other eating disorders such as problems with chewing and swallowing or nausea. Nutritional supplements were given if the individual needs were not covered by the intervention described dietary above. The recommended protein intake was 15-20% of the total energy intake (adjusted if necessary for chronic kidney damage). Salt intake was limited to less than 5 grams per day. The article makes no mention of fluid intake (Gamez-Lopez 2014).

The outcome measure is a combined measure for mortality and rehospitalisation if heart failure deteriorates. After 12 months, this outcome was found in 27.1% of the patients in the intervention group and in 60.7% of the patients in the control group; the Hazard Ratio (HR) for the combined outcome measure was 0.45 (95%CI: 0.19-0.62; p=0.0004). The HR for mortality was 0.37 (95%CI: 0.19-0.72; p=0,003). There were also fewer rehospitalisations due to heart failure in the intervention group (10.2% vs. 36.1%, HR= 0.21; 95%CI: 0.09-0.52; p=0.001). The evidentiary value for this is low; it was downgraded by 2 levels due to the risk of bias and inaccuracy.

Literature and further information on malnutrition in combination with kidney failure

A considerable dilemma in the dietary treatment of older adults with malnutrition and chronic kidney damage in stages G4 and G5 is the choice between limiting protein to slow down the deterioration of kidney function and increasing protein intake to counter malnutrition. At the beginning of 2023, a narrative review of the dietary treatment options for older adults with chronic kidney damage was published (Piccoli 2023). This review was the result of a collaboration between the European Society for Clinical Nutrition and Metabolism (ESPEN) and the European Renal Nutrition group of the European Renal Association (ERN-ERA). The purpose of the review is to give a tool for prioritising dietary characteristics related to the treatment of chronic kidney damage and (a risk of) malnutrition. The review also underlines the importance of deciding together with the patient and the relevant healthcare providers what the dominant problem is and what treatment goals would be realistic and desirable.

The review by Piccoli indicates in which circumstances the priority of the dietary treatment would be to strive for a good nutritional condition and in which circumstances the kidneys should actually be spared. In the latter case, the aim is to prevent early mortality and an aggravation of the disease (an increased risk of having to dialyse). The priority here is to avoid dialysis.

When prioritising chronic kidney damage (above nutritional status) the following factors may be determining:

- Advanced chronic kidney damage (stage G4- G5)
- Rapid progression of kidney damage without a demonstrable cause
- Avoiding or postponing dialysis
- Good nutritional status

When prioritising nutritional status (above kidney damage), the following factors may be determining:

- Diagnosed with malnutrition or a high risk thereof
- Early-stage kidney damage (for example stage G3a-G3b)
- No or slow progression of kidney damage
- Co-morbidity and short life expectancy

For frail older adults it is generally not desirable to be started on dialysis. This module furthermore looks at frail older adults who do not have a good nutritional status. This makes it difficult to choose between these two options.

A personalised approach with regard to protein recommendation is important and, according to the authors, should consist of joint decision-making. The personal circumstances, wishes and lifestyle of the patient and their loved ones must also be taken into account.
The first step in making a joint decision is to prioritise the main problem: Kidney damage or malnutrition. Based on this, realistic goals will be defined that aim to: 1) maintain or improve the quality of life, 2) reduce symptoms and the burdens of the treatment and 3) deliver high-quality care.
The authors indicate that the most important goals are to: 1) postpone or avoid dialysis, 2) maintain or improve the nutritional status and 3) improve the quality of life. These must be prioritised.
The next step is to define parameters in order to deliver quality care:

- Patient-Reported Outcome Measures (PROMs): the first thing that needs attention is how the older adult with kidney damage leads their life and what their state of wellbeing is. This involves symptoms, impact of the dietary intervention on the quality of life, mental health and social functioning.
- Nutritional status: it is important to monitor the nutritional status before and during the dietary intervention. Regular attention must also be given to appetite, anthropometry and blood values.

Lastly, the review states that for frail older adults with advanced kidney damage and a poor prognosis, the focus should primarily be on the quality of life, as this would make dietary advice more flexible.

The 'Diëtisten Nierziekten Nederland' network is recognised by NVD as a network of dietitians with specific expertise in kidney damage.
On the network's website, the link between kidney function and protein intake is explained. In addition, protein recommendations are made for frail older adults with chronic kidney damage.
These include a reference to an article of the ESPEN expert group (Deutz 2014) in which recommendations are made for protein intake by older adults. The article recommends finding a balance between the risk of further deterioration of the nutritional status or mortality as a result of malnutrition and the risk of reaching the final stage of kidney failure.

Literature and further information on malnutrition in combination with kidney failure

The Paramedical Guideline on Parkinson's Disease, like this Guideline on Frail Older Adults, is an evidence-based guideline that makes use of the GRADE method.
The guideline includes a clinical question on dietary treatment for patients with Parkinson's disease and malnutrition: What are effective paramedical interventions for treating inadvertent weight loss in people with Parkinson's disease?
It recommends identifying underlying issues (similar to the module 'factors of malnutrition and sarcopenia in frail older adults' in this guideline on Paramedical Care for Frail Older Adults.
A conditional recommendation is then made with regard to dietary advice: 'Consider giving energy- and protein-rich dietary advice'. Since not literature was found on this, this recommendation is based on expert opinion. It also states that the dietitian must take account of the intake of L-DOPA: L-DOPA must preferably be taken half an hour before the meal with (sparkling mineral) water, juice or apple sauce. If it is not feasible to take it before the meal, L-DOPA can be taken at least 1 hour after the meal. In the event of gastrointestinal complaints, it may also be taken with some low-protein food or drink.'

From evidence to recommendation

The component 'from evidence to recommendation' contains nine criteria that are listed below.

Criteria

Desirable effects

Heart failure

In the included systematic review of the effects of a dietary intervention for patients with heart failure, the results show an increase in weight and physical functioning. The measured difference in weight between the intervention and the control group was 3.83 kg. The question here is what exactly this 3.83 kg difference implies; it is probably a combination of muscle and fatty tissue. The question is also whether there is more liquid accumulation in the intervention group. One of the RCTs in this review examined the combined effect of resistance training and a protein supplement on body composition. No difference was found here between the intervention group and the control group.
Physical functioning was measured with a 6-minute walk test; after 2 months of protein supplementation (8 grams of essential amino acids per day) in the intervention group, the difference with the control group (no supplements) was significant (405 ± 130 metres versus 310 ± 155 metres). No data is available, however, on the difference scores (measurements before and after) between the two groups. From the primary article it appeared that the baseline scores of the two groups were different (Intervention: 331 ± 124 metres; Control: 282 ± 142 metres) (Aquilani 2008).

Although hospitalisation and mortality were formulated as undesirable outcomes, a dietary intervention for malnutrition in patients with heart failure in fact appeared to lead to fewer rehospitalisations and lower mortality. These results are therefore included in the desirable effects. In one RCT with a personalised dietary intervention with a recommended protein intake of 15-20% of the total energy intake and a salt intake of less than 5 grams per day, significantly fewer cased of mortality and re-intakes in hospital were seen in the invention group than in the control group that received no dietary intervention. After 12 months, rehospitalisation or mortality occurred for 27.1% of the patients in the intervention group, compared to 60.7% of the patients in the control group.

The guideline panel considers the desirable effects of a dietary treatment for malnutrition compared to no dietary intervention to be fair.

Chronic kidney damage

Since no systematic reviews or other studies pertaining to dietary treatment of malnourished older adults with chronic kidney damage were found, no statements can be made about the desirable effects.

Parkinson's disease

Also with regard to the dietary treatment of malnutrition for frail older adults with Parkinson's disease, no statements can be made about desirable effects due to the absence of suitable literature.

Undesirable effects

No studies were found in which undesirable effects of the dietary treatment of malnutrition for frail older adults with heart failure, chronic kidney damage or Parkinson's disease were examined.

Quality of evidence

Heart failure

The quality of the evidence for each outcome measure was assessed according to the GRADE method. The included RCTs all had a high risk of bias. The evidentiary value for all outcome measures was also downgraded by one level due to indirectness or inaccuracy. The guideline panel therefore assesses the evidentiary value of the desirable effects as low.

Chronic kidney damage

No GRADE could be applied due to the lack of research articles. Additional literature was used in the form of a narrative review.

Parkinson's disease

No GRADE could be applied here either: no suitable studies were found. Use was made of the Paramedical Guideline on Parkinson's Disease, which was developed simultaneously with the paramedical guideline on Frail Older Adults.

Patient values and preferences

In the dietary treatment of malnutrition for frail older adults with co-morbidity, such as heart failure, chronic kidney damage and Parkinson's disease, account must be taken of the preferences and options of the patient and any loved ones they may have. Deciding together about the most suitable intervention is the starting point for personalised dietary treatment.

Balance between desirable and undesirable effects

Heart failure

Since no studies were found in which undesirable effects of dietary treatment for malnutrition in frail older adults with heart failure was investigated, no balance could be determined between the desirable and undesirable effects.

Chronic kidney damage

Due to a lack of evidence, no balance could be determined between the desirable and undesirable effects. An important focus area is making joint decisions with the patient about what the balance will be between the dietary intervention for malnutrition and the one for chronic kidney damage. In the event of frailty, the risk of mortality is generally higher than the risk of reaching final-stage kidney failure. The treatment for malnutrition will then take precedence.

Parkinson's disease

The literature yielded no clear evidence for the desirable and undesirable effects of dietary treatment for malnutrition in frail older adults with Parkinson's disease. The Paramedical Guideline on Parkinson's Disease indicates, based on expert opinion, that there is a positive balance and that people with Parkinson's disease benefit from a good nutritional status.

Economic considerations and cost-effectiveness

Treatment for malnutrition can ensure that frail older adults can remain autonomous for longer and stand a lower chance, for instance, of being hospitalised, staying in hospital for longer periods, decubitus or falls. In general it can be concluded that dietary treatment for malnutrition is cost-effective (Hugo 2018). The guideline panel expects that it will be the same for this group.

Equality

The treatment of malnutrition by a dietitian is available for all clients. Dietitians adjust treatment to a patient's personal situation. In a primary care setting, three hours of such treatment is available under basic healthcare insurance. Patients who have supplementary insurance can sometimes be reimbursed for more hours. This could lead to inequality in access to the intervention. Three hours will probably not be enough to treat a patient with malnutrition and co-morbidity. Fluid nutrition is reimbursed under basic healthcare insurance. The guideline panel expects no change in health equality.

Acceptability

Due to the potentially contradictory dietary advice, for instance, for malnutrition and chronic kidney damage (protein-enriched versus protein-restricted), proper coordination between the various healthcare professionals is very important. The guideline panel expects that, provided it is well substantiated by the dietitian in consultation with the frail older adult, a dietary intervention will be accepted by all key stakeholders (all the healthcare professionals involved). Proper transfer of information on the dietary treatment is, however, important, to ensure that the treatment is administered properly. This applies, for example, to informal caregivers and neighbourhood professionals who are involved with frail older adults in a home setting.

Feasibility

The dietary treatment of malnutrition in older adults with heart failure, chronic kidney damage or Parkinson's disease can be complex, due to the various aspects that have to be taken into account. The three hours of dietary care in a primary care setting that are reimbursed under basic healthcare insurance might not be sufficient.
The implementation of the recommended dietary interventions is regarded as realistic by the guideline panel.

Additional considerations

A dietary intervention for malnutrition mostly consists of an energy- and protein-enriched diet. In the event of co-morbidities, specific aspects of the diet must also be taken into account. With heart failure, this will, for example, mean limited liquid, sodium and potassium intake. With chronic kidney damage, an assessment will have to be made between advising a low-protein or a protein-enriched diet or standardising the amount of protein and account must be taken of sodium, phosphate, sometimes potassium and in rare cases also liquid. With Parkinson's disease, medication (L-DOPA) and fluctuations in response to the medication must be taken into account.

Knowledge gaps

The literature search for the clinical question of this module produced insufficient literature of good quality. Only one systematic review was included on dietary treatment for frail older adults with malnutrition and heart failure. This review and the underlying primary studies had a high risk of bias, and also based on points such as indirectness and inaccuracy, the evidentiary value was low.
With regard to malnutrition in combination with chronic kidney damage or Parkinson's disease, no suitable literature was found. A narrative review and a guideline were used for this. Further research on the dietary treatment of concurrent malnutrition and heart failure, chronic kidney damage or Parkinson's disease is highly desirable.

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G Speech therapy

G.1 Communicative participation and preservation of autonomy

Literature: search and select

Research question

To answer the clinical question, a systematic review was carried out for the following research question (PICO):

P | frail older adults with communicative frailty
I | the role of the speech therapist in improving communicative participation
C | no care/usual care
O | maintain autonomy and communicative participation for as long as possible

Relevant outcome measures

'Participation in society' is not defined with sufficient clarity in science and in practice. Participation is difficult to measure in practice, since participation means something different for each person. Any growth or change in participation is established in terms of subjective measurements through the environment of the frail older adult. Due to the lack of concrete outcome measures, the search form of this question is formulated with a very broad definition of the outcome measures and the guideline panel therefore expects broad outcomes from the literature for the terms 'communication' and 'participation'. Through the formulation of the aforementioned outcome measures, there is room to include interventions that aim to improve participation, maintain autonomy and safeguard the overall wellbeing of the frail older adult in general.

Search

The starting point for the search was a systematic review where preference was given to designs with a high degree of evidence such as meta-analyses, systematic reviews and randomised controlled trials (RCTs). Publications since 2010 were searched for.
On 14 December an information specialist, Rikie Deurenberg, conducted a systematic search in MEDLINE and PsycInfo via Ovid (see Appendix G.1.1 for the search justification). This systematic search produced 774 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 757 articles were excluded. Of 20 articles the full article was assessed; 12 studies were eventually included. See Appendix G.1.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix G.1.3.

Inclusion criteria

Types of studies	All search designs
Types of patients	Frail older adults formulated as such by the guideline panel, aged 60 and and above
Type of intervention	All interventions where the goal is explicitly stated as helping to improve the participation and communication of frail older adults.
Type of comparison	No intervention, usual care or informal social contact between frail older adult and their environment
Type of outcome	Changes and improvement in participation
Type of timeline	All timelines

Exclusion criteria

The role of the speech therapist in cases of aphasia and Parkinson's disease was not included in this guideline, with the exception of Primary Progressive Aphasia (PPA). The speech-therapy diagnosis and treatment of aphasia and Parkinson's disease are explained in the specific guidelines on Aphasia (NVLF 2015) and the Paramedical Guideline on Parkinson's disease (ParkinsonNet 2023).

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix G.1.4. The 12 included studies included patients with a mild to severe form of cognitive disorders or dementia. The age of patients who could be included in the studies was 60 years and above. The included studies described mainly reminiscence therapy and cognitive stimulation therapy. In addition, three studies were found that described ICT interventions and direct and indirect therapy aimed at improving communication.
The interventions were not developed and evaluated in a Dutch context, but in various countries and cultures around the world. Below is a description of the interventions that were found and the target group for which each intervention was used.

Reminiscence therapy (RT) | (I. D. Saragih 2022; I. Gil 2019; J. M.Thomas 2021; K Park 2019; L. O'Philbin 2018)
Reminiscence therapy is a widely usable intervention that is offered both in groups and individually. RT is offered in various forms, but in all cases the ultimate aim of this intervention is to stimulate mental activity to the benefit of overall wellbeing which includes communication and participation. This goal is achieved by bringing up memories and experiences by means of props such as photos, objects and music that have a special meaning for the person in question and that will help to draw out a conversation.

In a systematic review by Gil et al. (I. Gil 2019) RT was offered to older adults with dementia (>65 years of age) who lived in a nursing home. In total, 4 RCTs were included and 2 quasi experimental studies with 296 older adults. Outcome measures were improved cognition, reduced depression and improved quality of life.
Five studies described in detail the structure and topics that were presented in the RT group. In four of these studies, the topic was laid out in a structured way for each session. The first meeting was often used to give information on the intervention, while the following sessions focused in chronological order on life events of the older adults. An average of 12 sessions of RT were organised, varying from 6 to 24 sessions. In most cases, the sessions took place weekly, except for one study where RT sessions were organised every fortnight. The duration of the sessions was 30 to 60 minutes.

The meta-analysis by (L. O'Philbin 2018) examined the effect of RT compared to usual care or passive interventions such as 'social contact' for people with dementia. In total, 22 RCTs were included, of which 16 studies could be used in the meta-analysis. Most of the studies used simple reminiscence interventions, where participants took part in discussions about specific topics of events that had taken place in their past. Five studies implemented a more structured intervention, based on 'life review'. One RCT made use of a standardised RT intervention based on the SolCos model (P van Bogaert 2016) and one RCT implemented a musical reminiscence intervention. Three studies implemented the Remembering Yesterday Caring Today (RYCT (2020) programme, which consists of bringing back memories in a large group of people with dementia and their family informal caregivers. The length of RT varied from 4 weeks to 25 months. The total median was 11.5 hours (3 to 39 hours) and the median for individual sessions was 53 minutes (30 minutes to 2 hours).

The meta-analysis by K Park (2019) looked for RCTs that studied the effect of RT for people aged over 60 with dementia, Alzheimer's or cognitive deterioration. In total, 1,765 participants were included who received RT. In seven of the 23 included studies, RT was offered in 12 sessions, which was the largest number of sessions offered. Individual sessions were implemented in five studies, while the rest of the studies examined the effects of RT in groups.

In the systematic review by I. D. Saragih (2022) experimental studies were included that investigated the effect of RT on people with dementia. Of the 29 studies, 24 were RCTs and 5 studies quasi-experimental. 3,102 participants in total were included. 26 studies reported on participants with mild-to-moderate dementia, while for the other studies the stage of dementia was not clarified. The interventions were offered by neurologists, psychiatrists, psychologists, biostatistician, nurses, cognitive therapists, social workers, long-term care personnel or researchers. The RT interventions consisted of bringing back memories of youth, festivals, trips, favourite foods or events. The intervention was held 1 to 5 times per week and lasted 30 to 90 minutes. The minimum duration was 4 weeks, while the maximum was 4 months.

J.M. Thomas (J. M.Thomas 2021) studied in a meta-analysis the effect of RT for people with dementia in nursing homes and a MMSE score between 10 and 24. Five studies were eventually included, of which 2 could be included in the meta-analysis. Three studies described the 'life story' or 'life review' approach. One study used simple reminiscence based on experiences from the past. One study used a standardised reminiscence intervention based on the SolCos model, which consists of three elements: process, items and outcomes. The process component describes the skills of the therapist, who interviews the client based on the items brought in, with a specific focus on personal traits and perspectives to improve communicative participation. The item component relates to with stimuli and reactions. The outcome component looks at the outcome for the participant and the therapist. The length of the RT varied from eight weeks to three months. In three studies, the intervention was offered by several psychologists. In one study, the intervention was offered by a nursing specialist and in the other study the intervention was conducted by volunteers.

Cognitive Stimulation Therapy (CST) | (Chen 2022; I.D.Saragih 2021; YL Wong 2021)
Originally developed in the UK, Cognitive Stimulation Therapy (CST) is a social-psychological intervention that is offered in groups. CST offers a stimulating environment for people with dementia. Appropriate activities are chosen for participants, based on their needs and capabilities. The activities are based on the interests of participants. Each activity stimulates thinking, memory and orientation. The entire CST programme consists of (regularly) doing activities, often in a group. The main goal of the activities is cognitive stimulation, for example, remembering experiences from the past, physical activities, following a recipe, making associations with certain words, a creative activity or team games.

The meta-analysis carried out by by Chen (Chen 2022) searched Chinese and European databases for RCTs based on the criteria; CST in combination with people with dementia (PwD) that contribute to the improvement in cognitive capabilities, quality of life, behaviour and participation in activities of daily living. In total, 10 RCTs were included that showed that CST had a positive effect on the aforementioned criteria, demonstrated with a significant change on the Mini-Mental State Examination score with 1.98 points compared to the control group. At the same time this meta-analysis does not show any specific results for ADAS-cog, which is frequently used in practice to measure cognitive function.

The systematic review and meta-analysis by Wong et al. (YL Wong 2021) examined the effect of CST voor people with dementia compared to no therapy or usual care. 22 RCTs were included in the qualitative analysis and 20 studies from these were included in the meta-analysis. 1,343 participants were included (717 in the intervention group and 626 in the control group). CST is often implemented in outpatient facilities. Two studies implemented CST in a hospital setting. CST was conducted in three studies.

The meta-analysis by Saragih et al. (I.D.Saragih 2021) examined the effect of CST for people with dementia. 26 RCTs were found, of which 11 were conducted in the UK. 2,244 people with dementia were included. The intervention was conducted by psychologists, nurses, occupational therapists, cognitive therapists, physical therapists, speech therapists, psychiatrists, activity counsellors, neuropsychologists, social workers and 'other staff'. 9 studies implemented CST by means of physical activities making use of sound, memories, food, faces or scenes, word associations, creative activities, classification of objects orientation or using money. The remaining 17 studies implemented a generic CST, such as stimulating new ideas, linguistic skills and executive function, drawing or discussing topics. CST was conducted in nursing homes, care facilities, psychiatric institutions, rehabilitation centres, neurological outpatient facilities or hospitals.

ICT solutions | (H. J. Chae 2022; R. Domenicucci 2022)

Two of the included studies focused on the use of ICT solutions to improve or support the communicative participation of frail older adults with dementia living at home or in a long-term care facility. The use of ICT solutions was not concretely described as being a specific intervention. It seems to focus mainly on the use of aids like apps and video calls to prevent loneliness in this group, also during the COVID pandemic.

In a systematic review by Chae et al. (H. J. Chae 2022), the ICT intervention was offered to older adults (≥65 years of age) living at home in Korea with mild dementia or mild cognitive disorders. In total, 44 RCTs were included with 495 older adults in which stratification took place based on ICT interventions suited to dementia and older adults with dementia who are still living at home. 22 studies described a comparison between the intervention group and the active control group, 8 studies reported a comparison between the intervention group and the control group, 4 studies compared the intervention group, the active control group and a control group, and 10 studies compared the ICT-based intervention groups. Outcome measures included: an improvement in cognitive function, quality of life of older adults with mild cognitive disorders or dementia and reduced depression. This was measured with the Mini Mental State Examination score (MMSE). The meta-analysis showed that the MMSE score of the frail older adults improved with the use of ICT interventions focusing on cognitive stimulation in this target group if stimulated by healthcare providers. Cognitive training with the use of ICT was found significantly effective when offered for a period of more than 6 weeks, with at least 30 minutes of exercise per day. Improvements were seen in cognitive function, quality of life and reduced depression.

Domenicucci et al. (R. Domenicucci 2022) reported in a systematic review on the effectiveness of ICT interventions, where outcomes had to focus at least on improvement in one of the following factors; quality of life, social interaction and reduction in mood swings and stress. 48 studies were suitable for inclusion, which focused on ICT interventions that are suited to older adults with dementia or mild cognitive impairments who live at home. It was established that the included studies focused specifically on the improvement in quality of life through the use of ICT interventions and to a lesser extent on the emotional and psychosocial domain, including social interaction. A high degree of heterogeneity was furthermore observed, due to the broad range of ICT interventions that were used in the various studies described. This has an impact on the feasibility of determining the degree of effectiveness of ICT interventions for the wellbeing and quality of life of older adults with dementia.

Direct and indirect communication interventions | (K Swan 2018)

The included systematic review by Swan et al. (Swan 2018) focused in particular on the improvement in communicative participation and the wellbeing of the person with dementia by means of direct and indirect communication interventions. In total, 11 studies were included with 352 participants, with 2 RCTs, 3 non-RCTs, 3 one group pre-post test, 1 case study and 2 substudies of larger RCTs. Studies were included if they reported on indirect or direct interventions that could be carried out by a speech therapist for people with mild or severe dementia, classified according to the Mini-Mental State Examination (MMSE; Folstein, Folstein & McHugh 1975), with an individual MMSE score of 15 or less. 10 of these studies looked at direct interventions with a focus on cognitive stimulation in a group, individual cognitive training with a focus on naming therapy and retrieving memories (spaced retrieval training) or rehabilitation interventions aimed at increasing and implementing alternative communication. 1 study focused on Communication Partner Training for the frail older adult's communication partners. A meta-analysis could not be performed due to the heterogeneity of the studies.

Home-based, non-exercise interventions | (D. G. H. Tan 2022)

The included systematic review by Tan et al. (Tan 2022) focused on the effectiveness of interventions for people with dementia and their informal caregivers/healthcare providers that could be performed in their own home. Studies were included if they reported on interventions that could be performed at home for participants living at home with a diagnosis of dementia and that focused on factors other than physical training, for example, improvement in behaviour, quality of life, cognitive functions and mood. These were filtered by study design, where RCTs and quasi-experimental studies were included, provided that articles on these were published in English in a peer-reviewed journal. In total, 14 RCTs and

4 quasi-experimental studies were included in this systematic review. The following interventions were described; TAP tailored activity programme, music therapy, ICST, reality orientation, cognitive rehabilitation and interventions aimed at various components of the interventions mentioned earlier. The outcomes after the use of these interventions were measured with the Neuropsychiatric Inventory (NPI-Q), Revised Memory and Behaviour Problems Checklist (RMBPC) and Agitated Behaviour in Dementia Scale (ABS). This study found only one significant effect for the use of interventions in a home setting aimed at improving the aforementioned factors of older adults living at home and their informal caregivers or healthcare providers. Interventions adapted to the fields of interest and experience of the participant with dementia alleviate behavioural disorders and functional deterioration.

Individual study quality (RoB)

The design and execution of the individual studies (Risk of Bias, RoB) was assessed by MR and IB with the help of the Cochrane Risk-of-Bias tool (Higgins 2011). The opinion on the various items was discussed with the full guideline panel, after which consensus was reached. An overview of the study quality assessment (RoB) per study is provided in Appendix G.1.5 (Risk-of-bias table).

Effectiveness and evidentiary value

An overview of the effectiveness of Reminiscence Therapy (RT), Cognitive Stimulation Therapy (CST), ICT-based solutions and direct and indirect communication interventions is presented in Appendix G.1.4. The target group of these interventions were mostly people with mild cognitive disorders or dementia. The crucial outcome measures that were looked at to answer this clinical question were; quality of life, communicative participation and Activities of Daily Living (ADL).

Quality of life

Four systematic reviews looked at the effect of RT on quality of life (references) of people with cognitive disorders or dementia. Three of the four studies found a significant improvement in quality of life after RT. One study found no significant improvement compared to usual care or no intervention'. The level of evidentiary value for the effect of RT on quality of life is low.

Two systematic reviews looked at the effect of CST on quality of life. One study found a significant improvement in quality of life after CST and one study found no significant improvement compared to usual care or 'no intervention'. The level of evidentiary value for the effect of CST on quality of life is low.

Two systematic reviews looked at the effect of ICT interventions on quality of life (references). One study found a significant improvement for people with cognitive disorders or dementia, and the other study found no significant improvement in the quality of life or wellbeing of the person with cognitive problems.

The evidentiary value for the outcome measure quality of life and the effect of RT, CST and ICT-based interventions for this is low, with studies contradicting each other. 3 studies also had an increased risk of bias for which they were downgraded by 1 point.

Communicative participation

One systematic review by Swan et al. looked at the effect of RT and conversation groups on the communicative participation of people with dementia. The study found a significant improvement in communicative participation after RT and conversation groups. Communication Partner Training also improved the communicative participation of people with dementia. Why then was it not included further?

The evidentiary value for the outcome measure communicative participation was lowered by 2 levels due to the limited substantiation in the literature, with only 1 systematic review recording the effect of the interventions on communicative

participation. No meta-analysis was carried out due to the high degree of heterogeneity of the research results, which makes it impossible to make a clear estimate of the effect.
The level of evidentiary value for the effect of RT, conversation groups and Communication Partner Training on the communicative participation of an older adult is low.

Activities of Daily Living

One systematic review by Chen (Chen 2022) compared the effect of CST on Activities of Daily Living (ADL) of people with dementia. The study found a significant improvement in ADL after CST.
The evidentiary value for the effect of CST on ADL is low due to the risk of bias in the review and the heterogeneity between the primary studies.

From evidence to recommendation

The recommendations are in particular formulated for the speech therapist, who plays a key role in improving communication and participation between the frail older adult and their healthcare providers and loved ones.
Generally speaking, the guideline panel emphasises that CST and RT are mostly not done by a speech therapist, as also described in the literature, but by the activity counsellor or psychologist. In practice, however, speech therapists do make use of principles from RT and CST to advise or support frail older adults and people in their environment.

Criteria

Quality of evidence

The guideline panel considers the evidentiary value for the following interventions to be low.

- Reminiscence therapy
- Direct and indirect interventions aimed at communicative participation in a group or individual therapy
- Cognitive stimulation therapy
- ICT interventions
- Communication Partner Training

Patient values and preferences

Reminiscence therapy (RT)
The guideline panel assesses that patients attach reasonable value to the components of interventions and that there is some variation between patients in this regard. The variation between patients depends on the degree of dementia: in cases of very severe dementia, it is doubtful whether this intervention sufficiently contributes to improving communication and participation. In most studies, severe dementia is excluded and the intervention focuses specifically on moderate dementia. The guideline panel explains that reminiscence therapy in speech-therapy practice is not regarded as a therapy on its own, but rather as an approach to improve communication and participation in a specific context. The implementation thereof differs in practice; where cycles are followed in an intramural group setting, RT is sometimes also used in individual treatment to improve contact between the client and their loved ones. An advantage is that this method can be used under the supervision of a speech therapist. The main goal is to maintain the client's autonomy so that they can stay in control. This enables the client to preserve their dignity and autonomy for as long as possible.

Cognitive Stimulation Therapy
The guideline panel considers that the patients attach reasonable value to this intervention and that there is limited variation between the patients in this regard. The variation depends on the degree of dementia: in cases of very severe dementia, it is unclear whether this intervention sufficiently contributes to improving communication and participation.

In most studies, severe dementia is excluded and the intervention focuses also on mild cognitive disorders and moderate dementia. The intervention is geared to the interests, needs and capabilities of patients with mild cognitive disorders and moderate dementia. Many patients who are aware of their cognitive deterioration like it if they can do something about it themselves. At the same time, CST is also a social activity, which could increase motivation to participate. It is not a stand-alone speech-therapy intervention, but works well when it is performed in collaboration with other disciplines. The main goal is to maintain the client's autonomy so that they can stay in control. This enables the client to preserve their dignity and autonomy for as long as possible.

Balance between desirable and undesirable effects

Reminiscence therapy (RT)
The guideline panel came to the following assessment:
The desirable effects definitely outweigh the undesirable effects. The motivation for this is that no undesirable effects are described in the literature. The guideline panel does consider it crucial to be aware of the patient's history, to bring back positive memories from the past, but also to avoid bringing up traumas from the past. The goal is always to maintain the client's autonomy so that they can stay in control. This enables the client to preserve their dignity and pride for a long time into their dementia.

Cognitive Stimulation Therapy (CST)
The guideline panel came to the following assessment:
The desirable effects moderately outweigh the undesirable effects. Insofar as CST is not specifically a speech-therapy intervention and the literature shows a varying effect on the improvement in communication as such, it is unclear how effective it is for a speech therapist to implement this intervention. The intervention has be done in a group, which is difficult to put in place in a primary care setting. The guideline panel agrees that CST within a facility has a greater chance of succeeding than when it is done in a primary care setting.

Economic considerations and cost-effectiveness

Reminiscence therapy (RT)
The guideline panel considers the necessary resources for the use of RT to be negligible. Reminiscence therapy makes use of photos and objects that are supplied by the client and that can help to bring back memories. The use of RT is cost-saving since it requires no extra investments by healthcare facilities or healthcare providers, and can be done both in a group and individually, which means that it can also be used as an indirect therapy by the patient's loved ones, who are trained by the speech therapist or a professional from another discipline, for example, an occupational therapist.

Cognitive Stimulation Therapy (CST)
The guideline panel considers that the resources needed to implement the principles of Cognitive Stimulation Therapy are negligible. No investments are needed from healthcare facilities or the healthcare provider in order to perform this intervention. The resources needed for this intervention are already in the possession of the patient or in the facility where the intervention will be performed. The members of the guideline panel apply the basic principles of CST specifically in group therapy, where the client may introduce and do their own topics or activities under the multidisciplinary supervision of a speech therapist, an occupational therapist and/or an activity counsellor.

Equality

Reminiscence therapy (RT)
The implementation of Reminiscence Therapy can lead to an improvement in overall wellbeing, for all levels of socio-economic status. Multilingualism or diversity in cultural background could have an influence on equal entry opportunities

to follow this therapy. By paying attention to personal or cultural differences and keeping these in mind in the therapy, anyone can participate in accordance with their personal and cultural preferences.
The therapy can, however, also be less accessible for frail older adults with mental disorders. Proper coordination with a physician or psychiatrist is essential here, to prevent undesirable effects.

Cognitive Stimulation Therapy (CST)
The implementation of cognitive stimulation therapy can lead to an improvement in overall wellbeing, an improvement in quality of life and alleviation of depression in all patients regardless of their socio-economic status. As with RT, multilingualism or diversity in cultural background can have an influence on equal entry opportunities to follow this therapy, which is why mutual agreement on the content of the activities is recommended. The studies that are included and in which CST is described were conducted in other countries where care for older adults is organised differently. This differs from care for older adults in the Netherlands, which is why CST cannot fully be implemented as stand-alone speech-therapy treatment, although principles of CST are used in the stimulation of autonomy and participation of frail older adults.

Acceptability

The guideline panel expects that the implementation of (the basic principles of) RT and CST will probably be accepted by a majority of the key stakeholders, because the use of CST is in line with a multidisciplinary approach and eventually leads to efficiency and cost savings in the healthcare for frail older adults. It nevertheless appears from studies focusing on this intervention that this form of supervision in particular brings improvement in cognitive functions, for example, by alleviating depression, which makes it seem more of a topic for (neuro)psychologists. Speech therapists can, however, still give advice on how communication capabilities can be stimulated during this therapy.

Feasibility

Reminiscence therapy (RT)
The guideline panel considers that the implementation of reminiscence therapy is probably realistic. It is, however, not clear whether as a speech therapist you need to follow courses to offer this intervention. The guideline panel applies the principles described for RT in practice, but does not see it as a therapy in itself. There is no consensus on the speech-therapy goals that might be set when offering RT. It might be applied as part of care for older adults in collaboration with a psychologist to improve quality of life.

Cognitive Stimulation Therapy (CST)
The guideline panel considers that the implementation of cognitive stimulation therapy is probably not realistic. For a speech therapist, it is not realistic to work twice a week with a group in collaboration with other disciplines, even if it could be made more feasible. CST is not known to the guideline panel as being a widespread therapy programme among speech therapists, although the content seems to have similarities with well-known speech-therapy treatments in groups such as aphasia groups or dysarthria groups. CST comes across as a programme that can be implemented in a broad and effectively multidisciplinary way, with activities like cooking that may be done in collaboration with an occupational therapist, while physical activities may be offered by the physical therapist and communication/fluency training by a speech therapist. When implementing this group treatment, the load capacity of the patient must be identified. Patients arrive more and more frequently at nursing homes with a severe form of dementia, when the intervention can perhaps no longer be offered in the way that was intended. The experience in practice is that older adults also prefer to receive supervision with their loved ones. The guideline panel considers that the chances of success in a rehabilitation unit are higher than in a PG unit. This will depend on the approach and supervision, and will be adapted to the capabilities of the client. The guideline panel furthermore considers it to be suited to day care and as a way of spending the day.

G.2 Communication with loved ones and healthcare professionals

Literature: search and select

Research question

To answer the research question, a systematic review was carried out to answer the following PICO question. 'Which speech-therapy interventions focusing on communication are available for the loved ones and healthcare professionals of frail older adults?'

Relevant outcome measures

In the area of 'communication with the environment' there is a great deal of discussion between researchers and speech therapy practitioners on relevant outcome measures. Communication is a complex concept to measure and a subjective assessment of communication by the patient and conversation partner, moreover, seems as important as an objective outcome measure such as quantifying behaviour (for example, the use of communication techniques). Due to the lack of relevant outcome measures, the guideline panel believes that the outcomes remain very broadly defined in the literature search. The outcomes 'communication' and 'participation' leave room for including articles in which interventions are described that aim to optimise the dialogue between the frail older adult and their loved one or healthcare provider. These outcomes are mostly evaluated by means of questionnaires, (subjective) assessments of video recordings, score lists or focus-groups/interviews.

Search

A systematic review was conducted without excluding designs. Despite the quality of the evidence of randomised controlled trials (RCTs) and systematic reviews, the guideline panel came to the consensus that excluding other designs would narrow the scope of the resulting recommendations. In the area of speech therapy and communication, not many RCTs were conducted. This has to do with the lack of relevant outcome measures for communication on the hand, and with the nature and degree of complexity of speech-therapy interventions on the other. These interventions focus on improving communication between two or more people, which can be impacted considerably by behaviour, identity and contextual factors.

On 6 September 2022, Rikie van Deurenberg (an independent information specialist) did a search in Medline, PubMed and Cochrane Library. The search form can be found in Appendix G.2.1 with a detailed description of search terms, methodological filters and selection criteria. This search produced 55 unique articles. The titles and abstracts were screened based on the inclusion and exclusion criteria in Table G.2.1. See Appendix G.2.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix G.2.3.

Inclusion criteria

Types of studies	All search designs
Types of patients	Frail older adults selected as such by the guideline panel, aged 70 and and above.
Type of intervention	Any intervention whose explicit goal is to improve communication between frail older adults and their loved ones and/or healthcare professionals
Type of comparison	Usual care
Type of outcome	Change in communication and/or participation
Type of timeline	All timelines

Exclusion criteria

Types of patients	People with aphasia fall outside the scope of this guideline, except for PPA

Characteristics of the included studies

None of the studies met the inclusion criteria. We consider this as a knowledge gap.

Additional literature review

There were no studies in the literature that could be included based on the criteria. It was therefore decided to conduct an additional literature review without the condition of a control intervention. After screening title and abstract, a total of 12 full-text articles were selected. Two articles were excluded after reading the full text. The exclusion table for full-text articles can be found in Appendix 2. Finally, 10 articles were included for assessment and to formulate recommendations. The characteristics and results of the 10 included studies are described in Appendix 3.

The speech-therapy interventions that were found and that focus on the improvement in communication, all pertained to training modules for the loved ones or healthcare professionals. These training modules were mostly presented in the form of Communication Partner Training (CPT), an overarching term in evidence-based interventions aimed at improving communication between a person with communication problems and their conversation partner(s).
Five specialised interventions were found (described in Togher et al., 2014, McGilton et al., 2018, Roglaski et al., 2021, Tate et al., 2020 and Wilson et al., 2020). The remaining interventions were described as CPT interventions and were not specified in more detail. Not all interventions were developed and evaluated in the Dutch context. One that falls outside the scope of the further literature review is Com-mens by F. Debets which was developed in the Netherlands and which was submitted outside of the data in which this further search took place.

Below is a description of the interventions that were found and the target group for which each intervention is used.

INCOG guidelines | (Togher et al. 2014)
The INCOG guidelines were developed by a group of researchers and healthcare professionals who are experts in the field of cognitive communication disorders (the INCOG group). This guideline contains 7 recommendations for best practice in the diagnosis and treatment of cognitive communication disorders (e.g. following traumatic brain injury). Two recommendations focus on the principles that all healthcare professionals must adhere to when offering care to people with cognitive communication disorders. Principle #1: rehabilitation staff recognise that the client has communication problems and needs. At the same time, attention is given to how communication is influenced by the way in which communication partners communicate, but also by the environment, priorities, fatigue and other personal factors. Principle #2: healthcare professionals are educated and trained in communicating with people with cognitive communication disorders. One recommendation focuses on the partner of the person with cognitive communication impairments. Principle #3: people with severe communication problems are trained in the use of supporting communication aids by speech therapists and occupational therapists.

Communication Partner Training (CPT) | interventions (without specification) (Tessier et al., 2020; Behn et al., 2020; Eriksson, 2006; O'Rourke et al., 2018; Swan et al., 2007))
In the scoping review by Tessier et al. 70 articles were included that described CPT programmes. 32 of these focus on the target group of **dementia**, and healthcare professionals or students in healthcare were offered CPT.
The length of the interventions varied tremendously (from a few minutes to 46 hours, a year with 10 sessions or a day and a half).

Most of the CPT interventions were offered by speech therapists (57%). Most of them took place face-to-face; one intervention was given via an asynchronous lesson, three programmes via a CD-ROM or DVD and two interventions were online. Two programmes were a combination of face-to-face and online.
In terms of content, most of the CPT interventions contained information on which communication techniques could be used and a background/cause of the communication problems. Videos were often used to present communication skills. The communication techniques in which healthcare professionals were trained varied between interventions.
The systematic review by Behn et al. found eight studies that looked at the effects of interventions aimed at improving communication between people who had had a **traumatic brain injury** and their conversation partners. The studies included a total of 258 people who had had a traumatic brain injury and 328 conversation partners. Three studies were included for the synthesis of results: these three studies all showed the effects of the CPT intervention called TBI Express. All the studies showed a positive effect of TBI Express on the communicative participation of the person with a traumatic brain injury. These positive outcomes were maintained up to 6 months after the intervention took place. Average to large effects were found for the communication skills of the conversation partner, in favour of the intervention. There seemed to be insufficient evidence for an improvement in the communication skills of the person who had had a traumatic brain injury.
In the CPT intervention of Eriksson, eight training sessions were given to pairs; a person with communication problems and a nurse in the nursing home. In one of these pairs, there was a person with **dysarthria**. 1 or 2 sessions took place per week. The training programme was based on an evidence-based CPT called Supporting Partners of People with Aphasia in Relationships and Conversation (SPPARC). The purpose of the intervention was to improve knowledge on communication and awareness of communication patterns and to develop functional communication strategies. Each session started with a video of a natural conversation/interaction. The video recording was then discussed by the pair and a speech therapist. Prior to the first training session, an information folder was given in which general communication problems were described. In the first training session, the participants reflected on this and looked at video recordings of other pairs in or outside the study. In the second training session, the pair defined learning goals. Topics that were discussed during sessions were: 1) how can comprehension problems be recognised and how can the conversation partner deal with them, 2) how can the person with communication problems be helped to express themselves, 3) the social aspect of communication and how one-way communication can affect the dialogue, 4) a post-mortem on successful communication and less successful communication.

O'Rourke et al. conducted a quality literature review on common as well as different elements in CPT programmes for people who had had a stroke or traumatic brain injury or people with dementia. The four CPT interventions that were included were Supported Conversation for Adults with Aphasia (SCA), Traumatic Brain Injury (TBI) Express, MESSAGE and CS & CBI. The four interventions all offered information to the healthcare professional or loved ones. Skill-building techniques were also used in all of the interventions. Social support was offered in 3 of the 4 interventions. Intervention elements that did occur, but only in 1 or 2 of the interventions, were: giving assessment feedback, behaviour reinforcement, problem-solving and giving instructions. In total, 96 communication techniques were learnt in the four interventions. O'Rourke et al. classified these in 12 groups. 6 of the 12 groups were offered in all four interventions and 5 of the 12 in three of the four interventions. Which these were is shown in Tables G.2.1 and G.2.2.

In a systematic review by Swan et al. (2017) 1 study was included that describes a communication training course for the communication partner of people with **moderate to severe dementia** (Acton et al., 2007). Nurses in nursing homes were trained to use communication techniques for this target group.

Table G.2.1 | **Strategies to enhance communication (O'Rourke et al. 2018)**

'Strategies to enhance communication' groups	SCA	TBI Express	Message	CS&CBI
Find opportunities for communication		✓	✓	✓
Set up the communication environment physically	✓		✓	✓
Address and distracting behaviours				✓
Consider speech rate and tone	✓		✓	✓
Choose a conversation topic	✓	✓	✓	✓
Use different modes to support the conversation	✓	✓	✓	✓
Provide information	✓	✓	✓	✓
Evaluate whether the person has understood	✓	✓	✓	
Request information from the person	✓	✓	✓	
Respond to/follow up what the person says	✓	✓	✓	✓
Continue the conversation by taking turns	✓	✓	✓	✓
Consider approach to communication	✓	✓	✓	✓

Tabel G.2.2 | **Negative behaviour to avoid (O'Rourke et al. 2018)**

'Negative behaviour to avoid' groups	SCA	TBI Express	Message	CS&CBI
Failing to set up the communication environment physically			✓	
Inappropriate speech rate tone				✓
Choosing an inappropriate conversation topic			✓	✓
Using other modes of communication (e.g., gesture) inappropriately	✓			
Providing inappropriate information	✓	✓	✓	✓
Failing to evaluate whether the person has understood			✓	
Requesting information from the person inappropriately	✓	✓	✓	
Responding to what the person says inappropriately			✓	
Failing to continue the conversation by talking turns	✓			
Taking a negative approach to communication (e.g. being patronising)	✓	✓	✓	✓

Patient-Centred Communication Intervention (PCCI) - a CPT intervention | (McGilton et al., 2018)
In a cohort study by McGilton et al. (2018) nurses were trained in PCCI to use communication techniques with people who have **communication problems due to a stroke**. The intervention consisted of two intervention elements: 1) a workshop (of 1 day) and a booster session (of two hours, eight months later) in which communication techniques were described and practised, 2) the development of individual communication plans for patients by a speech therapist and 3) a support system in which the speech therapist looked on during conversations between nurses and the patient with communication problems and then gave feedback (bedside teaching).

Communication Bridge Intervention | (Roglaski et al., 2021)
In a systematic review by Roglaski et al. (2021) the Communication Bridge Intervention, an Internet-based intervention, was given by a speech therapist to a person with **Primary Progressive Aphasia (PPA) and an informal caregiver**. The intervention consisted of three components: 1) disorder-centred treatment principles (finding words and motor speech-production training), 2) learning strategies for activities and/or participation in activities of daily living and 3) education, counselling and training of the informal caregiver. The three components are not specified further; it is, however, indicated that the first and second components consisted of evidence-based interventions.

StudentSPEACS programme | (Tate et al. 2020)
In this pilot study, student nurses were trained in communicating with **patients with communication problems**. The programme consisted of three components: 1) an online training session of 1 hour, 2) a physical lesson of 2 hours, and 3) a simulation clinic of 1.5 hours). In the online training module, students were given access to the SPEACS-2 communication skills training program, with 6 ten-minute videos in which a nurse uses communication techniques with a patient. In the physical lecture, evidence is discussed for the use of communication techniques to adapt to the communication needs of a patient. In the simulation clinic, students practised the use of communication techniques in a role play with an actor and received feedback from training instructors.

Communication apps | (Wilson et al., 2020)
This study searched for communication apps that could support communication for **clients with communication problems in nursing homes**: apps to support spoken language or apps to translate the language (into English). These apps are not available in Dutch. However, we are mentioning the studies here nevertheless, because apps are also regularly used in the Netherlands to support language. Examples of these are Touch Speak, Touch to Tell and the Gespreksboek App.

Effectiveness and evidentiary value

No studies met the inclusion criteria. We therefore consider this as a knowledge gap. Nor is it possible to give a verdict on the effectiveness of the evidence.

Effects in remaining literature

The effects of the interventions that were found are described in Appendix 3.

Training Interventions Communication Partner

The study by Eriksson et al. (2016) was considered to be a study with a high risk of bias. The effects of the intervention were the following: The effect sizes after the final intervention sessions compared to the baseline measurement were 0.38 to 4. The effect size was large for four goals, average for six goals and low for three goals. The average was higher in the intervention phase than in the baseline phase. The change in the average score in GOAL Attainment Scaling was significant for eight goals. All of the participants indicated in a self-evaluation that there had been a significant improvement after the sessions for each goal. And three of the four participants indicated an improvement in how they experienced functional communication.
The study by El-Wahsh et al. (2021) is a study that was considered to have a high risk of bias. The study did, however, lead to insights with regard to patient perspective.

Patient-Centred Communication Intervention (PCCI)

The study by McGilton was considered to be a study with a high risk of bias. In this study, scores improved by about 25% on each SAQOL component after the intervention. Symptoms of depression decreased by 30% and satisfaction with the care improved by 10%.

TBI Express

The study by Behn et al. (2020) was not assessed for risk of bias. The effect sizes of the group studies were (*d*=0.80 – 1.13) for TBI and (*d*=1.16 -2.09) for communication partners.

Communication Bridge intervention

The study by Rogalski was considered to be a study with a high risk of bias. All 49 participants showed a significant improvement in CCRSA after 2 months. There was, however, no significant improvement any more after 6 months.

StudentSPEACS

The study by Tate et al. (2020) was considered to be a study with a high risk of bias. Students indicated that they experienced the content as very valuable and rated their abilities to communicate with this group after training as average. The programme can therefore also help the student.

Communication apps

The study by Wilson et al. (2020) was not assessed for risk of bias. The research has shown that apps with cApps and PCC functions in particular are suitable for use. Examples of these on the Dutch market are Touch Speak, Touch to Tell and the Gespreksboek App. There is, however, no specific information on this.

As was already described in the chapter on other literature, research designs with a low evidentiary value were included for this clinical question, after revising the criteria, for example, subject designs with no control group, case studies and scoping reviews. An overview of the degree of evidentiary value, as assessed with the appropriate Risk of Bias tool for individual designs, for the effect of each intervention is given in Appendix 4.

G.3 The role of the speech therapist in the multidisciplinary approach to problem behaviour

Literature: search and select

Research question

To answer the clinical question, a systematic review was carried out for the following research question (PICO):

P | Frail Older Adult
I | communication approach treatment in case of problem behaviour
C | no intervention/usual care
O | reducing problem behaviour by improving communication among other things.

Relevant outcome measures

With regard to significant outcome measures for decision-making, the guideline panel considered it of crucial importance that the role of the speech therapist in the improvement in communication and teaching how to deal with potential cognitive problems to reduce behavioural problems should explicitly be described in the literature. At the same time, this is difficult to measure, since improvement or change in behavioural problems, for example, through improvement in communication is often established by subjective measurements and observations by the frail older adults and their loved ones. The guideline panel expects to see broad outcomes from the literature for the terms 'communication', 'behaviour' and 'cognition'. By formulating outcome measures, there is room for including interventions that focus on the improvement in behaviour through cognitive interventions and interventions that focus on improving participation and communication.

Search

On 31 March 2023, an information specialist (Tale Evenhuis, Hogeschool Utrecht) conducted a systematic search in PubMed (see Appendix G.3.1. for the search justification). This systematic search produced 1506 unique hits. After screening the title and abstract based on the inclusion criteria (see table below), 1465 articles were excluded. For 36 articles, the full article was then screened; eventually the search yielded 6 studies (Abraha 2017; Amieva 2016; Chiu 2018; Han 2017; Kim 2017; Martín-García 2022). See Appendix G.3.2 for the flowchart of the inclusion process. The articles that were excluded based on the full text and the reasons for the exclusion are listed in Appendix G.3.3.

Inclusion criteria

Types of studies	Randomised Controlled Trials (RCTs) and Systematic Reviews (SRs)
Types of patients	Frail older adults (with dementia)
Type of intervention	Interventions where a speech therapist might be able to provide input to stimulate behaviour through the improvement in communication
Type of comparison	Usual care
Type of outcome	Alleviation of behavioural problems
Type of timeline	Studies starting from 2010

Exclusion criteria

The role of the speech therapist in cases of aphasia and Parkinson's disease was not included in this guideline, with the exception of Primary Progressive Aphasia (PPA).
The speech-therapy diagnosis and treatment of aphasia and Parkinson's disease are explained in the specific guidelines on aphasia (NVLF 2015)* and the Paramedical Guideline on Parkinson's Disease (ParkinsonNet 2023). The role of the speech therapist in dysphagia and eating and drinking problems is set out in the SKILZ guideline on problems with swallowing (Slikproblemen, SKILZ 2023).

* The NVLF guideline on Diagnostics and treatment of aphasia is being studied. The revised version will be available by mid-2024.

Characteristics of the included studies

The characteristics of the included studies are provided in Appendix G.3.4. The 7 included studies looked at frail older adults with a mild to severe form of dementia or cognitive disorders. The lower age limit at which people could be included was set at 60 years. The interventions that were found were not developed and evaluated in a Dutch context, but in various countries and cultures around the world. Below is a detailed description of the interventions that were found.

Sensory stimulation interventions
This includes interventions such as aromatherapy, phototherapy (a form of light therapy), Snoezelen sensory therapy, etc. These are interventions that do not directly correspond to the clinical question and/or cannot be used as a speech-therapy intervention, which is why it was decided not take these interventions into consideration in this module.

Cognitive-emotional interventions | (Abraha 2017; Amieva 2016)
This is a collective term for interventions such as; reminiscence therapy, cognitive stimulation therapy, individual cognitive rehabilitation, validation therapy, individual cognitive rehabilitation, walking programme with conversation, group validation therapy, live review programmes.

Reminiscence therapy | (Abraha 2017)
Reminiscence therapy is a multidisciplinary applicable intervention that is offered both in groups and individually. RT is offered in various forms, but in all cases the ultimate aim of this intervention is to stimulate mental activity for the purposes of overall wellbeing, including communication and participation. This goal is achieved by bringing up memories and experiences by means of props such as photos, objects and music that have a special meaning for the person in question and that will help to draw out a conversation.

Cognitive stimulation therapy | (Abraha 2017)
Originally developed in the UK, Cognitive Stimulation Therapy (CST) is a social-psychological intervention that is offered in groups. CST offers a stimulating environment for people with dementia. Appropriate activities are chosen for participants, based on their needs and capabilities. The activities arise from the interests of participants. Each activity stimulates thinking, memory and orientation. The entire CST programme consists of (regularly) doing activities, often in a group set-up. The main goal of the activities is cognitive stimulation, for example, remembering experiences from the past, physical activities, following a recipe, making associations with certain words, a creative activity or team games.

Validation therapy | (Abraha 2017)
Validation therapy focuses on respectful communication. For this, the opinions and feelings of the person with dementia are respected, regardless of whether the content thereof is strictly correct.

Group validation therapy | (Abraha 2017)
Validation therapy in a group

Individual cognitive rehabilitation | (Amieva 2016)
This intervention is based on the principle that new things can be learnt into an advanced stage of dementia such as compensation strategies and mnemonics.

Walking programme combined with conversation, group validation therapy, live review programmes, cognitive stimulation therapy, activity therapy and staff education | (Abraha 2017)
Abraha includes a study by Vasse 2010 in which within a single time frame various interventions are offered to frail older adults with dementia, with the aim of improving cognition and reducing problems behaviour. Staff education in particular is the most challenging in this regard, with staff being trained to improve their communication with residents with dementia when strategies from the aforementioned interventions are embedded in everyday healthcare activities or learning how to effectively plan interventions as one-off task sessions at specific times, to further the wellbeing of the older adult with dementia.

Reality orientation | (Chiu 2018)
Reality orientation was developed as a method for severely traumatised veterans with PTSD. The programme has since been used to improve cognitive function in people with delirium. It is used to get the person involved again in, and make them aware of, their environment in terms of people, places and time. The basic principle is the repeated confirmation of time-place-person information, for example, in conversations, but also in the physical environment. Labelling doors and objects, talking about current events and regularly addressing the person by their name can be useful here. In addition, showing calendars and clocks will help to orient the person in terms of date and time. People with Alzheimer's and other forms of dementia can also benefit from reality orientation.

Multi-modal Cognitive Enhanced Therapy (MCET) | (Han 2017)
MCET consists of a combination of various therapies that are given according to a certain diagram and performed by the older adult with dementia, 3 times a week, 3 hours at a time, for 8 weeks. Each 3-hour session consists of 30 minutes of physical therapy, 30 minutes of reality-orientation therapy, 30 minutes of cognitive training, a 30-minute break and finally 60 minutes of reminiscence therapy, cognitive stimulation and music therapy.

Personalised care | (Kim 2017)
Personalised care is a holistic and integrated approach that is designed to maintain the wellbeing and quality of life of people (with dementia) and that encompasses the elements of care, the client, the loved ones and healthcare providers. In clinical practice, personalised care involves using personal information on the person behind the dementia, where the wellbeing of the person with dementia has priority. This view is included in various meaningful activities that are carried out together with the person who has dementia. The quality of relationships between the frail older adult (with dementia), the healthcare provider and loved ones is thereby improved.
Personalised care is currently common practice in nursing homes.

Doll therapy | (Martín-García 2022)
Doll therapy is a personalised non-pharmacological intervention that uses bonding and company to minimise problem behaviour, which in turn can have an influence on interaction with loved ones and/or healthcare providers.

Individual study quality (RoB)

The design and implementation of the individual studies was scored by LP, JB and IL using the Cochrane Risk-of-Bias tool (Risk of Bias, RoB) (Higgins 2011) and the ROBIS tool. The opinion on the various items was discussed with the LP and IL, after which consensus was achieved. An overview of the study quality assessment (RoB) per study is provided in Appendix G.3.5 (Risk-of-bias table).

Effectiveness and evidentiary value

An overview of the effectiveness, divided according to the relevant outcome measures of cognitive-emotional interventions, reality orientation, MCET, person-centred care and doll therapy, is provided in Appendix G.3.4.

Cognition

In 2 RCTs and 1 SR the effectiveness of the intervention is described in terms of cognition. The interventions, however, all differ from each other.

In the study by Amieva (Amieva 2016) no single intervention merited preference over usual care. The number of institutionalised patients was, however, lower in the individual cognitive rehabilitation group than in the control group (p=0.01). The study had an unclear risk of bias. The level of evidentiary value for the effect of the interventions on cognition is low.

In the study by Han (Han 2017), no significant effect was found for MCET compared to mock therapy. The effect size of MCET on cognition, however, is 0.38, which is many times higher than in previously reported studies. MCET was also found to have a positive effect compared to mock therapy in terms of global cognitive functions (0.47). On the Assessment Scale-Cognitive Subscale, MCET was also found to have an effect of 0.35 compared to mock therapy. The study has a low risk of bias and the evidentiary value for the effect of MCET on cognition is low.

The study by Chiu (Chiu 2018) describes a positive effect of reality-orientation therapy on cognition of 0.39. The study has a low risk of bias and the level of evidentiary value for the effect of reality-orientation therapy on cognition is low.

Behaviour

In 2 RCTs and 4 SRs the effectiveness of the intervention is described in terms of reducing behavioural problems.

In the study by Abraha (Abraha 2017) a positive effect is attributed to music therapy for agitation (-0.49) and behaviour-management techniques are also found to have a positive effect on anxiety (-0.64), but the study has a high risk of bias which means that the level of the evidentiary value of music and behaviour-management techniques for behaviour is considered to be low.

In the study by Amieva (Amieva 2016), none of the interventions showed an effect on the secondary outcome measures including behaviour. The study has an unclear risk of bias. The level of evidentiary value for the effect of RT on behaviour is low.

The study by Chiu (Chiu 2018) demonstrates that reality-oriented therapy shows no effect on behavioural problems (-0.18) or on depression (-0.17). The study has a low risk of bias. The level of evidentiary value for the effect of RT on behaviour is low.

In the study by Han (Han 2017) MCET is described as having a positive effect on behaviour, but it was not significant compared to mock therapy. The study has a low risk of bias. The level of evidentiary value for the effect of MCET on behaviour is fair.

The study by Kim (Kim 2017) reports a positive effect on agitation. The effect for short-term interventions was greater (-0.434) than for long-term interventions (-0.098). Individualised activities also show a significantly greater positive effect than standard care (0.513). Long-term training of staff and interventions for cultural change, however, had a greater effect on the improvement in quality of life, which ultimately has an impact on behaviour (0.191). The study has a low risk of bias. The level of evidentiary value for the effect of person-centred care is fair.

In the study by Martin-García (Martín-García 2022) doll therapy was found to have a positive effect on behaviour (-0.025). The study has a low risk of bias. The level of evidentiary value for the effect of doll therapy on behaviour is unclear, due to its limited importance for speech-therapy practice.

Communication

1 SR describes the effectiveness of the intervention for improving communication.

In the study by Martin-García (Martín-García 2022) doll therapy is shown to have a positive effect on communication (-0.025). The study has a low risk of bias. The level of evidentiary value for the effect of doll therapy on communication is low, mainly due to the low degree of relevance for speech therapy for frail older adults with dementia.

Criteria

Desirable effects

Life-review programmes
Paying attention to the life history of the client can be reassuring and can prevent or reduce problem behaviour.

Staff communication training
A desirable effect is that it enables staff to communicate more easily with the client. When staff members are able to 'be present in the moment', they can more easily put themselves in the client's place, which helps to prevent or reduce problem behaviour.

Personalised interventions
The guideline panel believes that this is an overarching term that refers to an approach rather than an intervention. The personalised care approach has become an inextricable part of healthcare for older adults (and healthcare in the Netherlands in general). According to the guideline panel, the intervention as described in the literature is more applicable for psychologists than for speech therapist. The speech therapist can play a role when communication impairments are the primary cause of the problem behaviour, in which case they will look at which aids can be used. Based on this, an appropriate communication recommendation is formulated, in which the communication capabilities of the client are emphasised. This recommendation can be shared with healthcare professionals, family and loved ones. The aim of the speech therapist here is to offer the frail older adult with problem behaviour opportunities to communicate regardless and to gain insight into the environment of the older adult, which may help reduce problem behaviour.

Patient values and preferences

The guideline panel considers that frail older adults attach great value to a personalised approach, where their loved ones and direct environment are directly involved in the formulation of communication advice. The communication advice may follow from a psychologist's analysis of the problem behaviour.

Economic considerations and cost-effectiveness

The guideline panel considers that the resources needed for establishing a multidisciplinary treatment plan are negligible and that the plan is cost-saving in terms of the resources that need to be implemented. In terms of staff deployment, the costs are higher, since multidisciplinary consultations are facilitated on a large scale in order to draw up a joint treatment plan. At the same time, this can ensure that all healthcare providers have a uniform manner of communicating with the frail older adult, which will make the care more effective and hence cost-saving.

Equality

The guideline panel expects that the personalised approach mentioned above will lead to a potential increase in health equality. Observing the problem behaviour and the associated communication impairment and establishing a multidisciplinary treatment plan ties in with the possibilities and needs of of the older adult and their environment. The care becomes accessible to everyone, as it is a personalised approach in which cultural and ethnic differences and cognitive and psychiatric characteristics can be taken into consideration.

From evidence to recommendation

The component 'from evidence to recommendation' contains six criteria that are listed below.

Criteria

Desirable effects

The guideline panel considers that the following interventions have a desirable effect on improving communication with frail older adults:

1 The Traumatic Brain Injury (TBI) Express
2 Supported Conversation for adults with Aphasia (SCA)
   - Although aphasia falls outside the scope of this guideline, many aspects of this intervention are practicable in the therapy of, for example, frail older adults and other groups.

Undesirable effects

No undesirable effects were found or described in the included studies. The guideline panel can therefore not express an opinion on the undesirable effects of interventions that aim to improve communication with frail older adults.

Quality of evidence

There is no evidence based on the literature.

The guideline panel, however, also looked at the additional literature and reached the following conclusion:
The guideline panel considers the evidentiary value for the following interventions to be fair to high:

- Supported Conversation for adults with Aphasia (SCA)
- Traumatic Brain Injury (TBI) Express

The guideline panel considers the evidentiary value for the following interventions to be moderate:

- Patient-Centred Communication Intervention (PCCI)

The guideline panel considers the evidentiary value for the following interventions to be very low:

- Communication Bridge intervention
- StudentsSPEACS
- Communication apps

Patient values and preferences

The guideline panel indicates that there are large individual differences within the group of frail older adults with communication problems. Living and family situations of frail older adults differ. There is often intramural information available on the person's life course as well as further background information from other disciplines, yet at the same time this setting makes it hard to involve loved ones or informal caregivers. Moreover, not every frail older adult will be able to rely on a loved one, in which case a healthcare professional who is associated with the client can be called upon.
The guideline panel therefore considers it important to build up a good relationship with the older adult and/or loved ones and to assess for each individual and situation what the opportunities are. In the literature and in practice, frail older adults themselves indicate that they like the holistic approach. They also want to be well informed by all the healthcare professionals involved. As described above, the frail older adult consider the partnership and relationship with the healthcare providers involved important.
Opportunities to create room for the training of healthcare professionals will also depend on the facility where the frail older adult may be residing and the bond that a frail older adult is able to build with their carer.

Balance of desirable and undesirable effects

Not applicable

Economic considerations and cost-effectiveness

The guideline panel expects that with the implementation of speech therapy interventions aimed at improving communication, the costs will not outweigh the benefits. Fewer therapy sessions may be needed, but it requires a great deal of time and energy from the frail older adult and their loved ones. Considering the short duration of the intervention, which is not aimed at direct treatment but at transferring knowledge and skills to the environment, the efficiency increases. An optimisation of care is needed, with attention to the personal situation of the patient, which can imply a considerable time investment at the front end, but which is conducive to the quality of care.

Equality

By taking culturally sensitive aspects into account and having insight in factors such as education level and adjusting the treatment accordingly, inequality between groups can be reduced.

Acceptability

The guideline panel expects that the recommendations will be accepted by the speech therapist, healthcare providers, loved ones and other people involved.

Feasibility

The speech therapist can provide support for all forms of communication. It is the role of the speech therapist to identify the communication and to advise and train the frail older adult, their loved ones and healthcare providers.

Additional considerations

Not all interventions are developed and evaluated in the Dutch context. An intervention that was delivered outside the timeline of the additional research is the Com-mens study by M. Olthof, which could contribute significantly to the improvement in healthcare and communication around frail older adults. The applicability of these interventions, if they were translated, was therefore not evaluated and the guideline panel can thus not recommend any intervention as a whole in the professional field. Common intervention elements and treatment principles can, however, be found in the interventions, which can be translated into recommendations for practice.
In *Characteristics of the included studies* is a description of the interventions that were found and for which target group each intervention is used. From these descriptions, the guideline panel took intervention elements or treatment principles that appear to be valuable for improving communication between the frail older adult and their loved ones and healthcare professionals.

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Paramedical guideline
Frail older adults