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No formal synthesis or evidence grading is conducted.

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Clinical Frailty Scale in prediction of mortality, disability and quality of life for patients in need of intensive care

Clinical Frailty Scale (CFS) is an assessment tool used to describe the frailty of a patient. The scale originated in Canada and was initially developed to estimate the need for institutional care and to predict life expectancy. The CFS version currently used has 9 levels (CFS-9) where an assessment of frailty is made between 1, very fit, to 9, terminally ill.

Question

> Is the Clinical Frailty Scale able to predict mortality, disability or quality of life in patients admitted to intensive care, either due to respiratory tract infection or due to other cause?

Summary

SBU Enquiry Service identified 23 primary studies considered within the scope of the review question after literature search and study selection. Eleven studies were critically appraised as low to moderate risk of bias regarding at least one outcome. In the included studies, the Clinical Frailty Scale (CFS) was used to estimate the frailty of individuals prior to admission to intensive care. The included studies were mainly conducted on elderly patients in need of intensive care, where the cause of need for intensive care varied. None of the studies examined patients who exclusively had respiratory tract infections. The studies were published from 2014 and onwards, and most studies during the last two years. Most studies originated from Europe and Canada. Several were multicentre studies, in which some had participation from Swedish clinics. The studies that were appraised as having a low to moderate risk of bias are briefly described in the text below, and all studies are presented in Table 1 and in Appendix 3 and 4.

SBU Enquiry Service identified:

- Eight studies examined the validity and reliability of CFS in patients in intensive care (low to moderate risk of bias) [1–8]. Seven of these studies examined the prediction of mortality [1–5,7,8].
- Two studies evaluated to which degree CFS could predict future disability for patients in intensive care (moderate risk of bias) [4,6].
- One study examined to which degree CFS could predict future quality of life for patients in intensive care (moderate risk of bias) [4].
- Four studies examined interrater reliability for CFS in patients in intensive care (low to moderate risk of bias) [2,3,9,10].

In studies with low to moderate risk of bias, the results showed that frailty assessment with CFS to some extent could predict in-hospital mortality and 30-day mortality. The mortality increased with each unit of the frailty scale. DeGeer et al. 2020, found that frailty assessment with CFS could predict 30-day mortality with an AUC (area under curve) of 0.74 (95% CI, 0.9 to 0.79) [1]. Two studies analysed the optimal threshold value for predicting mortality, with the aim of being able to use the scale dichotomously and found that mortality substantially increased from scale-point CFS 5 and above [1,5].

In the study by Hope et al. 2019, the risk of disability at six months was associated with an increase per unit on the CFS scale [6]. In the study by Brummel et al. 2017, the risk of disability varied depending on the assessment tool used to assess disability level, as well as on the time of assessment. Regarding prediction of quality of life, the results presented by Brummel et al showed varying results [4].

It should be noted that no study showed that CFS was able to predict either outcome (mortality, disability or quality of life) of all individuals. This implies that, there will be patients who are assessed as having a high level of frailty but do not die within 30 days, as well as patients who are assessed as having a low level of frailty but that nevertheless die.

Table 1. Identified studies according to age and outcome (reference, risk of bias)

	Outcome					
Age	**ICU mortality In-hospital mortality**	**30-day mortality**	**90-day mortality**	**Disability**	**Quality of life**	**Test-retest reliability**
≥18 years 7 studies	**Shears et al 2018,** [3] Moderate **Fernando et al 2019,** [11] High **Montgomery et al 2019,** [12] High	**De Geer et al 2020,** [1] Low	**Brummel et al 2017,** [4] Moderate	**Brummel et al 2017,** [4] Moderate **Hope et al[a] 2017,** [13] High	**Brummel et al 2017,** [4] Moderate	**Shears et al 2018,** [3] Moderate

	Outcome					
Age	**ICU mortality In-hospital mortality**	**30-day mortality**	**90-day mortality**	**Disability**	**Quality of life**	**Test-retest reliability**
≥50 years 6 studies	**Bagshaw et al**[b] **2014,** [8] Moderate (for this outcome) **Darvall et al**[c] **2019,** [14] High **Kara et al 2018** [15] High **Tipping et al 2019,** [16] High			**Hope et al** [d] **2019,** [6] Moderate	**Bagshaw et al 2014,** [8] High (for this outcome)	**Hope et al**[d] **2019,** [9] Moderate
≥60 years 1 study	**Pugh et al 2019,** [10] High (for this outcome)					**Pugh et al 2019,** [10] Moderate (for this outcome)
≥65 years 3 studies	**Langlais et al 2018,** [7] Moderate **Fernando et al 2019,** [17] High **Le Maguet et al**[c] **2014,** [18] High					
≥70 years 1 study		**Silva-Obregon et al 2020,** [19] High	**Silva-Obregon et al 2020,** [19] High	**Silva-Obregon et al 2020,** [19] High		
≥80 years 3 studies	**Guidet et al 2020,** [2] Low **Flaatten et al 2017,** [5] Low **Darvall et al 2019,** [20] High	**Guidet et al 2020,** [2] Low **Flaatten et al 2017,** [5] Low				**Guidet et al 2020,** [2] Low
Age not reported 2 studies	**Fisher et al 2018,** [21] High					**Pugh et al 2017,** [22] High

[a] Measures disability or death at 6 months as a combined endpoint.
[b] Also presents 1-year mortality.
[c] Also presents 6 months mortality.
[d] These articles are based on the same patient material.

Background

The Clinical Frailty Scale was originally developed by researchers within The Canadian Study of Health and Aging -2. The study initiated in 1996 and results were published in 2005 [23]. The aim was to develop an easy-to-use tool that could predict mortality or the need for institutional care in elderly patients. Most patients included in the original study had some degree of dementia. 2305 elderly were assessed with the new tool, named the Clinical Frailty Scale (CFS). The participants were followed for five years, and the data analysed how frailty assessed by CFS could predicted the need for institutional care or mortality. The Clinical Frailty Scale originally consisted of seven scale-points, but was revised in 2007 to include nine scale-points [24]. The highest level from the original version, "Severely Frail" (that was described as "completely dependent on others for activities of daily living, or terminally ill"), was subsequently divided into three separate scale-points, CFS 7 "Severely frail", CFS 8 "Very severely frail" and CFS 9 "Terminally ill".

Method

Criteria for inclusion and exclusion

The research question was formulated according to the following PICOTS[1]:

- **Population:** Patients in need of intensive care[2]
- **Index test:** Clinical Frailty Scale
- **Control/ Reference test:** Other frailty assessment scale or no control
- **Outcome:**
  - Mortality
  - Disability
  - Quality of life
- **Timepoint:** Within 90 days
- **Setting:** Stratification for future risk of death, disability or decreased quality of life

We also report results from studies examining the interrater reliability of Clinical Frailty Scale in intensive care patients.

Two systematic reviews relevant to the topic were identified through an exploratory literature search, and were appraised as moderate risk of bias [29,30].

These systematic reviews were published in 2017 and 2018, respectively, and the included studies were published up to October 2017. Therefore, the literature searches performed in this report were limited to primary studies published 2017 and onwards. No exclusions were made regarding language. Study protocols and conference abstracts were excluded.

[1] PICOTS is an abbreviation for Patient/population/problem, Intervention/index test, Comparison/control, Outcome, Timing and Setting.
[2] Including, in particular, studies with patients in need of mechanical ventilation due to respiratory tract infection.

Literature search

An information specialist designed and conducted the literature search in consultation with the project team. Controlled vocabulary search terms were used as well as text words (see section Literature search below for complete documentation). The two identified systematic reviews over frailty assessment included the assessment tools Clinical Frailty Scale or the Frailty Index scale. The complete literature search subsequently aimed to identify studies that used either of these two frailty assessment tools. The literature searches were conducted in March-April 2020 in the following international databases: CINAHL (EBSCO), EMBASE (Embase.com), PubMed (NLM), Scopus (Elsevier).

Study selection

Two reviewers (project managers at SBU) read all abstracts and full text articles independently of each other. Disagreement was resolved through discussion between the two reviewers and all members of the project team were consulted if necessary. The articles that were not relevant to the PICO were excluded. Data extraction from relevant studies was performed by one project manager and checked by another member of the project team. No formal synthesis or evidence grading of results was conducted.

Critical appraisal

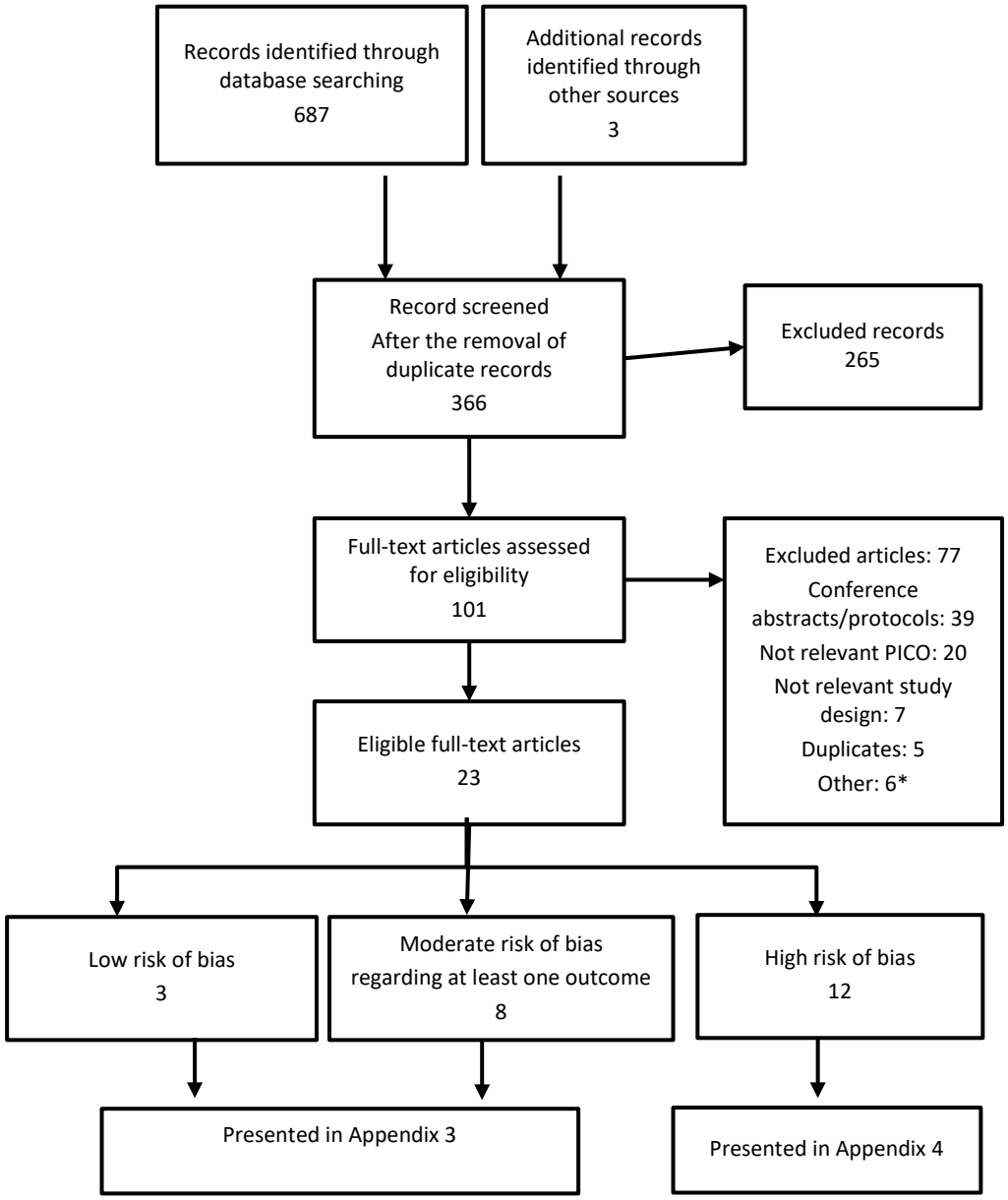
Two reviewers independently appraised the risk of bias in the systematic reviews using the AMSTAR tool [31]. Disagreement was resolved through discussion between the two reviewers and another project team member was consulted if necessary.

The risk of bias in primary studies was independently appraised by two reviewers using a modified PROBAST tool (Appendix 1). The PROBAST tool has been developed for the assessment of studies that evaluate prediction models [32]. Disagreement was resolved through discussion between the two reviewers and all members of the project team were consulted if necessary. The risk of bias of the primary studies included in the systematic reviews was also critically appraised.

Some of the identified studies developed prediction models that included more prediction factors than CFS only. In our assessment of the risk of bias, we did not evaluate any of these other models developed. However, to ensure validity, a new prediction model should be validated using a patient material different from that used when the model was developed (preferably in a new study by another research group).

Results

The literature search generated a total of 366 abstracts after duplicate removal (Figure 1). 101 abstracts were considered relevant, and after full text screening 23 articles were included. In total 23 primary studies and two systematic reviews were critically appraised for risk of bias (Figure 1). The articles that were not relevant were excluded, and excluded studies are listed in Appendix 2. In the studies with intensive care unit patients, the assessment of frailty using CFS-9 referred to the frailty of the patient that existed before the intensive care unit stay.Flow chart of included studies.



* These studies are relevant but are based on patient material already presented in the included studies and therefore not presented in detail. They are shortly described under the section Additional studies.

Figure 1 Flow chart of included studies.

Systematic reviews

Two systematic reviews with moderate risk of bias were included [29,30]. 16 primary studies were identified that were published since the last systematic review (2018). Therefore, we decided to appraise the risk of bias and report results from all primary studies, including the seven studies included in either one of the systematic reviews. Due to the large number of new studies the results of the systematic reviews are not presented in detail. The studies published after 2018 have further expanded the evidence base in the field, and the results in these studies do not contradict the results in the earlier systematic reviews. Both systematic reviews examined studies published regarding assessment tools for estimating frailty in patients in need of intensive care. In addition to studies using the Clinical Frailty Scale, studies using any of the following assessment tools were also identified: Frailty Index (FI, the most commonly used tool after CFS), Frailty Phenotype (FP), or Comprehensive Geriatric Assessment (CGA).

Primary studies

Validity and reliability of CFS for patients in need of intensive care.

Eight studies presented data on the validity and reliability of the CFS tool:

- prediction of mortality [1–5,7,8]
- prediction of disability [4,6]
- prediction of quality of life [4].

Table 3 presents an overall summary of findings of these studies, and in Appendix 3 the results are presented in detail.

All studies showed that frailty assessment with CFS may predict mortality, and that the risk of death increases with every unit increase on the CFS scale. In the study by Hope et al, which investigated the prediction of disability, it was found that the risk of increased disability may also be linked to an increase per unit on the CFS scale [6].

Table 2. Summary of studies reporting prediction of death, disability or quality of life. (Low to moderate risk of bias)

Author Year, reference Country Number of patients	**Outcome**	**Results**
De Geer et al 2020, [1] Sweden 872 patients	30-day mortality CFS ≥5	Receiver operating curve (ROC) Area under the curve (AUC): 0.74 (95 % CI, 0.69 to 0.79). After adjustment for SAPS3, comorbidities, limitations of treatment, age and sex: Frailty remained a strong predictor of death within 30 days: HR 2.12 (95% CI, 1.44 to 3.14); P<0.001
Guidet et al 2020, [2] VIP2 22 countries 3 920 patients	Predictors of 30-day mortality	(HR; 95 % CI,): Age (increase in risk of death per 1 year increase): HR 1.02 (95 % CI,1 to 1.03; p=0,01), ICU admission diagnosis, SOFA (increase in risk of death per 1-point increase): 1.15 (95 % CI,1.14 till 1.17; p<0,0001), CFS (increase in risk of death per 1-point increase): 1.1 (95 % CI,1.05 to 1.15; p<0,001)
Flaatten et al 2017, [5] VIP1 21 countries 5 021 patients	30-day survival CFS ≥5	HR 1.54 (95 % CI, 1.38 to 1.73)
Brummel et al 2017, [4] USA 1 040 patients	3-month mortality CFS 4 versus CFS 3	HR 1.4 (95 % CI, 1.1 to 1.8)
Shears et al 2018, [3] Canada 150 patients	Hospital mortality per point increase in CFS	OR 1.19 (95 % CI, 0.89 to 1.59)
Bagshaw et al 2014, [8] Canada 421 patients	Hospital mortality CFS ≥5	Adjusted OR 1.81 (95 % CI, 1.09 to 3.01)
Langlais et al 2018, [7] France 189 patients	Hospital mortality	AUC 0.62 (95 % CI, 0.53 to 0.71)
Hope et al 2019, [6] USA 302 patients	**Disability** Difference in ADL-function at 6-months per one-point increase in CFS	Adjusted IRR 1.39 (95 % CI, 1.15 to 1.67)
	Difference in ADL- function at 6 months 6-months, CFS ≥5	Adjusted IRR 2.58 (95 % CI, 1.67 to 3.99)

Author Year, reference Country Number of patients	Outcome	Results
Brummel et al 2017, [4] USA 1 040 patients	**Disability** IADL disability (measured using Functional Activities Questionnaire) 3-months [a] CFS 4 versus CFS 3	Adjusted OR 1:2 (95 % CI, 1.0 to 1.4)
	BADL disability (measured using Katz ADL) 3-months[a] CFS 4 versus CFS 3	Adjusted OR 1,1 (95 % CI, 0.9 to 1.3)
Brummel et al 2017, [4] USA 1 040 patients	**Quality of life** SF-36 Physical Component, 3-months CFS 4 versus CFS 3 linear regression	–2.1 (3,0 to 1,1)
	SF-36 Mental Component, 3-months CFS 4 versus CFS 3 linear regression	0.5 (0.9 to 2.0)

HR =hazard ratio; **ICU** = intensive care unit; **IRR** = incident rate ratio; **OR** =odds ratio **SOFA** = The Sequential Organ Failure Assessment
[a] Also presents data for 6 months.

Studies examining the prediction of mortality with a threshold level

In most studies, the authors presented data for the prediction of mortality based on whether the patients were deemed frail or non-frail using CFS. The most commonly used threshold value was between CFS 4 and CSF 5, although there was no validation of any threshold level in the original study. Many of the studies that were appraised as high risk of bias presented data based on this threshold level (between CSF 4 and CSF 5, with CFS ≥5 deemed as frail), but not per unit increase. This makes it difficult to evaluate whether there is any association between unit increase and mortality.

Two studies analysed the optimal threshold value of CFS for predicting mortality, with the aim of being able to use the scale dichotomously, and found that mortality clearly increased from CFS 5 and above [1,5].

Studies comparing CFS with other frailty assessment tool

Six studies compared CFS with other assessment tools, all appraised at high risk of bias (Table 3).

Table 3 Studies comparing Clinical Frailty Scale with other frailty scale

Assessment tool (number of studies, risk of bias)	Reference
Edmonton frailty scale (EFS) (2 studies, high risk of bias)	[14,15]
Frailty phenotype (FP) (2 studies, high risk of bias)	[16,18]
Fried's original five frailty domains (1 study, high risk of bias)	[13]
FI-lab (1 study, high risk of bias)	[17]

Frailty assessment method and test-retest reliability

In studies on intensive care patients, the CFS-9 version was used to estimate the frailty of the patient that was present before admission to the intensive care unit (ICU). The assessor who estimated the frailty, either different health care staff professions or next of kin or other surrogate, differed between the studies. In cases where health care staff performed the frailty assessment, the evaluation was based on conversations either with the patient, or with the next of kin or surrogates (in cases where patient was not able to participate).

Five studies investigated the interrater reliability of the CSF scale [2,3,9,10,22]. These studies indicated that reliability is good (Linear weighted kappa: 0.74 (95% CI, 0.67 to 0.80 [10], 0.85 (95% CI, 0.84 to 0.87 [2]) when frailty assessment was performed by staff of different health care professions.

When comparing frailty assessments made by health care staff versus the assessments made by next of kin, a difference was observed where next of kin tended to rate lower on the CFS scale than the health care staff, i.e. assessing the person as less frail [9]. Six studies examined the correlation between CFS and other scales to estimate frailty (see Table 3) [13–18]. These studies were appraised at high risk of bias (Appendix 4).

Studies with high risk of bias

Twelve studies were appraised as high risk of bias [11–20,22,33]. Pugh et al was appraised as high risk of bias for the outcome mortality, but as moderate risk of bias for interrater reliability [10]. Bagshaw et al was appraised as high risk of bias for the outcome quality of life, but as moderate risk of bias for the outcome mortality [8].

Most of the studies that were appraised as high risk of bias presented prediction of mortality using CFS based on a dichotomous scale. The most common threshold used was CFS 1–4 classified as non-frail versus CSF 5–9 classified as frail. The most common reasons for a study being appraised as high risk of bias included: using a non-consecutive sample of the population, retrospective study, CFS was assessed

retrospectively based on medical records, studies with few events (number of deaths), or studies with uncertainties in how data was presented and analysed. All studies appraised as high risk of bias are described in Appendix 4.

In one study the authors evaluated frailty using CFS for patients receiving mechanical ventilation [11]. However, the proportion of patients receiving mechanical ventilation due to respiratory failure was below 20 percent. In another study the authors evaluated frailty using CFS for patients with any type of infection, and in this study the proportion of patients with respiratory infection was 48 percent [17].

Two studies were large retrospective registry studies with data from over 15,000 people from Canada and Australia - New Zealand respectively [12,20]. The results in these studies were consistent with the results of the prospective studies with low or moderate risk of bias.

The results of most of the studies with high risk of bias coincide well with the results of the studies that were appraised as low to moderate risk of bias (with the exception of the study by Fisher et al [33] and the study by Pugh et al [10]). However, both studies were small with few events (number of deaths) which could explain the lack of significant predictive effect for mortality being seen.

Additional studies

We identified six additional publications that were relevant to the research question, in which subpopulations in already included primary studies were analysed. These were mainly analysing subpopulations from the multinational VIP1 study by Flaatten et al 2017 [5]. We have not appraised the risk of bias or presented data from these substudies, since the patient material is already included and presented in the original studies described above. The six publications were:

- One publication by De Lange et al 2019 [34], in which the authors developed a new prediction model that included CFS. This article is based on data from the VIP-1 study.

- Three publications presented analyses for subpopulations from the VIP1 study [35–37] originally presented in Flatten et al. 2017 [5].

- One publication by Hope et al 2019 [38] that included the same patient material as in a previous paper by the same author [9]. This article examined the correlation between mortality and patients who received different estimates of frailty with CFS by different assessors.

- One publication by Marra et al 2018 [21] based on the same patient material as in Brummel et al 2017 [4]. This article presented long term data on disability and cognitive and mental health outcomes, which to some extent overlapped with the data presented in Brummel et al 2017.

Limitations

In this report we have presented an overall summary of the studies within the scope of frailty assessments in ICU patients, but no formal synthesis or evidence grading of the results was conducted. The identified risk of bias in the included studies was appraised using a modified version of the PROBAST checklist (Appendix 1).

Project group

This report was compilated by Christel Hellberg (project manager), Marie Österberg (project manager), Malin Höistad (project manager), Agneta Petersson (project manager), Jan Adolfsson (medical advisor), Claes Lennmarken (medical advisor), Emma Palmqvist Wojda (information specialist), Sara Fundell (project administrator), Irene Edebert (project coordinator) och Pernilla Östlund (head of department).

Appendices

Appendix 1. Critical appraisal checklist
Appendix 2. Excluded studies
Appendix 3. Included studies
Appendix 4. Studies with high risk of bias

Literature search

PubMed via NLM 20 04 01

Frailty assessment in the critically ill using Clinical frailty scale

	Search terms	Items found
Population:		
1.	"Critical Care"[Mesh]	56 746
2.	"Intensive Care Units"[Mesh]	82 287
3.	"Critical Illness"[Mesh]	27 989
4.	critical care[Title/Abstract]	29 925
5.	Critical illness[Title/Abstract]	8 819
6.	critically ill[Title/Abstract]	43 135
7.	Intensive care[Title/Abstract]	140 634
8.	ICU[Title/Abstract]	54 277
9.	1-8 (OR)	***248 489***
10.	"Airway Management"[Mesh]	133 633
11.	"Respiratory Insufficiency"[Mesh]	63 557
12.	Influenza, Human[Mesh]	48 335
13.	Pneumonia[Mesh]	90 785
14.	Ventilat*[Title/Abstract]	162 458
15.	Respirat*[Title/Abstract]	485 671
16.	Airway*[Title/Abstract]	159 850
17.	Intubat*[Title/Abstract]	55 233
18.	Influenza[Title/Abstract]	94 940
19.	Pneumoni*[Title/Abstract]	177 432
20.	Pulmonary[Title/Abstract]	535174
21.	Lung*[Title/Abstract]	633 130
22.	***10-21 (OR)***	***1 782 341***
23.	***9 OR 22***	***1 967 584***
24.	"Severe Acute Respiratory Syndrome Coronavirus 2"[Supplementary Concept]	353
25.	severe acute respiratory syndrome coronavirus 2[Title/abstract]	183
26.	2019nCoV[Title/Abstract]	394
27.	2019-nCov[Title/Abstract]	402
28.	CoVID-19[Title/Abstract]	1 758
29.	CoVID19[Title/Abstract]	1 749
30.	SARS-CoV-2[Title/Abstract]	614
31.	CoVid[Title/Abstract]	1 772
32.	nCov[Title/Abstract]	419
33.	novel coronavirus[Title/Abstract]	1 143
34.	new coronavirus[Title/Abstract]	163
35.	coronavirus 2019[Title/Abstract]	228
36.	SARS coronavirus 2[Title/Abstract]	5
37.	***24-36 (OR)***	***2 850***
38.	"Severe Acute Respiratory Syndrome"[Mesh]	4 484
39.	"SARS Virus"[Mesh]	2 916
40.	Severe acute respiratory syndrome[Title/Abstract]	4 807
41.	SARS[Title/Abstract]	9 046
42.	SARS-CoV[Title/Abstract]	2 915
43.	***38-42 (OR)***	***10 581***
44.	"Coronavirus Infections"[Mesh:NoExp]	4 679

45.	"Middle East Respiratory Syndrome Coronavirus"[Mesh]	982
46.	MERS[Title/Abstract]	4 156
47.	MERS-CoV[Title/Abstract]	1 563
48.	Middle East respiratory syndrome[Title/Abstract]	1 818
49.	Middle East respiratory syndrome-related coronavirus[Title/Abstract]	10
50.	EMC/2012	15
51.	***44-50 (OR)***	***7 923***
52.	***37 OR 43 OR 51***	***18 852***
53.	***23 OR 52***	***1 977 403***
Intervention:		
54.	Clinical frailty scale[Title/Abstract]	295
55.	Csha-cfs[Title/Abstract]	19
56.	frailty index[Title/Abstract]	1 238
57.	***54 OR 55 OR 56***	***1 489***
Combined sets:		
58.	*23 AND 57*	*183*
59.	*53 AND 57*	*183*
Limits:		
60.	*59 and limit 2017 -*	*133*
Final 60		**133**

The search result, usually found at the end of the documentation, forms the list of abstracts

[MeSH] = Term from the Medline controlled vocabulary, including terms found below this term in the MeSH hierarchy
[MeSH:NoExp] = Does not include terms found below this term in the MeSH hierarchy
[MAJR] = MeSH Major Topic
[TIAB] = Title or abstract
[TI] = Title
Systematic[SB] = Filter for retrieving systematic reviews
* = Truncation

Embase via embase.com 20 04 01

Frailty assessment in the critically ill using Clinical frailty scale

	Search terms	Items found
Population:		
1.	'intensive care'/exp	699 967
2.	'intensive care unit'/exp	186 548
3.	'critical illness'/exp	28 616
4.	'critically ill patient'/exp	42 781
5.	'critical care':ti,ab,kw	45 100
6.	'critical illness':ti,ab,kw	11 979
7.	'critically ill':ti,ab,kw	63 867
8.	'intensive care':ti,ab,kw	202 584
9.	'icu':ti,ab,kw	111 350
10.	***1-9 (OR)***	***916 778***
11.	'assisted ventilation'/exp	168 620
12.	'respiratory failure'/exp	101 148
13.	'virus pneumonia'/exp	15 552
14.	'viral respiratory tract infection'/exp	3 886
15.	'ventilat*':ti,ab,kw	239 525
16.	'respirat*':ti,ab,kw	651 176

17.	'airway*':ti,ab,kw	229 402
18.	'intubat*':ti,ab,kw	86 825
19.	'influenza':ti,ab,kw	111 342
20.	'pneumoni*' :ti,ab,kw	249 310
21.	'pulmonary':ti,ab,kw	730 432
22.	'lung*':ti,ab,kw	932 588
23.	***11-22 (OR)***	***2 435 961***
24.	***10 OR 23***	***3 035 795***
25.	'coronavirus disease 2019'/exp	166
26.	'sars-related coronavirus'/de	46
27.	'severe acute respiratory syndrome coronavirus 2':ti,ab,kw	113
28.	'2019-ncov':ti,ab,kw	344
29.	'covid-19':ti,ab,kw	1 104
30.	'covid19':ti,ab,kw	9
31.	'sars-cov-2':ti,ab,kw	401
32.	'covid':ti,ab,kw	1 117
33.	'ncov':ti,ab,kw	359
34.	'novel coronavirus':ti,ab,kw	1 016
35.	'new coronavirus':ti,ab,kw	151
36.	'coronavirus 2019':ti,ab,kw	194
37.	'sars coronavirus 2':ti,ab,kw	7
38.	***25-37 (OR)***	***2 199***
39.	'severe acute respiratory syndrome'/exp	8 242
40.	'sars coronavirus'/exp	4 858
41.	'severe acute respiratory syndrome':ti,ab,kw	4 956
42.	'sars':ti,ab,kw	9 674
43.	'sars-cov':ti,ab,kw	2 804
44.	39-43 (OR)	***14 056***
45.	'middle east respiratory syndrome coronavirus'/exp	1 886
46.	'middle east respiratory syndrome'/exp	1 031
47.	'mers':ti,ab	4 456
48.	'mers-cov':ti,ab	1 659
49.	'middle east respiratory syndrome':ti,ab	1 905
50.	'emc/2012':ti,ab	24
51.	***45-50 (OR)***	***5 253***
52.	***38 OR 44 OR 51***	***19 516***
53.	***24 OR 52***	***3 044 399***
Intervention:		
54.	'clinical frailty scale'/exp	128
55.	'frailty index'/exp	185
56.	'clinical frailty scale':ab,ti,kw	604
57.	'csha-cfs':ab,ti,kw	34
58.	'frailty index':ab,ti,kw	2 001
59.	***54-58 (OR)***	***2 592***
Combined sets		
60.	*24 AND 59*	*428*
61.	*53 AND 59*	*428*
Limits:		
62.	*61 limit 2017 -*	*284*
Final		**284**

/de= Term from the EMTREE controlled vocabulary
/exp= Includes terms found below this term in the EMTREE hierarchy
/mj = Major Topic
:ab = Abstract
:au = Author
:ti = Article Title
:ti,ab = Title or abstract
* = Truncation
’ ’ = Citation Marks; searches for an exact phrase

Scopus via scopus.com 20 04 01

Frailty assessment in the critically ill using Clinical frailty scale

	Search terms	Items found
Population:		
1.	TITLE-ABS-KEY(“critical care”)	70 360
2.	TITLE-ABS-KEY(“critical illness”)	44 195
3.	TITLE-ABS-KEY(“critically ill”)	59 453
4.	TITLE-ABS-KEY(“intensive care”)	289 685
5.	TITLE-ABS-KEY(ICU)	66 375
6.	***1-5 (OR)***	***349 952***
7.	TITLE-ABS-KEY(ventilat*)	347 495
8.	TITLE-ABS-KEY(respirat*)	1 097 689
9.	TITLE-ABS-KEY(airway)	228 056
10.	TITLE-ABS-KEY(intubat*)	115 733
11.	TITLE-ABS-KEY(influenza)	151 754
12.	TITLE-ABS-KEY(pneumoni*)	370 746
13.	TITLE-ABS-KEY(pulmonary)	775 658
14.	TITLE-ABS-KEY(lung)	1 471 367
15.	***7-14 (OR)***	***2 938 457***
16.	***6 OR 15***	***3 152 556***
17.	TITLE-ABS-KEY ("severe acute respiratory syndrome coronavirus 2")	308
18.	TITLE-ABS-KEY ("2019-ncov")	259
19.	TITLE-ABS-KEY ("covid-19")	796
20.	TITLE-ABS-KEY ("covid19")	3
21.	TITLE-ABS-KEY ("sars-cov-2")	248
22.	TITLE-ABS-KEY ("covid")	804
23.	TITLE-ABS-KEY ("ncov")	276
24.	TITLE-ABS-KEY ("novel coronavirus")	871
25.	TITLE-ABS-KEY ("new coronavirus")	152
26.	TITLE-ABS-KEY ("coronavirus 2019")	151
27.	TITLE-ABS-KEY ("sars coronavirus 2")	14
28.	***17-27 (OR)***	***1 634***
29.	TITLE-ABS-KEY ("severe acute respiratory syndrome")	10 545
30.	TITLE-ABS-KEY ("sars")	100 532
31.	TITLE-ABS-KEY ("sars-cov")	2 765
32.	***29-31 (OR)***	***103 904***
33.	TITLE-ABS-KEY ("mers")	32 349
34.	TITLE-ABS-KEY ("mers-cov")	1 587
35.	TITLE-ABS-KEY ("middle east respiratory syndrome")	2 576
36.	TITLE-ABS-KEY ("emc/2012")	41
37.	***33-36 (OR)***	***33 120***

38.	***28 OR 32 OR 37***	***136 593***
39.	***16 OR 38***	***3 272 784***
Intervention:		
40.	TITLE-ABS-KEY(“clinical frailty scale”)	330
41.	TITLE-ABS-KEY(csha-cfs)	21
42.	TITLE-ABS-KEY(“frailty index”)	1 356
43.	40-42 (OR)	***1 635***
Combined sets:		
44.	***16 AND 43***	***280***
45.	***39 AND 43***	***280***
Limits:		
46.	***45 limit 2017 -***	***203***
Final		**203**

The search result, usually found at the end of the documentation, forms the list of abstracts

TITLE-ABS-KEY = Title or abstract or keywords
* = Truncation

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Frailty assessment in the critically ill using Clinical frailty scale

	Search terms	Items found
Population:		
1.	MH “Critical Care”	23 830
2.	MH “Critical Illness”	12 216
3.	MH “Critically Ill Patients”	13 452
4.	MH “Intensive Care Units”	40 072
5.	MH “Respiratory Care Units”	181
6.	TI "critical care" OR AB "critical care"	23 198
7.	TI "Critical illness" OR AB "Critical illness"	4 474
8.	TI "critically ill" OR AB "critically ill"	21 775
9.	TI "Intensive care" OR AB "Intensive care"	64 499
10.	TI "ICU" OR AB "ICU"	28 650
11.	1-10 (OR)	*126 925*
12.	MH “Respiration, Artificial+”	33 869
13.	MH “Respiratory Failure+”	14 861
14.	MH “Airway Management+”	21 225
15.	MH “Ventilator Patients”	2 659
16.	MH “Pneumonia, Viral”	728
17.	MH “Influenza, Human”	5 978
18.	TI "ventila*" OR AB "ventilat*"	49 016
19.	TI "respirat*" OR AB "respirat*"	89 112
20.	TI "airway*" OR AB "airway*"	34 603
21.	TI "intubat*" OR AB "intubat*"	17 001
22.	TI "influenza" OR AB "influenza"	19 137
23.	TI "pneumoni*" OR AB "pneumoni*"	34 343
24.	TI "pulmonary" OR AB "pulmonary"	95 961
25.	TI "lung*" OR AB "lung*"	108 749
26.	12-25 (OR)	***353 075***
27.	11 OR 26	***445 634***

28.	TI "severe acute respiratory syndrome coronavirus 2" OR AB "severe acute respiratory syndrome coronavirus 2"	14
29.	TI "2019 nCoV" OR AB "2019 nCoV"	2
30.	TI "2019-nCov" OR AB "2019-nCov"	75
31.	TI CoVID-19 OR AB CoVID-19	233
32.	TI CoVID19 OR AB CoVID19	2
33.	TI SARS-CoV-2 OR AB SARS-CoV-2	43
34.	TI "SARS CoV 2" OR AB "SARS CoV 2"	1
35.	TI CoVid OR AB CoVid	3
36.	TI nCov OR AB nCov	9
37.	TI "novel coronavirus" OR AB "novel coronavirus"	231
38.	TI "new coronavirus" OR AB "new coronavirus"	39
39.	TI "coronavirus 2019" OR AB coronavirus 2019"	90
40.	*28-39 (OR)*	***479***
41.	MH "Severe Acute Respiratory Syndrome"	1 997
42.	MH "SARS Virus"	158
43.	TI "Severe acute respiratory syndrome" OR AB "Severe acute respiratory syndrome"	1 056
44.	TI SARS OR AB SARS	2 304
45.	TI SARS-CoV OR AB SARS-CoV	99
46.	41-45 (OR)	***3 332***
47.	MH "Middle East Respiratory Syndrome Coronavirus"	372
48.	MH "Middle East Respiratory Syndrome"	245
49.	TI MERS OR AB MERS	959
50.	TI MERS-CoV OR AB MERS-CoV	400
51.	TI "Middle East respiratory syndrome" OR AB "Middle East respiratory syndrome"	611
52.	TI "Middle East respiratory syndrome-related coronavirus" OR AB "Middle East respiratory syndrome-related coronavirus"	2
53.	TI "EMC/2012" OR AB "EMC/2012"	4
54.	47-53 (OR)	*1 195*
55.	40 OR 46 OR 54	***4 711***
56.	27 OR 55	***446 435***
Intervention:		
57.	TI "clinical frailty scale" OR AB "clinical frailty scale"	202
58.	TI "csha-cfs" OR AB "csha-cfs"	14
59.	TI "frailty index" OR AB "frailty index"	728
60.	57-59 (OR)	***903***
Combined sets:		
61.	***27 AND 60***	***105***
62.	***56 AND 60***	***105***
Limits:		
63.	***62 limit 2017 -***	***67***
Final		**67**

The search result, usually found at the end of the documentation, forms the list of abstracts

AB = Abstract
DE = Term from the thesaurus
MM = Major Concept
TI = Title
* = Truncation
" " = Citation Marks; searches for an exact phrase

Referenser

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