Bilaga 1

Clinical Frailty Scale för prediktion av död, framtida funktionsnivå och livskvalitet för personer i behov av intensivvård (2020)

Bilaga 1 Granskningsmall

Modified from the PROBAST tool[1].

	Yes/ probably yes:	No/ probably no:	No information:
Was the study prospectively conducted? (Were appropriate data sources used?)			
Were all inclusions and exclusions of participants appropriate?			
Were predictors defined and assessed in a similar way for all participants?			
Were there a reasonable number of participants with the outcome (For model validation studies, if the number of participants with the outcome is ≥100.)			
Were participants with missing data handled appropriately?			
Were complexities in the data (e.g., censoring, competing risks, sampling of control participants) accounted for appropriately			
Were relevant model performance measures evaluated appropriately?			
Other concerns			
Overall assessment			

[1] Wolff RF, Moons KGM, Riley RD, Whiting PF, Westwood M, Collins GS, et al. PROBAST: A Tool to Assess the Risk of Bias and Applicability of Prediction Model Studies. Ann Intern Med 2019;170:51-58.

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Bilaga 2 Exkluderade studier

Reference	Reason for Exclusion
Agrawal N, Hope A, Gong M. Frailty and post-intensive care syndrome in older adult survivors of critical illness. J Am Geriatr Soc 2019;67:S327.	Conference abstract
Amado-Rodríguez L, López-Alonso I, Huidobro C, Blázquez-Prieto J, Del Busto C, Iglesias L, et al. Impact of frailty and duration of mechanical ventilation on post-intensive care unit functional status of cardiac critically ill patients. Am J Respir Crit Care Med 2018;197.	Conference abstract
Andrew MK, Lees C, Godin J, Black K, McElhaney J, Ambrose A, et al. Frailty hinders recovery from acute respiratory illness in older adults. Open Forum Infect Dis 2017;4:S573-S574.	Conference abstract
Arriero Fernández N, Silva Obregón JA, Estrella Alonso A, Eguileor Marin Z, Tirado Fernández MA, Viejo Moreno R, et al. Frailty assesment in cardiopulmonary arrest, is it necessary? Crit Care 2019;23.	Conference abstract
Arroyo Espliguero R, Silva-Obregon A, Viana-Llamas MC, Estrella-Alonso A, Saboya-Sanchez S, Uribe-Heredia G, et al. Frailty is an independent predictor of one-year mortality in patients with ST-segment elevation myocardial infarction, regardless of age, clinical severity and left ventricular function. Eur Heart J 2019;40:862.	Conference abstract
Baldwin MR, Gonzalez WC, Pollack LR, Javaid A, Maurer MS, Lederer DJ. Frailty subphenotypes and functional recovery in older survivors of acute respiratory failure. Am J Respir Crit Care Med 2018;197.	Conference abstract
Bech LK, Lindhardt A, Meyhoff CS. Clinical impact of frailty among patients with severe vital sign derangement: An observational study. Acta Anaesthesiol Scand 2020.	Duplication
Bech LK, Lindhardt A, Meyhoff CS. Clinical impact of frailty among patients with severe vital sign derangement: An observational study. Acta Anaesthesiol Scand 2020.	Not relevant population
Brummel NE, Girard TD, Hughes CG, Thompson JL, Chandrasekhar R, Ware LB, et al. Associations between markers of inflammation and frailty in survivors of hospitalization for critical illness. Am J Respir Crit Care Med 2019;199.	Conference abstract
Brummel NE, Girard TD, Thompson JL, Chandrasekhar R, Pandharipande P, Ely E. Prevalence of and risk factors for frailty after hospitalization for critical illness. Am J Respir Crit Care Med 2018;197.	Conference abstract
Buitrago DH, Gangadharan SP, Majid A, Kent MS, Alape D, Wilson JL, et al. Frailty Characteristics Predict Respiratory Failure in Patients Undergoing Tracheobronchoplasty. Ann Thorac Surg 2018;106:836-41.	Not relevant population
Carpenter E, Mahmooth Z, Elwood D, Lin E, Foster M, Haack C, et al. Frailty and predictors of discharge disposition in the acute and critical care surgery patient: A comparison of three frailty scoring instruments. Am Surg 2019;85:E504-E507.	Not relevant population

Cheung A, Haas B, Ringer TJ, McFarlan A, Wong CL. Canadian Study of Health and Aging Clinical Frailty Scale: Does It Predict Adverse Outcomes among Geriatric Trauma Patients? J Am Coll Surg 2017;225:658-665.e3.	Not relevant population
Curtis B, Carson SS, Douglas IS, Hough CTL, Kahn JM, White DB, et al. Long-term cognitive, psychological, and disability outcomes of survivors of chronic critical illness. Am J Respir Crit Care Med 2019;199.	Conference abstract
Dang M, Selvachandran A, Wiggan G, Mills M, Bartels M, Verghese J, et al. Pre-hospital frailty and cognitive motor interference(CMI) in adults with acute respiratory failure. J Am Geriatr Soc 2019;67:S241.	Conference abstract
Darvall JN, Boonstra T, Norman J, Murphy D, Bailey M, Iwashyna TJ, et al. Retrospective frailty determination in critical illness from a review of the intensive care unit clinical record. Anaesth Intensive Care 2019;47:343-8.	Not relevant outcome
Darvall JN, Braat S, Story DA, Greentree K, Bose T, Loth J, et al. Protocol for a prospective observational study to develop a frailty index for use in perioperative and critical care. BMJ Open 2019;9.	Protocol
Darvall JN, Gregorevic KJ, Story DA, Hubbard RE, Lim WK. Frailty indexes in perioperative and critical care: A systematic review. Arch Gerontol Geriatr 2018;79:88-96.	Not relevant Instrument
De Las Casas R, Bell D, Bounds C, Trimmings A. Association between the Canadian Study of Health and Ageing (CSHA) Clinical Frailty Score and Outcomes from Critical Care. J Intensive Care Soc 2018;19:104-5.	Conference abstract
Di Monte A, D'Amore P, Sabbatini F, Minardi M, Franco A. Non invasive ventilation in frailty elderly inpatient with acute respiratory failure. Italian Journal of Medicine 2019;13:27.	Conference abstract
Dong J, Sun J, Zeng A, Guo Z. Research progress of frailty syndrome in critically ill elderly patients. Zhonghua Wei Zhong Bing Ji Jiu Yi Xue 2017;29:958-60.	Not relevant study design
Enilari O, Nair R, Chuang E, Gong MN, Hope AA. Exploring the provision of primary and specialty palliative care services in critically ill older adults by pre-hospitality frailty. Am J Respir Crit Care Med 2018;197.	Conference abstract
Falvey JR, Ferrante LE. Frailty assessment in the ICU: translation to ‘real-world' clinical practice. Anaesthesia 2019;74:700-3.	Not relevant study design
Fernando S, McIsaac D, Rochwerg B, Bagshaw S, Seely A, Perry J, et al. Frailty and associated outcomes among emergency department patients requiring endotracheal intubation. CJEM 2019;21:S31.	Conference abstract
Fernando SM, McIsaac DI, Rochwerg B, Cook DJ, Bagshaw SM, Muscedere J, et al. Frailty and associated outcomes and resource utilization following in-hospital cardiac arrest. Resuscitation 2020;146:138-44.	Not relevant population
Finkel D, Sternäng O, Jylhävä J, Bai G, Pedersen NL. Functional Aging Index Complements Frailty in Prediction of Entry Into Care and Mortality. J Gerontol A Biol Sci Med Sci 2019;74:1980-6.	Not relevant Instrument
Flaatten H, Clegg A. Frailty: we need valid and reliable tools in critical care. Intensive Care Med 2018;44:1973-5.	Not relevant study design
Flaatten H, Jung C, Vallet H, Guidet B. How Does Frailty Affect ICU Outcome? Curr Anesthesiol Rep 2019;9:144-50.	Not relevant study design
Fronczek J, Polok K, Nowak-Kózka I, Włudarczyk A, Górka J, Czuczwar M, et al. Frailty increases mortality among patients ≥ 80 years old treated in Polish ICUs. Anaesthesiol Intensive Ther 2018;50:245-51.	Duplication
Geense W, Zegers M, Dieperink P, Vermeulen H, van der Hoeven J, van den Boogaard M. Changes in frailty among ICU survivors and associated factors:	Duplication

Results of a one-year prospective cohort study using the Dutch Clinical Frailty Scale. J Crit Care 2020;55:184-93.	
Geense W, Zegers M, Peters M, Janssen I, Ramakers B, Van Der Hoeven J, et al. What is the patients' physical, cognitive and mental status before ICU admission? Intensive Care Med Exp 2018;6.	Conference abstract
Guidet B, Flaatten H, Boumendil A, Morandi A, Andersen FH, Artigas A, et al. Withholding or withdrawing of life-sustaining therapy in older adults (≥ 80 years) admitted to the intensive care unit. Intensive Care Med 2018;44:1027-38.	Not relevant outcome
Hamidi M, Haddadin Z, Zeeshan M, Saljuqi AT, Hanna K, Tang A, et al. Prospective evaluation and comparison of the predictive ability of different frailty scores to predict outcomes in geriatric trauma patients. J Trauma Acute Care Surg 2019;87:1172-80.	Conference abstract
Hamidi M, Zeeshan M, Leon-Risemberg V, Nikolich-Zugich J, Hanna K, Kulvatunyou N, et al. Frailty as a prognostic factor for the critically ill older adult trauma patients. Am J Surg 2019;218:484-9.	Not relevant Instrument
Hamidi M, Zeeshan M, Tang A, Nikolich-Zugich J, Kulvatunyou N, O'Keeffe T, et al. Frailty as a prognostic factor for the critically ill: A propensity matched analysis of 34,854 geriatric patients. J Am Geriatr Soc 2018;66:S162-S163.	Conference abstract
Hart R, Ruddy JP. Frailty in ICU: An unmeasured burden. Intensive Care Med Exp 2018;6.	Conference abstract
Hewitt D, Booth M. Does frailty score at intensive care unit admission affect mortality at one year? A retrospective observational cohort study. Crit Care 2019;23.	Conference abstract
Hickman RL. Evidence-Based Review and Discussion Points. Am J Crit Care 2019;28:124-5.	Not relevant study design
Hodgson L, Warren J, Hunt D, Allen A, Venn R. Prevalence and impact of frailty on intensive care unit outcomes. Intensive Care Med Exp 2018;6.	Conference abstract
Hope AA, Verghese J, Gong MN. Pre-hospital frailty and cognitive impairment in older adult survivors of intensive care: An observational cohort study. Am J Respir Crit Care Med 2019;199.	Conference abstract
Kizilarslanoglu MC, Civelek R, Kilic MK, Sumer F, Varan HD, Kara O, et al. Is frailty a prognostic factor for critically ill elderly patients? Aging Clin Exp Res 2017;29:247-55.	Not relevant Instrument
Launey Y, Jacquet H, Arnouat M, Rousseau C, Nesseler N, Seguin P. Risk factors of frailty and death or only frailty after intensive care in non-frail elderly patients: a prospective non-interventional study. J Intensive Care 2019;7:48.	Not relevant instrument
Launey Y, Jacquet H, Arnouat M, Rousseau C, Nesseler N, Seguin P. Risk factors of frailty and death or only frailty after intensive care in non-frail elderly patients: A prospective non-interventional study. J Intensive Care 2019;7:48.	Duplication
Law J, Ng Gong M, Nair R, Hope AA. Predictors of increased post-hospital disability in critically ill older adults. J Am Geriatr Soc 2018;66:S319-S320.	Conference abstract
MacNally L, Soe N, Manohar RA. The impact of frailty on critical care unit outcome and treatment intensity in a district general hospital. J Intensive Care Soc 2018;19:50-1.	Conference abstract
Marques Mendes E, Pereira JM, Sousa Dias C, Honrado T. Short-and long-term outcomes of very old patients admitted to intensive care unit. Intensive Care Med Exp 2017;5.	Conference abstract

McMahon DP, Donnelly B, Chamberlin N. The significance of clinical frailty scoring in the outcomes of patients receiving non-invasive ventilation. Thorax 2019;74:A192-A193.	Conference abstract
Montgomery CL, Zuege DJ, Rolfson DB, Opgenorth D, Hudson D, Stelfox HT, et al. Mise en œuvre d'un outil de dépistage de la fragilité à l'échelle de la population parmi les patients admis aux soins intensifs pour adultes en Alberta, Canada. Can J Anaesth 2019;66:1310-9.	Duplication
Mudge AM. Outcomes for frail very old patients in the ICU are remarkably good. Med J Aust 2019;211:314-5.	Not relevant study design
Muscedere J, Boyd J, Maslove D, Sibley S, Hunt M, Norman P, et al. Frailty, outcomes, recovery and care steps of critically ill patients (FORECAST) pilot study. Crit Care 2019;23.	Conference abstract
Nakajima H, Nishikimi M, Shimizu M, Hayashi K, Inoue T, Nishida K, et al. Clinical Frailty Scale Score Before ICU Admission Is Associated With Mobility Disability in Septic Patients Receiving Early Rehabilitation. Crit Care Explor 2019;1:e0066.	Not relevant outcome
O'Caoimh R, Cooney MT, Cooke J, O'Shea D. The challenges of using the Hospital Frailty Risk Score. The Lancet 2018;392:2693.	Not relevant study design
Papageorgiou D, Gika E, Kosenai K, Tsironas K, Avramopoulou L, Sela E, et al. Frailty in elderly ICU patients in Greece: A prospective, observational study. Ann Transl Med 2018;6:111.	Not relevant outcome
Pedder A, Harrold R, Cruikshanks A, Tridente A, Raithatha A. Impact of frailty on critical care and hospital mortality in criticallyill patients with decompensated alcoholic liver disease. Crit Care 2019;23.	Conference abstract
Petrie JG, Martin ET, Zhu Y, Wyatt DG, Kaniclides A, Ferdinands JM, et al. Comparison of a frailty short interview to a validated frailty index in adults hospitalized for acute respiratory illness. Vaccine 2019;37:3849-55.	Not relevant outcome
Porteous C, Langton L, Little J, Old A. Does clinical fraility scale aid prognostication in ICU? J Intensive Care Soc 2018;19:51- 2.	Conference abstract
Rice H, Hill K, Fowler R, Watson C, Waterer G, Harrold M. Reduced Step Count and Clinical Frailty in Hospitalized Adults With Community-Acquired Pneumonia. Respir Care2020;65:455-63.	Duplication
Rice H, Hill K, Fowler R, Watson C, Waterer G, Harrold M. Reduced Step Count and Clinical Frailty in Hospitalized Adults With Community-Acquired Pneumonia. Respir Care 2020;65:455-63.	Not relevant population
Rosman J, Cordonnier A, Forceville X, Besch G, Mentec H, Michel P, et al. Impact of frailty on elderly patients (≥ 80 years) admitted in French intensive care units: A post hoc analysis from the international VIP study. Ann Intensive Care 2019;9.	Conference abstract
So RKL, Bannard-Smith J, Subbe CP, Jones DA, Van Rosmalen J, Lighthall GK. The association of clinical frailty with outcomes of patients reviewed by rapid response teams: an international prospective observational cohort study. Critical Care 2018;22:227.	Not relevant population
Souza IAO, Vieira TS, Ribeiro PC, Taniguchi LU. Frailty syndrome among critically ill patients undergoing nutrition support therapy in a Brazilian tertiary hospital. Intensive Care Med Exp 2017;5.	Conference abstract
Takaoka AA, Shears MB, Millen TC, Holding AD, Clarke FE, Tharmalingam SF, et al. The prognostic value of chart review-based clinical frailty scale scores in the intensive care unit. Can J Anaesth 2018;65:S124-S125.	Conference abstract

Taniguchi L, Souza IAO, Siqueira EMP, Ribeiro PC. Prevalence, nutrition risk evaluation and resource use of frail critically ill patients undergoing nutrition support therapy in a Brazilian tertiary hospitalIntensive Care Med Exp 2018;6.	Conference abstract
Va P, Rali P, Kota H, Keenan V, Mujtaba S, Naing W, et al. Home return following invasive mechanical ventilation for the oldest-old patients in medical intensive care units from two US hospitals. Lung India 2018;35:461-6.	Not relevant Instrument
Viana-Llamas MC, Silva-Obregon A, Arroyo Espliguero R, Estrella-Alonso A, Saboya-Sanchez S, Uribe-Heredia G, et al. Female gender is an independent predictor of one-year mortality following primary angioplasty for ST-segment elevation myocardial infarction, regardless of age, clinical severity and frailty. Eur Heart J 2019;40:2070.	Conference abstract
Walsh S, Searle S, Davis G, Mercier T, Haroon B, McMullen S, et al. Frailty in critical care: patient mobility as a clinical predictor. Can J Anaesth 2018;65:S52-S55.	Conference abstract
Wang M, Huang J, Reed MJ. Geriatric trauma intensive care patients: Complications and ICU readmission. J Am Geriatr Soc 2019;67:S135.	Conference abstract
Welch SA, Girard TD, Thompson JL, Chandrasekhar R, McNeil JB, Ware LB, et al. Association between markers of inflammation and frailty in survivors of hospitalization for critical illness. J Am Geriatr Soc 2019;67:S165.	Conference abstract
Zacchetti L, Aresi S, Zangari R, Cavalleri G, Fagnani L, Longhi L, et al. Traumatic brain injury in elderly: Impact of frailty on outcome. Crit Care 2019;23.	Conference abstract
Zampieri F, Taniguchi L, Salluh J, Bozza F, Soares M. Association of the Modified Frailty Index (MFI) with resource use and short-term outcomes in 129,680 critically ill patients. Intensive Care Med Exp 2018;6.	Conference abstract
Zampieri FG, Iwashyna TJ, Viglianti EM, Taniguchi LU, Viana WN, Costa R, et al. Association of frailty with short-term outcomes, organ support and resource use in critically ill patients. Intensive Care Med 2018;44:1512-20.	Not relevant Instrument

Bilaga 3

Clinical Frailty Scale för prediktion av död, framtida funktionsnivå och livskvalitet för personer i behov av intensivvård (2020)

Bilaga 3 Tabell över ingående studier

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Study (Author Year Country) Study design Setting	**Population (Number, age, sex, Patient characteristics, Selection of data reported[1])**	**Scale used Definition of frailty**	**Outcome Analyse made**	**Results[2]**	**Aims Conclusions**	**Risk of bias Limitations**
De Geer et al 2020 Sweden **Design:** Prospective study with comparison of two prediction models. 2017–2018 **Setting:** Mixed, tertiary general ICU in a university hospital	Adults >18y admitted to ICU **n=872 patients** Age: median 64y (IQR 46–73) 59% male **ICU diagnosis:** Sepsis, septic shock (22%) respiratory insufficiency (13%) **Selection of data reported:** Source of transfer to ICU Treatment and events in the ICU Severity of illness: SAPS3 **Exclusions:** Patients could be included only once, in cases of multiple ICU admissions only primary admission was included	CFS, 9pt scale CFS ≥5 defined as frail **Frailty assessment:** Premorbid frailty was defined as the level of frailty before the acute illness and hospital admission	Death within 30 days of ICU admission Survival for up to 180 days after ICU admission Estimate a discrimination and calibration of a model including frailty and SAPS3 Survival analysis, unadjusted, and adjusted by: severity of illness, comorbidities, limitations of treatment, age and sex	375/872 (43%) frail patients **Mortality non frail/frail (%):** ICU: 21 (4%)/67 (17%) 30 days 41 (8%)/113 (32%) 90 days 50 (10%)/138 (41%) 180 days 53 (11%)/150 (46%) AUC: 0.74 (95% CI, 0.69 to 0.79), and a CFS of 5 corresponded to: sensitivity of 76%, specificity of 66%, defining CFS ≥5 as the cut-off point. After adjustment, frailty remained a strong predictor of death within 30 days: HR 2.12 (95% CI, 1.44 to 3.14). ROC AUC of CFS did not differ significantly from that of SAPS3, whereas combining the two resulted in an improved discriminatory ability. The correlation of CFS to SAPS3 corresponded to an r of 0.4.	**Aim:** To study the impact of frailty on mortality in unselected ICU patients, and to compare its discriminatory ability to an established model for outcome prediction in intensive care. **Conclusion:** Premorbid frailty is a predictor of death in ICU patients. A strengthened predictive ability of severity of illness scores in clinical use (SAPS3) when combined with an assessment of a patient's degree of frailty. When adjusted for severity of illness and comorbidities, limitations of treatment, age and sex, the risk of death remained increased in frail patients.	Low risk of bias **Limitations:** Does not report how missing data was handled in the analysis
Guidet et al 2020 VIP 2	Consecutive patients >80y, acutely admitted to ICU	CFS, 9pt scale CFS ≥5 defined as frail	Survival in the ICU	1568/3903 (40%) frail patients	**Aim:**	Low risk of bias

[1] This does not present all data reported, but a subset of the ones most relevant to the PICOTS.
[2] This does not present all outcomes of the study, but the ones relevant for our PICOTS.

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
France **Design:** Prospective cohort study, May 2018–May 2019 **Setting:** 242 ICUs from 22 countries, coordinated via European Society of Intensive Care Medicine (10 Swedish ICU, 140 patients)	**n=3920 patients** Age: mean 84y (IQR 81–87) 53.3% males **ICU diagnosis:** Respiratory failure 944 (24.1%) Circulatory failure 541 (13.8%) Combined respiratory/ circulatory failure 449 (11.5%) Sepsis 539 (13.8%) **Selection of data reported:** Demographic data Reason for admission Severity of illness: (SOFA - Sequential Organ Failure assessment) ICU procedures Limitation of care Length of stay **Exclusions:** Non acute admission	**Frailty assessment:** Frailty level present before hospital admission and not affected by the acute illness. Information was given by patients or proxy, or by patient records Cognitive impairment (IQCODE ≥3.5 defining cognitive decline) Disability measured by Katz activities of daily living, Katz ADL ≤4 defining disability	Death within 30 days of ICU admission Potential predictive factors for 30-day survival.	**Mortality at 30 days (%):** **CFS1-3/CFS4/CFS5-9:** 509 (34%)/287(19%)/704 (47%) Overall survival at 30 days: 61.2% (59.7–62.7) **Predictors of 30 day mortality:** (HR, 95% CI): Age (increase in risk of death per 1 year increase): HR 1.02 (1–1.03); ICU admission diagnosis, SOFA (increase in risk of death per one-point increase): HR 1.15 (1.14–1.17); CFS (increase in risk of death per one point increase): HR 1.1 (1.05–1.15). The model including all geriatric parameters did not perform better than the model with CFS only. **Inter rater reliability** CFS was measured by two raters in 1924 patients. Weighted kappa: 0.85 (95% CI, 0.84 to 0.87	Prevalence of frailty, cognition decline and activity of daily life in addition to the presence of comorbidity and polypharmacy and to assess their influence on 30-day survival. **Conclusion:** Frailty assessment using the CFS is able to predict short-term mortality in elderly patients admitted to ICU.	**Limitations:** Only includes persons over 80
Flatten et al 2017 VIP 1 Norway	Consecutive very old (≥ 80y) patients admitted to the ICU	CFS, 9pt scale CFS ≥5 defined as frail	ICU survival 30-day survival	2156/5021 (43%) frail patients **Survival**:	**Aim:** To study the impact of frailty compared with	Low risk of bias **Limitations:**

Study (Author Year Country) Study design Setting	**Population (Number, age, sex, Patient characteristics, Selection of data reported[1])**	**Scale used Definition of frailty**	**Outcome Analyse made**	**Results[2]**	**Aims Conclusions**	**Risk of bias Limitations**
 Design: A transnational prospective cohort study, 2016–2017 **Setting:** 311 ICUs from 21 European countries, coordinated by European Society of Intensive Care Medicine. (26 Swedish ICU, 398 patients)	**n=5021 patients** Age: median 84y (IQR 81–86) 52.1% male **ICU diagnosis:** Respiratory and/or circulatory failure most frequent causes **Selection of data reported:** Severity of illness SOFA score, ICU procedures [invasive ventilation 50.7%, NIV 23%, no ICU procedures 23.8%] limitations of care, length of stay (LOS) **Exclusion criteria:** None	**Frailty assessment:** Frailty level before the acute illness and hospital admission. The Clinical Frailty Scale (CFS) was used and information necessary to perform the assessment by the ICU staff was given by patients or proxy.	Multivariate analysis, adjusted by: age, gender, SOFA score, type of ICU admission.	non frail CFS 1-3/ pre frail CFS 4/ frail CFS 5-9 (%): ICU survival: 1558 (82.3%)/ 775 (79.7%)/ 1578 (73.2%) 30 day survival: 1431 (75.6%)/ 686 (70.6%)/ 1278 (59.3%) Frailty was independently related to 30-day survival (HR 1.54; 95% CI, 1.38 to 1.73) for frail versus non-frail.	other variables with regards to short-term outcome in the very old ICU population. **Conclusions:** Among very old patients (≥ 80 years) admitted to the ICU, the consecutive classes in Clinical Frailty Scale were inversely associated with short-term survival.	only includes persons over 80
Shears et al 2018 Canada **Design:** Prospective **Setting:** 2 ICUs in Hamilton, Canada.	Patients ≥18 y admitted to ICU **n=150 patients** Age: mean 63.8y (SD 15.3) Female 60 (40.0%) **ICU admitting diagnosis:** Respiratory 48 (32%) Sepsis 22 (14.7%) **Selection of data reported:**	CFS, 9pt scale CFS ≥5 defined as frail **Frailty assessment:** At enrolment, study personnel attempted to determine pre-existing frailty at a timepoint 1-week prior to hospital admission	Mortality in ICU and in hospital Mean differences were calculated to assess the Research Coordinator	Patients non-frail (1–4)/ frail (5–9): 80/70 CFS were similar between RC, OT, and GR chart reviews ($p > 0.05$ for all comparisons). There was no difference between RC chart review and RC final score, or between RC	**Aim:** To describe pre-ICU frailty in critically ill patients using the Clinical Frailty Scale (CFS). **Conclusions:** CFS scores can be generated using medical chart review and can be	Moderate risk of bias **Limitations:** Less than 100 events (deaths)

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
McMaster University	Demographic data Admission classification APACHE II score Duration of ICU ICU procedures mechanical ventilation (80.7%), non-invasive ventilation (19.3%) **Exclusion criteria:** projected stay in ICU for ≤24 h.	for enrolled patients using the CFS. The ICU Research Coordinator generated 3 CFS scores using: 1) chart review, 2) family interview, 3) patient interview. An overall impression was captured in a final score (when available).	intra-rater reliability and inter-rater reliability of chart reviews made by the research coordinator, Occupational Therapist, and Geriatrics Resident. Analysis of the relationship between CFS scores and mortality.	patient interview and RC final score. Scores following the RC family interview and the RC final score were significantly different (−0.24, 95% CI, −0.38, −0.09). **Mortality non frail/frail:** ICU mortality: 20/17 Hospital mortality: 26/21 Each 1-point increase in the final CFS scored by the RC was weakly associated with ICU mortality: OR 1.18 (95% CI 0.84–1.66), and hospital mortality: OR 1.19 (95% CI 0.89, −1.59).	reliably completed by ICU clinicians and research staff.	
Bagshaw et al 2014, Association between frailty and short- and long-term outcomes among critically ill patients: a multicentre prospective cohort study	Adults ≥50 admitted to ICU **n=421 participants** Age: mean 67y ± 10 61% male **Selection of data reported:** Demographic data ADL Comorbidity score (Elixhauser) Source of transfer to ICU Postoperative ICU admission	CFS, 9pt scale CFS ≥5 defined as frail **Frailty assessment:** Trained research coordinators masked to the study hypotheses determined the Clinical Frailty Scale scores by interviewing	In hospital mortality ICU mortality mortality at 6 and 12 months Health-related quality of life at 6 and 12 months Length of stay	138/ 21 (33%) frail patients **Mortality** frail/not frail (%): In ICU: 16 (12%)/27 (9%) In Hospital: 44 (32%)/45 (16%) 12 months: 66 (48)%/71 (25%) In-hospital mortality was higher among frail patients than among nonfrail patients adjusted odds ratio: aOR 1.81 (95% CI, 1.09 to 3.01) and remained higher at 1 year	**Aim:** We determined the prevalence, correlates and outcomes associated with frailty among adults admitted to intensive care. **Conclusions:** Frailty was common among critically ill adults aged 50 years or more	**Moderate risk of bias:** Mortality **High risk of bias:** Quality of Life **Limitations:** Less than 100 events (deaths). Results missing in regard to EQ5D

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
Canada **Design:** Prospective multicentre cohort study **Setting:** 6 ICUs in the province of Alberta, Canada	Limitation of medical therapy Cardiac arrest APACHE score SOFA score **Exclusions:** ICU stay or survival was less than 24 hours, or previously enrolled in the study	participants or surrogates and reviewing each participant's medical record. Patients were considered to be frail if they had a score greater than 4 immediately before the index hospital admission.	Discharge disposition Major adverse events The models were adjusted for potential confounding factors, which were included based on their clinical importance, evidence from the literature or their significance at p <0.20 in the univariable analysis.	adjusted hazard ratio: aHR 1.82 (95% CI, 1.28 to 2.60). Adjusted hazard ratios for death within 12 months after admission to ICU, stratified by CFS (>4 indicating frailty). Unadjusted HR (95% CI): CFS 1–3: 1.00 reference CFS 4: HR 2.01 (1,25–3.24) CFS 5: HR 2.88 (1,65–5.02) CGS 6–8: HR 3.76 (2.33–6.07) **Function and QoL** Compared with nonfrail survivors, frail survivors were more likely to become functionally dependent (71% v. 52%; OR 2.25, 95% CI, 1.03 to 4.89), had significantly lower quality of life.	and identified a vulnerable population at increased risk of adverse events, morbidity and mortality. Our findings suggest that routine assessment of frailty could provide more accurate prognostication and identify a vulnerable population that might benefit from follow-up and intervention.	assessments. Only data from SF12 and EuroQol visual analogue scale presented.
Langlais et al 2018 France **Design:** Prospective observational study, 2015–2016	Adults ≥65y hospitalized ≥24h in the ICU **n=189 patients** Age: mean 74y (SD 6) 62% male **Selection of data reported:** Reasons for ICU admission Source of infection,	CFS, 9pt scale. CFS ≥5 defined as frail **SOFA score**: Sequential organ failure assessment score, calculated based on the worst variables observed	In hospital mortality ROC curves: Receiver operating characteristic curves were used to	27% (51/189) frail patients **Mortality:** Mortality overall: 51/189 Hospital mortality: 19/51 (37%) frail patients 32/138 (22%) nonfrail The probability of remaining alive according to frailty status	**Aim:** To determine whether the addition of the frailty status assessed by the CFS score to the SOFA score (SOFA+CFS) improves the performance of the SOFA score alone, in predicting the hospital mortality of	Moderate risk of bias **Limitations:** Less than 100 events (deaths) Information not clear regarding analysis of missing data

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
Setting: ICU of a university hospital, Rennes	Life expectancy (McCabe) Disability (Katz ADL), Comorbidity (Charlson score), SAPS II, SOFA. Glasgow coma score **ICU diagnosis**: Pulmonary infection (25%) Shock (50%) **Exclusions:** Patients who could not be interviewed or who had no proxy(ies) or family member available.	during the first 24 h of hospitalization **Frailty assessment:** Frailty was determined during the first 24h of ICU hospitalization by ICU physicians based on clinical examination, patient medical record and interview of patient or proxy(ies).	determine the likelihood ratios for the abilities of the CFS score, SOFA score and SOFA+CFS to predict hospital mortality.	was significantly higher in patients who had a CFS ≥5. **Predictions:** SOFA-CFS score did not improve the performance of the SOFA score alone in predicting hospital mortality: AUC CFS+SOFA: 0.66 (95% CI, 0.58 to 0.74) AUC SOFA: 0.63 (95% CI, 0.55 to 0.72) AUC CFS: 0.62 (95% CI, 0.53 to 0.71) In multivariable analysis, age (OR 1.09 (95% CI, 1.03 to 1.16), McCabe score, Glasgow coma score at admission, and SOFA score were risk factors for hospital mortality.	elderly critically ill patients. **Conclusions:** The performance of the SOFA score in predicting hospital mortality was low, although it was an independent risk factor for mortality. The combination of frailty status with the SOFA score did not improve the performance of the SOFA score alone.	
Hope et al 2019 USA **Design:** Prospective observational cohort,	Adults ≥50y admitted to ICUs **n=302 patients** Age: mean 67–69y (SD 10) 48-54% male) **Selection of data reported:** Demographics	CFS, 9pt scale CSF ≥5 defined as frail **Frailty assessments:** Prehospital frailty assessed by study physicians within 3d of ICU admission	Posthospital disability Information regarding frailty and in hospital mortality presented	61.7% (50/81) frail of deceased patients 45.7% (101/221) frail of patients that survived **Mortality:** Hospital mortality: 81/302 (27%) overall	**Aim:** To describe the association between prehospital frailty, acute organ dysfunction, and posthospital disability outcome in older adults	Moderate risk of bias **Limitations:** Less than 100 events (deaths)

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
2016–2017 **Setting:** Two tertiary care hospitals, Bronx, New York, Albert Einstein College of Medicine	Frailty markers SOFA score APACHE Comorbidity (Charlson score) ADL (Katz ADL) Cognitive impairment (IQCODE) **ICU diagnosis:** respiratory failure (28–43%) sepsis (16–20%) **Exclusions:** Patients admitted to ICU directly after an elective procedure, Patients not expected to be in ICU >24h; Patients in hospital ≥30 days prior to ICU transfer or in ICU >72h Patients who did not speak English or Spanish	**Organ failure assessments:** SOFA, using the most abnormal value within first 24h of ICU admission **Disability assessments**: By research coordinators from interviews with patients or surrogates. Posthospital ADL obtained through discharge or telephone interviews with patients, surrogates, nurses, or physical therapists or, where appropriate, through chart review.		50/81 (61.7%) frail patients 6 month mortality: 116/302 (38%) overall **Frailty associations:** Prehospital frailty was associated with posthospital disability (adjusted incident rate ratio [aIRR] per unit increase in CFS: aIRR 1.38 (95% CI, 1.15 to 1.67). Total day 1 SOFA score was weakly associated with posthospital discharge: aIRR 1.05 (95% CI, 1.00 to 1.10); Day 1 SOFA neurologic score was strongly associated with posthospital discharge: aIRR 1.42 (95% CI, 1.24 to 1.62) per unit increase in SOFA neurologic score. Effects were independent of prehospital frailty and other premorbid factors.	admitted to the intensive care unit. **Conclusion:** Both prehospital frailty and early acute brain dysfunction are important factors associated with increasing posthospital disability in older adults who survive critical illness.	
Brummel et al 2017 USA **Design:**	Patients ≥18 y treated for respiratory failure or shock from the medical and/or surgical ICUs **n=1040 patients** Age: median 62y (IQR 53–72)	CFS, 7pt scale CFS≥5 defined as frail **Frailty assessment:** Pre-existing frailty at enrollment, assessed by study personnel,	Mortality ADL (Katz ADL) Cognition (Repeatable Battery for Assessment of	307/1040 (30%) frail patients Half of patients with CFS ≥5 were younger than 65y. **Mortality: Overall:** 329/1040 (32%) at 3mo	**Aim:** To describe the prevalence and severity of frailty in adults age 18 years of age and older and to determine the independent association	Moderate risk of bias **Limitations:** Several exclusion criteria applied. Some details

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
Prospective multicenter cohort study, 2007–2010 **Setting:** Five US centers. patients enrolled in the identical BRAIN-ICU (NCT00392795) and MIND-ICU (NCT00400062) studies	60% male **ICU diagnosis:** acute respiratory failure (17%) sepsis (32%) **Selection of data reported:** APACHE II score at admission Mean daily SOFA score Diagnosis at admission, Mechanical ventilation Duration of ICU stay Duration of hospital stay **Exclusions:** Organ dysfunction >72 hours, recent ICU exposure, severe cognitive impairment, substance abuse, homelessness. Patients who died or withdrew before follow-up from the disability, cognitive, and HRQoL analyses.	trained by a geriatrician with expertise in frailty assessments, used patient/proxy interviews and medical records to determine preexisting frailty with the CFS.	Neuro-psychological Status) Health-related quality of life (SF-36) Adjustments (a priori): age, sex, education, comorbidities, baseline disability, baseline cognition, severity of illness (SOFA score), delirium, coma, sepsis, mechanical ventilation, and sedatives/ opiates.	409/1040 (39%) at 12mo **Associations:** Greater CFS scores were independently associated with greater mortality. Greater CFS scores were independently associated with greater odds of disability in instrumental ADL. CFS scores were not associated with disability in basic activities of daily living or with cognition. Higher CFS score at enrolment, however, was associated with lower SF-36 Physical Component Scores at 3 and 12 months. CFS score was not associated with SF-36 Mental Component Scores at either follow-up assessment.	between preexisting frailty (i.e., frailty present before critical illness) and long-term outcomes 3 and 12 months after critical illness. **Conclusions:** Our results suggest that pre-existing frailty, as measured by the Clinical Frailty Scale, is common in critically ill patients, regardless of age. Moreover, the risk of death, disability, and poor health-related quality of life increased along the fitness-frailty continuum, independent of many traditional risk factors, including age.	missing in regard to description of analysis
Hope et al 2019 USA **Design:** Observational cohort study,	Adults ≥50 y admitted to medical/ surgical ICU within 30 d of emergency admission **n=298 patients** Age: mean 67.2y (SD 10.5)	CFS, 9pt scale CFS≥5 defined as frail **Frailty assessment:** On admission, patients' surrogates	Agreement was described with kappa scores, McNemar tests, and Bland-Altman plots.	Researcher assessment: frail/non frail: 148/150 Surrogate assessment: frail/non frail: 111/187 **Hospital mortality:** Frail vs non frail (%):	**Aim:** To compare agreement and validity between surrogates' and researchers' assessments of frailty in critically ill older adults.	Moderate Risk of bias

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
2016–2017 **Setting:** Tertiary academic medical center, Albert Einstein College of Medicine, Bronx, New York	**Selection of data reported:** Prehospital disability, Primary diagnosis in ICU APACHE Charlson Comorbidity score, ADL **Exclusions:** Patients expected to be discharged from ICU within 24h, patients with no available surrogate or next of kin who knew their pre-hospitalization medical and social history.	quantified prehospital frailty. Researchers blinded to surrogates' assessments also quantified frailty.	Validity was compared by using Chi-2 tests and logistic regression.	Researcher CSF assessment 49 (33.1%) vs 30 (20.0%) Surrogate assessment 35 (31,5%) vs 44 (23,5%) Both surrogates' and researchers' frailty assessment scores ranged from 1 to 9, with moderate to substantial agreement between scores (kappa ≥0.40). Surrogates' frailty assessment scores were significantly lower than researchers', mean difference: –0.62 95% CI, –0.77 to –0.48 Surrogates were less likely than researchers to identify as frail those patients who experienced adverse hospital outcomes (death, prolonged stay, or disability newly identified at discharge).	**Conclusion:** Surrogates identified fewer patients as frail than did researchers. Factors involved in surrogates' assessments of patients' prehospital frailty status should be studied to see if the Clinical Frailty Scale can be modified to facilitate more accurate surrogate assessments.	
Pugh et al 2019 UK **Design:** Prospective observational multicentre study	Adults ≥60y receiving active treatment with an expectation to remain in critical care for at least 24 h. **n=101 patients** Age: 69y (IQR 60–80) 58% male	CFS 9pt scale CFS≥5 defined as frail **Frailty assessments:** Compare assessments of frailty by study investigators working within the critical	Interrater reliability Hospital mortality	Linear weighted Kappa: 0.74 (95% CI, 0.67 to 0.80) indicating a good level of agreement between assessors. Frailty rating differed by at least one category in 47% cases.	**Aim:** To investigate the inter-rater reliability of the Clinical Frailty Scale for assessing frailty in patients admitted to critical care.	**Moderate risk of bias:** interrater reliability **High risk of bias:** mortality **Limitations:**

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
Setting: 6 hospitals Wales and Scotland	**ICU diagnosis:** Respiratory (35%) gastrointestinal (27%), cardiovascular (16%) non-surgical patients (74%) **Selection of data reported:** APACHE II GCS (Glasgow Coma Scale) Dependence Mechanical ventilation during first 24h (62%)	care team and staff from medical, nursing and physiotherapy backgrounds. Total number of assessments: 202. Most assessments were performed by medical staff (47%) or staff from a nursing background, including advanced critical care practitioners (44%), with a much smaller number by physiotherapists (9%)		Among different staff pairings, the lowest level of agreement was found for the sub-group of patients for whom one assessor was from a medical and one from a nursing background. **Associations:** Factors independently associated with higher frailty rating: female sex; higher APACHE II score, higher category of pre-hospital dependence; and the assessor having a medical background. **Mortality:** Hospital mortality: 12/40 (30%) in frail patients 13/61 (21%) in nonfrail patients In-hospital mortality was similar between frail and non-frail patients.	**Conclusion:** We identified a good level of agreement in frailty assessment using the Clinical Frailty Scale, supporting its use in clinical care, but identified factors independently associated with higher ratings which could indicate personal bias.	Not consecutive sample, some information missing regarding analysis and results
Gense et al 2020 Netherlands **Design:** Prospective cohort study, 2016–2017	Adult ≥16y patients expected to survive the ICU, admitted for at least 12 h to the ICU Length of stay (LOS) **n=1300 patients** Age: mean 61y (SD 14.9)	CSF, 9pt scale, Dutch version CFS≥5 defined as frail **Frailty assessment:** Assessed by patients or proxies before or	CFS in survivors of ICU at 3 and 12 months Length of stay (LOS)	153/1300 (11.8%) frail at baseline **Frail patients:** 50.3% frail patients had chronic diagnosis. APACHE IV mean 55.4 (SD 18.9)	**Aim:** Examine changes in frailty in the year after ICU admission, and its associated factors. **Conclusion**:	**Moderate risk of bias** **Limitations:** Primary research question is related to how frailty

Study (Author Year Country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyse made	Results[2]	Aims Conclusions	Risk of bias Limitations
Setting: One university medical center, data from ongoing multicenter study (MONITOR-IC study)	65% male **ICU diagnoses:** Chronic diagnoses (26%) planned admission (66%), after elective surgery (65%) acute surgical (11.7%) medical (23.6%) **Selection of data reported:** APACHE IV, mechanical ventilation (70%) **Exclusions:** Life expectancy of <48 h Deceased before informed consent, ICU LOS <12 h	at ICU admission (planned or unplanned admissions), at hospital discharge, and three and 12months after ICU admission,	Linear regression to explore which factors were associated with changes in frailty 12 months after ICU admission	**Mortality** frail vs non frail (%): Hospital mortality: 1 (0.7%)/5 (0,4%) 1 year mortality: 24 (15.7%)/92 (8%) Frailty levels changed among ICU survivors, with higher levels at hospital discharge and lower levels in the following months. After one year, 42% of the unplanned and 27% of the planned patients were more frail. For both groups, older age, longer hospital length of stay, and discharge location were associated with being more frail.	Frailty levels changed following ICU admission, with higher frailty levels at hospital discharge, and lower levels at 12 months.	changes after ICU stay. Some information missing regarding analysis and results I relation to mortality

ADL = Activities of daily living; **aOR** = Adjusted odds ratio; **APACHE** = Acute Physiology and Chronic Health Evaluation; **AUC** = Area Under Curve; **CFS** = Clinical frailty scale; **CI** = Confidence interval; **CVC** = Central venous catheter; **d** = Days; **h** = Hours; **HR** = Hazard ratio; **HRQoL** = Health related quality of Life; **ICU** = Intensive care unit; **IQR** = Interquartile range; **LOS** = Length of stay; **LST** = Limitation of life-sustaining therapies; **mo** = Months; **NIV** = Non-invasive ventilation; **pt** = Points; **QoL** = Quality of Life; **ROC** = Receiver operating characteristic; **RR** = Risk ratio; **RRT** = Renal replacement therapy; **SAPS** = Simplified Acute Physiology Score; **SD** = Standard deviation; **SOFA** = The sequential organ failure assessment; **y** = Years

FOOTNOTES:

ICU interventions (also referred to as resource utilization or treatment intensity): Includes:
mechanical ventilation, noninvasive ventilation, intubation, reintubation, tracheostomy, vasoactive drugs, CVC (central venous catheter), arterial line, transfusion, renal replacement therapy, decision to withhold/ withdraw life sustaining treatment.

Bilaga 4 Studier med hög risk för bias

Study (Author, year, country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyses	Results[2]	Aims Conclusions	Risk of bias Limitations Comments
Montgomery et al 2019 Canada **Design:** Retrospective cohort study, from eCritical Alberta, 2016–2017 **Setting:** 17 ICUs in 7 cities, mixed medical/ surgical units, Alberta	Adult patients (≥18y) admitted to ICU **n=15.238 patients** Age: mean 58y (SD 17) 61% male **ICU diagnosis:** including respiratory (20%) cardiovascular (31%) **Selection of data reported:** diagnostic classification, surgical status, comorbidities, APACHE II score (19, SD8) SOFA score (6, SD 4) laboratory data ICU interventions (including: invasive ventilation (66%) non-invasive ventilation (12%) vasoactive therapy, renal replacement therapy)	CFS, 9point scale CFS ≥5 defined as frail **Frailty assessments:** CFS score assigned at ICU admission. 81% patients were assigned a CFS score at ICU admission.	Hospital mortality ICU mortality Length of stay, organ support, discharge disposition. Independent risk factors for hospital mortality and selected organ supports identified by multivariate logistic regression using CFS score at ICU admission, age, sex, diagnostic category, pre-ICU duration of hospitalization, and APACHE II score as covariates.	28% (4199/15.238) frail patients Prevalence of frailty: 9–43% across ICUs. **Frail patients:** Frail patients were older, mean 63y (SD 15) vs 56y (SD17), and had higher APACHE II scores 22 (SD 8) vs 17 (SD 8), compared with non-frail. Frail patients received less mechanical ventilation (62% vs 68%) and vasoactive therapy (24% vs 57%), but more non-invasive ventilation (22% vs 9%) **Mortality:** ICU mortality: 523/4199 (12%) of frail patients 1295/15238 (9%) overall deaths Hospital mortality: 982/4199 (23%) of frail patients 2019/15238 (13%) overall deaths. Frail patients had higher hospital mortality (23% vs 9%): aOR 1.83 (95% CI, 1.64 to 2.05) compared with nonfrail patients.	**Aim**: Following implementation of a validated frailty measure into a provincial ICU clinical information system, we describe the population-based prevalence and outcomes of frailty in patients admitted to ICUs. **Conclusion:** A validated measure of frailty can be implemented at the population level in ICU. Frailty is common in ICU patients and has implications for health service use and clinical outcomes.	High risk of bias **Limitations** Retrospective study **Comments:** Retrospective registry study with >15.000 patients. Stratifies by CFS score and age. Follows STROBE statement.

[1] This does not present all data reported, but a subset of the ones most relevant to the PICOTS.
[2] This does not present all outcomes of the study, but the ones relevant for our PICOTS.

Study (Author, year, country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyses	Results[2]	Aims Conclusions	Risk of bias Limitations Comments
Darvall et al 2019 New Zealand **Design:** Retrospective population-based cohort, 2017–2018, Australian and New Zealand Intensive Care Society Adult Patient Database (ANZICS) **Setting:** 178 ICUs, includes data on > 80% of all admissions to ICUs in Australia and New Zealand	Patients ≥80y admitted to ICU **n=15.613 patients** Age: median 84.6y (IQR 82–88) 52.8% male **ICU diagnoses:** including Respiratory (12–16%) sepsis (7–12%) cardiovascular, gastrointestinal, neurological trauma, cardiac surgery, other **Selection of data reported:** Admission diagnosis, chronic diseases, APACHE II, APACHE III-j, Risk of Death (ANZROD- scores), limitations of medical treatment **Exclusions:** Patients admitted for organ donation or palliative care only	CFS, 8 point scale (not including level 9 from the CFS 9point scale). CFS ≥5 defined as frail (CFS 5–8) **Frailty assessment:** Since 2017, frailty has been a non-mandatory variable measured at the time of ICU admission, depending on the patient's level of physical function in the two months preceding admission. Scores were assigned by data collectors in each participating ICU from the clinical record; no specific education in CFS measurement was provided. Frailty scores available for 34% of included patients.	In-hospital mortality, Length of stay, readmission to ICU during the same hospital admission, discharge destination. Unadjusted and adjusted associations between frailty and in-hospital mortality, results reported as odds ratios (OR) ANZROD: a locally derived mortality prediction model that includes: age, diagnosis, acute physiological disturbance, chronic comorbid conditions, and treatment limitations.	39.7% (6203/15613) frail **Frail patients:** Larger proportions of frail vs nonfrail patients were admitted with sepsis (12% *vs* 7%) or respiratory complications (16% *vs* 12%). Frail patients had more often higher illness severity scores, higher ANZROD scores, and more often treatment limitations on admission. **Mortality of frail patients:** ICU deaths: 554/6203 (9.0%) hospital deaths (incl ICU): 1090/6203 (17.6%) In-hospital mortality was higher for frail patients vs nonfrail (17.6% v 8.2%): OR, 2.40 (95% CI, 2.17 to 2.64), aOR 1.87 (95%CI, 1.65 to 2.11). AUC ROC univariate analysis: 0.61 (0.60 to 0.62) Multivariable analysis: 0.88 (0.88 to 0.89) Multivariable analysis: Frailty was associated with in-hospital mortality after adjusting	**Aim:** To explore associations between frailty (Clinical Frailty Scale score of 5 or more) in very old patients in intensive care units (ICUs) and their clinical outcomes (mortality, discharge destination). **Conclusions:** Mortality among frail patients, after adjusting for sex, severity of illness, and regional and hospital variation, was almost twice as high as for non-frail patients. Many very old critically ill patients in Australia and New Zealand are frail, and frailty is associated with considerably poorer health outcomes. Routine screening of older ICU patients for frailty could improve outcome prediction.	High risk of bias **Limitations** Retrospective study. High number of missing data. **Comments:** Retrospective registry study with >15.000 patients, includes data on > 80% of all admissions to ICUs in Australia and New Zealand.

Study (Author, year, country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyses	Results[2]	Aims Conclusions	Risk of bias Limitations Comments
				for sex, severity of illness (ANZROD model), region, hospital type.		
Fernando et al 2019 Canada **Design:** Retrospective analysis of prospectively collected registry data, 2011–2016. **Setting:** ICUs in two hospitals within Ottawa Hospital Network	Consecutive ICU patients, ≥18y receiving invasive mechanical ventilation **n=8110** Age: mean 69.2y (SD 12) frail mean 57.6y (SD 18) nonfrail, 57% male **ICU diagnosis:** including infection/sepsis (15–17%), respiratory failure (8–23%) trauma, malignancy, intracranial hemorrhage, stroke, other) **Selection of data reported:** Comorbidity diagnoses, Comorbidity Score (Elixhauser), MODS (Multiple Organ Dysfunction Score) **Exclusions:** Patients who only received non-invasive mechanical ventilation or high flow nasal cannulae; chronic invasive ventilation requirement at admission,	CFS 9 point scale, CFS ≥5 defined as frail **Assessments:** Pre-admission assessments prior to acute illness, within 24h of ICU admission, as completed by nursing staff or occupational therapy staff. Staff used medical records of patient pre-admission mobility and function assessments to retrospectively score each patient on the CFS, using a standardized abstraction tool.	In-hospital mortality Extubation failure, tracheostomy, ventilator-free days ICU length of stay, hospital length of stay, disposition (home or long-term care center), readmission to ICU during hospitalization, readmission within 30 days from discharge Adjustments: age, sex, illness severity [MODS], location of intubation, initiation of	31% (2529/8110) frail patients **Frail patients:** Respiratory failure more common admitting diagnosis among frail patients vs nonfrail (22.8% vs 8.2%). **Mortality:** In-hospital mortality: 1021/2529 (40%) frail 1617/5581 (29%) nonfrail In hospital death after extubation failure (33% vs 25%) In hospital death after tracheostomy (47% vs 31%) **Associations**: Frailty was associated with increased odds of: hospital death: aOR 1.24 (95% CI, 1.10 to 1.40), hospital death following extubation failure: aOR 1.18 (95% CI, 1.07 to 1.28), hospital death following tracheostomy: aOR 1.14 (95% CI, 1.03 to 1.25).	**Aim:** Evaluate the association between frailty, defined by the Clinical Frailty Scale (CFS), and outcomes of ICU patients receiving invasive mechanical ventilation. **Conclusions:** The presence of frailty among patients receiving mechanical ventilation is associated with increased odds of hospital mortality, discharge to long-term care, extubation failure, and need for tracheostomy.	High risk of bias **Limitations** CFS was retrospectively scored based on medical records **Comments:** Retrospective registry study. Specifically, patients receiving mechanical ventilation.

Study (Author, year, country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyses	Results[2]	Aims Conclusions	Risk of bias Limitations Comments
	existing goals-of-care that did not allow for mechanical ventilation, patients with a CFS of 9 given their high likelihood of short-term mortality.		mechanical ventilation (ICU vs. non-ICU), most responsible diagnosis, Elixhauser comorbidity index.			
Fernando et al 2019 Canada **Design:** Retrospective analysis of prospectively collected registry data, 2011–2016 **Setting:** Two hospitals within a single tertiary care level hospital system, Ottawa	Patients ≥65 y with suspected infection at ICU admission. **n=1510** Age: mean 72.9 y non-frail mean 80.3 y frail 56% male **ICU diagnosis:** 48% suspected pulmonary infection **Selection of data reported:** Suspected source of infection, comorbidity diagnoses, Elixhauser Comorbidity Score, MODS, SIRS - Systemic Inflammatory Response Syndrome, qSOFA scores, resource utilization (including: invasive mechanical ventilation,	CFS 9 point scale, CFS ≥5 defined as frailty**.** **Frailty assessment:** Staff used medical records of patient pre-admission mobility and function assessments to retrospectively score each patient on the CFS, using a standardized abstraction tool. Screen for frailty using FI-LAB, (23-item index), calculated using ICU admission laboratory values. Modified FI-LAB for acutely ill patients.	In-hospital mortality Resource utilization ICU length of stay, total hospital length of stay, survivors discharged to long-term care, survivors with hospital readmission within 30 days, hospital costs Adjusted for predefined confounders: age, sex, MODS, origin from long-	Prevalence of frailty: 507 (33.6%) frail using CFS 829 (54.9%) frail using FI-LAB. **Frail patients:** Invasive mechanical ventilation: 53.3% frail vs 51.9% nonfrail Noninvasive ventilation: 17.6% frail vs 16.3% nonfrail. **In hospital Mortality:** 37% (558/1510) patients overall 52% (264/507) frail 29% (294/1003) nonfrail **Associations:** Frailty was associated with increased risk of in-hospital death: OR 1.81 [95% CI 1.34–2.49] The combination of frailty and quick SOFA ≥ 2 further increased the risk of death	**Aim:** To evaluate the association between patient frailty (CFS ≥5) and outcomes of critically ill patients with suspected infection. To evaluate the association between frailty and the quick Sequential Organ Failure Assessment (SOFA) score. **Conclusion:** The presence of frailty among older ICU patients with suspected infection is associated with increased mortality, discharge to long-term care, hospital readmission, resource utilization, and costs.	High risk of bias **Limitations** CFS was retrospectively scored based on medical records **Comments:** Specifically patients with suspected infection

Study (Author, year, country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyses	Results[2]	Aims Conclusions	Risk of bias Limitations Comments
	noninvasive mechanical ventilation) **Exclusions:** Patients with missing data related to outcome or baseline functioning		term care, Elixhauser comorbidity index.	aOR 7.54 (95% CI, 5.82 to 9.90) The combination of frailty and SIRS ≥2 resulted in aOR 2.22 (95% CI, 1.40 to 3.48) for in-hospital mortality.		
Darvall et al 2019 Australia **Design:** Prospective cohort study, Feb–June 2017 **Setting**: Royal Melbourne Hospital Intensive Care Unit, a tertiary metropolitan ICU	Patients ≥50 y admitted to ICU **n=160 patients** Age: mean 70y (SD 10) 43.8% male **ICU diagnosis:** Medical (62,5 %) Surgical (37,5%) **Selection of data reported:** Admission source and type Charlson comorbidity score, Katz ADL APACHE 3 (mean 70 (SD24)) SAPS2 (mean 40 (SD14)) ICU interventions (incl. mechanical ventilation) limitation of treatment **Exclusions:** Patients admitted for organ retrieval	CFS CFS ≥5 defined as frail Edmonton Frail Scale (EFS) EFS ≥8 defined as frail **Frailty assessments:** Pre-illness frailty and all study assessments were measured by one of two study investigators (medical student or specialist intensivist) through interviews with the participants or surrogates. Pre-illness frailty was defined as the baseline patient state prior to the onset of acute illness precipitating hospital admission.	In-hospital mortality, 6-month mortality Length of stay, readmission to ICU, discharge destination Compared CFS and EFS using Spearman correlation and Kappa coefficients, assessing frailty status across health domains, and examining outcomes including mortality.	**Frail patients:** Frailty diagnosed in 54/160 (33.8%) using CFS 58/160 (36.3%) using EFS **Mortality of frail patients:** In-hospital death: 14/54 (25.9%) 6month mortality: 21/52 (40.4%) Frail patients had greater in-hospital mortality vs nonfrail (25.9% vs. 8.5%): aOR 3.31 (95% CI, 1.17 to 9.39), and greater 6-month mortality (40.4% vs. 17.3%): aOR 2.84 (95% CI, 1.18 to 6.83). **Correlations:** CFS and EFS were highly correlated: Spearman correlation coefficient: 0.85 (95% CI, 0.81 to 0.88), and with high agreement: kappa coefficient 0.78 (95% CI, 0.68 to 0.88)	**Aim:** To compare the Clinical Frailty Scale (CFS) with a multi-dimensional validated tool, the Edmonton Frail Scale (EFS) and investigated which health domains are affected by frailty in ICU. **Conclusions**: Frailty in the critically ill affects a range of health deficits, adequately measured via the CFS.	High risk of bias **Limitations** Not consecutive sample. Less than 100 events (deaths)

Study (Author, year, country) Study design Setting	Population (Number, age, sex, Patient characteristics, Selection of data reported[1])	Scale used Definition of frailty	Outcome Analyses	Results[2]	Aims Conclusions	Risk of bias Limitations Comments
Silva-Obregón et al 2020 Spain **Design:** Retrospective cohort study, 2009–2017 **Setting:** A mixed ICU of a university-affiliated reference hospital.	Patients ≥70 years admitted to ICU. Routinely collected data. **n=285 patients** Age: mean 77.56 y ± 4.11 58.2% male **Diagnosis at admission:** infectious disease (39%) respiratory (19%) cardiovascular, cardiac arrest, neurological, other **Selection of data reported:** Comorbidities, APACHE II, SAPS II, SOFA, ICU procedures, complications (incl. ARDS) **Exclusions:** Acute coronary syndrome, arrhythmia, elective surgery, urgent surgery prior to ICU admission, acute ischemic or hemorrhagic stroke patients, patients admitted for organ donation	CFS, 9 pt scale CFS ≥5 defined as frail **Frailty assessments:** Frailty stage was prospectively collected since October 2013. Prior this date, investigators used patient/proxy interviews and medical records to determine CFS score.	Mortality: ICU mortality, hospital mortality, short-term mortality (30d), long-term mortality (3-, 6-, 12-months) ICU length of stay (LOS), hospital length of stay Four different models with different adjustment levels: adjusting for: gender, comorbidities, severity scores, treatment intensity and complications.	18.6% (53/285) frail patients 81% (232/285) nonfrail patients **Frail patients:** Respiratory diagnosis: 26% frail vs 18% nonfrail **Mortality:** frail vs nonfrail: Hospital mortality: 30/53 (56.6%) vs 88/232 (37.9%) 30 day mortality: 28/ 53 (52.8%) vs 72/ 232 (31,0%) 90 day mortality: 30/ 53 (56.6%) vs 90/ 232 (38,8%) **Analyses:** Cox proportional hazard models demonstrated: HR in frailty group for: death in hospital: HR 1.81 (95% CI, 1.19 to 2.74) death at 30 days: HR 2.0 (95% CI, 1.29 to 3.10) In model 4, after adjustment for gender, comorbidities, severity scores, treatment intensity and complications: death in hospital: aHR 4.4 (95% CI, 1.72 to 11.45) death at 30 days: aHR 6.07 (95% CI, 1.76 to 20.89)	**Aim:** Assess the impact of frailty on short- and long-term mortality exclusively in critically ill older medical patients. **Conclusions:** Frailty (CFS ≥5) was independently associated with short- and long-term mortality in older patients admitted to ICU exclusively due to a medical reason.	High risk of bias **Limitations** Both prospective and retrospective. Some information missing regarding analysis and results **Comments:** Possible selection bias resulting from ICU triage decisions. In order to assess the relationship between frailty and mortality in the two periods of data collection (2009 to October-2013 vs. November-2013 until 2017) an additional analysis was performed to rule out the possibility of a major selection bias.

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Kara et al 2018 Turkey **Design:** Prospective observational cohort study, 2015–2016 **Setting:** A medical ICU of a university hospital.	Adults >50y with hypercapnic respiratory failure admitted to ICU **n=103 patients** Age: mean 73 y ± 11 55% male **Diagnosis at admission:** Hypercapnic respiratory failure, chronic obstructive pulmonary disease (51%), cardiopulmonary edema (42%) pneumonia (40%). Home NIV (21%) **Selection of data reported:** APACHE II score (mean 21 ± 6) SOFA score (mean 4 ± 3) **Exclusions:** hemodynamic instability and life threatening arrhythmias, massive gastrointestinal bleeding and excessive respiratory secretions, hypoxemic respiratory failure and end stage disease, immediate endotracheal intubation (decreased level of consciousness (GCS of <8), progression to cardiac or respiratory arrest	CFS CFS ≥5 defined as frail Edmonton Frailty Scale (EFS) EFS ≥8 defined as frail **Evaluation of NIV success and NIV failure:** *Noninvasive ventilation success:* success in at least two of the followings: PaO2 >60 mmHg, PaCO2 <50 mmHg, pH 7.35–7.45, improvement of respiratory effort, recovery of consciousness. *Noninvasive ventilation failure:* endotracheal intubation or death.	Frailty among patients with noninvasive ventilation (NIV) NIV success NIV failure	41% frail patients (CFS ≥5); 36% frail patients (EFS ≥8) NIV failure group: 30 (29%) NIV success group: 73 (71%) **Frail patients:** NIV failure & CFS ≥5: 60% (18/30 patients) NIV success & CFS ≥5: 33% (24/73 patients) **In hospital Mortality:** 18 patients (17%) died: CFS ≥5: 83% (15/18) EFS ≥8: 72% (13/18) NIV failure: 94% (17/18**)** NIV application problem: 83% (15/18 patients)	**Aim:** To evaluate the frailty prevalence with two different frailty scores among the NIV population of a medical intensive care unit (ICU). Evaluate the impact of frailty on NIV success and mortality and its association with NIV application problems. **Conclusion:** Frailty is associated with higher NIV application problems, failure and mortality risk in elderly ICU patients. The CFS and EFS frailty scores can be used to predict NIV success and outcomes in ICUs.	High Risk of bias **Limitations** No information regarding missing data. Low number of events **Comments:** Specifically, patients with hypercapnic respiratory failure.

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Tipping et al 2019 Australia **Design:** Secondary analysis of a Prospective observational study, 2015–016 **Setting:** 2 ICUs in Melbourne, Australia	Adults ≥50 y admitted to ICU under a trauma medical unit, expected to have an ICU length of stay of >24h **n=100 patients** Age: mean 69.2 y (10.4) 81% male **Selection of data reported:** APACHE II score, Functional Comorbidity Index, Injury Severity Score, Premorbid IMS score, **Exclusions:** Second or subsequent ICU admission during an indexed hospital admission, admitted for palliation, death deemed imminent and inevitable, informed consent unable to be obtained	CFS, 9point scale CFS ≥5 defined as frail Frailty Phenotype (FP) FP ≥3 defined as frail **Frailty assessments:** Frailty data were collected from the participant (n=40) or their surrogate (n=60).	Compare CFS 9 with Frailty Phenotype (FP) regarding concordance, floor and ceiling effects, construct, and predictive validity.	CFS ≥5: 13% (13/100) frail FP ≥3: 22% (22/100) frail **Mortality:** Mortality at ICU: 23.1% (3/13) frail CFS ≥5 5.7% (5/87) nonfrail CFS ≥5 Mortality in hospital: 30.8% (4/13) frail CFS ≥5 9.2% (8/ 87) nonfrail CFS ≥5 **Correlations:** Correlations between FP and CFS were excellent for: participant-reported frailty rs=0.74 (95% CI, 0.57 to 0.86) and surrogate-reported frailty rs=0.79 (95% CI, 0.65 to 0.88). Cohen kappa was moderate for frail and nonfrail groups for: participant-reported frailty: kappa=0.55 (95% CI, 0.13 to 0.85) Surrogate-reported frailty: kappa=0.56 (95% CI, 0.25 to 0.82)	**Aim:** To compare 2 frailty measures with regard to concordance, floor and ceiling effects, and construct and predictive validity and to determine which is more valid and clinically applicable in a critically ill trauma population. **Conclusion:** Measuring frailty in a trauma ICU population was feasible, with excellent correlation between the 2 frailty measures. Both showed aspects of construct and predictive validity; however, the FP identified frailty in more participants and was associated with more comorbidities and higher mortality at ICU discharge. Therefore, the FP might be more clinically relevant in this population.	High Risk of bias **Limitations** Some information missing regarding analysis and results. Low number of events. **Comments:** Specifically trauma patients.
Le Maguet et al 2014 France	Patients ≥65 hospitalized for ≥24h in the ICU	CFS, 9 point scale CFS ≥5 defined as frail	ICU mortality, hospital mortality,	23% (46/196) frail with CFS ≥5 41% (80/196) frail with FP ≥3	**Aim:** To determine the prevalence of frailty in	High Risk of bias **Limitations**

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Design: A multicenter, prospective, observational study, Nov 2011–May 2012 **Setting:** Four ICUs in university-affiliated hospitals in France	**n=196 patients** Age: mean 75 y (SD 6) 65% male **ICU diagnosis**: including infection (43%) brain injury (20%) cardiac arrest (8%) **Selection of data reported:** SAPS II score SOFA score Glasgow Coma Scale Life expectancy (McCabe), disability (Katz ADL), Charlson comorbidity index <u>Recorded during hospitalization:</u> severe sepsis, septic shock, acute renal failure, acute respiratory distress syndrome (ARDS), number of acquired infections; need for dialysis, mechanical ventilation, discontinued treatment **Exclusions:** Patients with no proxies or could not be interviewed.	FP, frailty phenotype FP ≥3 defined as frail	6 month mortality Length of stay (LOS), discharge location Cox proportional hazard model was performed to identify the independent factors associated with ICU and 6-month mortalities.	**Mortality:** In patients with CFS ≥5: ICU mortality: 41% (17/41) hospital mortality: 35% (23/65) 6mo mortality: 38% (27/72) **Analyses:** Risk factors for ICU mortality: FP ≥3: HR 3.3 (95% CI, 1.6 to 6.6), male gender HR, 2.4 (95% CI, 1.1 to 5.3), cardiac arrest before admission HR, 2.8 (95% CI, 1.1 to 7.4) SAPSII ≥46: HR 2.6 (95% CI, 1.2 to 5.3) and brain injury before admission HR, 3.5(95% CI, 1.6 to 7.7) Risk factors for 6-mo mortality: CFS ≥5: HR 2.4 (95% CI, 1.49 to 3.87), SOFA ≥7: HR 2.2 (95% CI, 1.35 to 3.64)	ICU patients and its impact on the rate of mortality. **Conclusions:** Frailty is a frequent occurrence and is independently associated with increased ICU and 6-month mortalities. Notably, the CFS predicts outcomes more effectively than the commonly used ICU illness scores.	No information regarding missing data. Low number of events. **Comments:**
Hope et al 2017	Adults ≥18y admitted to ICU within 30 days of ER admission.	CFS, 9 pt scale CFS ≥5 defined as frail	Disability at hospital,	35.8% (34/95) frail patients	**Aims:**	High Risk of bias

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USA **Design:** Prospective observational cohort study, 2014–2015 **Setting:** Tertiary hospital in Bronx, New York	**n=95 participants** Age: mean 57.1y (SD 17.5) 54% male **ICU diagnosis:** Acute respiratory failure (24%) Sepsis (21%) **Selection of data reported:** Prehospital disability (ADL), Charlson Comorbidity scores, APACHE IV, ICU procedures **Exclusions:** Patients expected to leave the ICU within 24h, patients with no surrogate available to provide baseline information about function.	**Frailty assessment:** Made by ICU physicians within 3 days of admission. Frailty markers: malnutrition, mobility, strength, physical activity, cognition, memory, sensory function	at discharge, at 6months Mortality Multivariate model adjusting for age, intubation status	**Disability:** Hospital survivors at discharge: 41/77 (53%) with increased disability 36/77 (47%) with no increased disability **Mortality:** Mortality in hospital: 18.1% (17/95) patients Mortality at 6 months of hospital survivors: 18% (14/77) patients **Predictions:** Predicting disability at hospital discharge (CFS ≥5): aOR 1.8 (95% CI, 0,6 to 5,5). Predicting death or disability at 6 months after discharge (CFS ≥5): aOR 3.8 (95% CI, 1.2 to 11.7). AUC: 0.73 A frailty phenotype, defined as at least 3 of 7 frailty markers, performed similarly to CFS in predicting death or increased disability at 6 months: aOR: 3.3 (1.2–9.0) vs. aOR 3.8 (1.2–11.7) for CFS.	To assess the construct and predictive validity of a questionnaire- based approach to identifying frailty in adult ICU patients. **Conclusions:** Asking patients or surrogates about frailty markers may be a valid approach to identifying critically ill adults with a frailty phenotype associated with increased risk of adverse outcomes	**Limitations** Primary research question is related to frailty markers and not CFS. Information missing in relation to results for CFS. Composite outcome of increased disability or death. Low number of events **Comments:** Focuses on disability outcomes.

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Fisher et al 2015 Design: Prospective pilot feasibility study, Oct–Dec 2012 Setting: A tertiary referral, mixed medical surgical ICU at the Austin Hospital in Melbourne, Victoria.	Patients admitted to ICU. **n=205 patients** Age: mean 60y (±17.4) 59% male **ICU diagnoses:** 46% postoperative patients >1% respiratory disease **Selection of data reported:** APACHE III comorbidities, calculated chronic health scores, risk-of-death scores **Exclusions:** anticipated death within 24h, admission for palliative care, admission for organ donation	CFS 9pt scale CFS ≥5 defined as frail **Frailty assessment:** Within 24 hours of ICU admission, the next of kin or nurse in charge assigned a CFS score to the patient. Each patient was assessed on his or her first ICU admission only. CFS assessed by next of kin (n= 150) or nurse after review of medical record (n=55). **Feasibility:** Feasibility of the use of the CFS: determined by number (%) of completed CFS forms:	Moartality (hospital mortality, ICU mortality) Hospital and ICU length of stay, discharge destination	13% (28/205) frail patients CFS score obtained in 59% (205/348) patients. **Associations:** CFS score was not significantly associated with: ICU mortality: OR 0.98 (95% CI, 0.6 to 1.6) or hospital mortality: OR 1.07 (95% CI, 0.8 to 1.4)	**Aim**: To prospectively assess feasibility using the number (%) of completed DCFS scores, while the potential prognostic utility of the DCFS scores was determined by exploring the relationship between the DCFS, patient comorbidities, patient outcomes and length-of-stay (LOS). **Conclusion:** The DCFS was associated with patient age and comorbidities and potentially predicts increased hospital length-of-stay but not other outcomes.	**High Risk of bias** **Limitations** Not consecutive sample. Some information missing regarding analysis and results. Low number of events **Comments:** Pilot study.
Pugh et al 2017 UK Design: Single center prospective study	**n=30 patients** Age: median 70.5 y 60% male	CSF **Frailty assessments:** Assessments were performed independently by a medical student and a critical care doctor	Inter-rater reliability of CFS, between medical students and critical care doctors	Linear weighted kappa: 0.64 (95% CI, 0.40 to 0.87), suggesting a good level of agreement.	**Aim:** Inter-rater reliability of CFS assessments in critical care.	High risk of bias **Limitations** Not enough information presented **Comments:**

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ADL = Activities of daily living; **aOR** = Adjusted odds ratio; **APACHE** = Acute Physiology and Chronic Health Evaluation; **AUC** = Area Under Curve; **CFS** = Clinical frailty scale; **CI** = Confidence interval; **CVC** = Central venous catheter; **d** = Days; **DCFS** = Dalhousie clinical frailty scale (another name for the CFS scale); **EFS** = Edmonton Frailty Scale; **h** = Hours; **HR** = Hazard ratio; **HRQoL** = Health related quality of Life; **ICU** = Intensive care unit; **IQR** = Interquartile range; **LOS** = Length of stay; **LST** = limitation of life-sustaining therapies; **mo** = Months; **NIV** = Non-invasive ventilation; **pt** = Points; **QoL** = Quality of Life; **ROC** = Receiver operating characteristic; **RR** = Risk ratio; **RRT** = Renal replacement therapy; **SAPS** = Simplified Acute Physiology Score; **SD** = Standard deviation; **SOFA** = The sequential organ failure assessment; **y** = Years

FOOTNOTES:

ICU interventions (also referred to as resource utilization or treatment intensity): includes:

mechanical ventilation, noninvasive ventilation, intubation, reintubation, tracheostomy, vasoactive drugs, CVC (central venous catheter), arterial line, transfusion, renal replacement therapy, decision to withhold/ withdraw life sustaining treatment