National Institute for Health and Care Excellence

Final

Falls: assessment and prevention in older people and people 50 and over at higher risk

Evidence review C: Accuracy of screening tools

NICE guideline NG249

Evidence review underpinning recommendations 1.1.1 to 1.1.7 and 1.2.1 to 1.2.3 in the NICE guideline

April 2025

Final

These evidence reviews were developed by NICE

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1. Accuracy of screening tools

1.1. Review question

How accurate are screening tools which quantify or categorise the degree of risk of falling in identifying people at risk of falls?

1.1.1. Introduction

Around 30% of people aged over 65 will have at least one fall every year. People who fall experience negative consequences ranging from a loss of confidence or fear, through to severe and life-changing injuries such as hip fracture or head injury. Not all older people are at equal risk of falling with those at higher risk being more likely to benefit from fall prevention interventions. Therefore, for efficient and targeted delivery of falls prevention interventions, it is important to identify those with a higher risk of falls from the general population of older people.

There are several characteristics required for a screening tool to be used to identify those at higher risk of falls. Most importantly, the tool should be able to accurately distinguish those at higher risk. A tool that incorrectly classifies someone as low risk (low sensitivity) may result in that individual missing the opportunity to participate in fall prevention interventions and going on to have further falls with associated harm. On the other hand, a tool that leads to the incorrect classification as higher risk (low specificity), could lead to increased pressure on resources, preventing those at higher risk from accessing services and adding to treatment burden for older people. Additionally, a fall risk screening tool needs to be suitable for deployment in a range of environments and undertaken by a health and social care workforce from differing professional backgrounds. It is envisaged that such a screening tool would be used opportunistically in health or social care encounters such as primary care consultations, care planning reviews or presentation at urgent care – following the philosophy of 'making every contact count'. As such, a tool would need to take less than 5 minutes to complete and have a minimal training requirement. This evidence review will evaluate the accuracy of simple screening tools to categorise the degree of fall risk in older adults.

1.1.2. Summary of the protocol

For full details see the review protocol in Appendix A

Table 1: PICO characteristics of review question

Population	Inclusion: • People aged 65 and over • People aged 50 to 64 who have a condition or conditions that may put them at a higher risk of falling. Exclusion: Any age group that does not fit the inclusion criteria Strata: settings (hospitals, community, long-term residential care); age group: people aged 50 to 64 who have a condition or conditions that may put them at higher risk of falling. The setting is stratified as a lot of the screening tests are not suitable for hospital settings.
Risk tool	To include externally validated screening tools which identify the degree of risk of falling, including: • The Falls Risk Assessment Tool (FRAT) (low, medium, high risk)

	• The St. Thomas Risk Assessment Tool in Falling Elderly (STRATIFY) (low, moderate, high risk) • Downton Fall risk index (DFRI) (>3= high risk of falls) • Morse Falls Scale (MFS) (no, low, moderate, high risk) • Hendrich II Falls Risk Tool (HIIFRM) Physical performance tests that specifically screen the risk of falls (take less than 5 minutes, require minimal equipment or skill to administer) which use a cut-off point to determine degree of falls risk: • Timed up and go test (15 seconds) • Turn 180 degrees (more than 4 steps to complete a turn) • One leg standing test (5 seconds) • Chair test • Functional reach test (25 cm or greater low risk of falls; 25 cm risk of falling is 2x greater than normal; 15 cm or less risk of falling is 4x greater than normal; unwilling to reach, risk of falling is 8x greater than normal) • Gait speed Frailty scores that quantify risk: • PRISMA-7 (>3 identifies frailty) • Clinical frailty scale (CFS) (>3 identifies frailty) • Electronic Frailty Index (eFI)
Patient outcomes	Falls: an unexpected event in which the participants come to rest on the ground, floor, or lower level.
Statistical outcomes	All outcomes are considered equally important for decision making and therefore have all been rated as critical: Accuracy of estimation of risk of falls: Statistical outputs may include: • Discrimination (sensitivity, specificity, predictive values) • Area under the curve (c-statistic) • Predicted risk versus observed risk (calibration) • Reclassification Other statistical measures: for example, D statistic, R^2 statistic and Brier score
Study design	External validation studies (prospective cohort studies or systematic reviews of these) with a sample size of n=100 or more. Where studies have validated a test/screening tool in a UK population, we will exclude studies validated in non-UK populations. External validation studies (tested on a different study sample to the derivation sample) are preferred. Published NMAS and IPDs will be considered for inclusion. Exclusion: • Case-control studies • Cross-sectional studies

1.1.3. Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and the methods document.

Declarations of interest were recorded according to NICE's conflicts of interest policy.

1.1.4. Risk prediction evidence

Evidence was identified regarding assessment tools to identify people at risk of falls. The assessments and the specific outcomes are summarised in Table 2. Full details can be found in Appendix D.

1.1.4.1. Included studies

Thirty-four cohort studies on fifteen risk tools were included in the review [1-13, 16, 18-23, 25-31, 33-39] Evidence from these studies is summarised in the clinical evidence summary below.

See also the study selection flow chart in Appendix A, study evidence tables in Appendix D, forest plots in Appendix E and GRADE tables in Table F.

1.1.4.2. Excluded studies

No Cochrane reviews were identified at the full text screening level.

See the excluded studies list in Appendix I.

1.1.5. Summary of studies included in the prognostic evidence

The included study characteristics are summarised in the table below.

Table 2: Summary of studies included in the evidence review

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
Almeida, 2016[1] Prospective cohort study	Timed Up and Go (TUG) test (cut-off point >15.2s), The Functional Reach test (cut-off point ≤ 17cm) Gait speed N= 225 Follow up: 12 months	Outpatients with Parkinsons disease Mean age (SD) 70.6 (6.56) years Sex: 45.8% female Setting: Outpatient movement disorder clinic, Brazil	Area under the curve (AUC); sensitivity; specificity	84 falls identified	Other tests included: BBS, FESI-I, ABC, BESTest, Mini-BESTest, FGA and Brief-BESTest.
Aranda-Gallardo, 2017[2]	STRATIFY (cut-off points 1 and 2) and	Patients expected to have a hospital stay	AUC	24 falls identified	Participants aged 16 years and above were included

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
Prospective cohort study Multicentre.	Downton Falls Risk Index (cut-off point 3) (n=1220) Study follow up: until discharge, death or transfer to another unit or centre	over 48 hours Mean age (SD): NR (over 65 years old sub-group) Sex: 47% female Setting: acute hospital setting, Andalusia, Spain.			so only data from a subgroup analysis on participants over 65 years old were included
Arslan, 2022[3] Prospective cohort study	Morse Falls scale (cut-off point ≥66.2) Hendrich II Fall Risk Model (cut-off point ≥4.5) (n=125) Follow up: not reported	Stroke patients. Mean age (SD): 71.47 years (11.16) Sex: 48.8% female Setting: Community setting, Turkey.	Sensitivity; specificity; PPV; NPV	11 falls identified	Another tool included in the study was the Itaki Fall Risk Scale. Participants aged 18 years or over included but they had had a stroke and mean age 71.47 years.
Ashburn, 2008[4] Prospective cohort study	Functional reach test (cut-off point ≤ 21.5 cm) (n=122) Follow-up: 12 months	Stroke patients about to be discharged from hospital. Mean age (SD): 70.1 (12.4) years Sex: Non-repeat faller 31% female; repeat faller 35% female. Setting: Community setting, Southampton , UK	Sensitivity; specificity; PPV; NPV	63 falls identified	Participants aged as young as 21 years, but they had had a stroke and mean age 70.1 years.
Beauchamp, 2022[5]	Chair test (Faller cut-off point 15.90)	Older adults	AUC sensitivity; specificity; PPV; NPV	218 falls reported	TUG is included with cut-off scores of 12.9

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
Prospective longitudinal study	Gait speed (Faller cut-off point 0.73) (n=1121) Follow up: 12 months	Mean age (SD): 75.2 (5.91) years Sex: 66.6% female Setting: Community setting, Canada			seconds and 14.1 seconds (52% sensitivity/specificity 88%) and single leg stance test.
Bentzen, 2011[6] Prospective cohort study 18 Norwegian nursing homes	STRATIFY (cut-off point ≥2) (n=1236) Study duration: 18 months	Residents Mean age (SD): 84.6 (8.1) years Sex: 72.3% female Setting: Nursing homes, Norway	Sensitivity; specificity; PPV; NPV	570 falls identified	Other arm of study was staff judgement was also analysed (study also included in Clinical observation review).
Butler, 2019[7] Prospective cohort study 2 spinal cord injuries.	Downton Fall Risk Index (cut-off point 3) (n=224; n=151 wheelchair users. n=73 ambulatory) follow up: 6 months	Ambulatory persons with spinal cord injury. Mean age (SD): 54.3 (15.7) years (ambulatory population). Sex: 33% female Setting: Community setting, Norway and Sweden	Sensitivity; specificity; PPV; and NPV	61 falls identified	Study included wheelchair users and ambulatory persons. Data from ambulatory persons was used. Another arm included one falls question.
Campanini, 2018[8] Prospective cohort study Single hospital	Hendrich II Fall Risk Model (cut-off points ≥5-9)](n=191) Duration of study: 6 months	Adult patients in a rehabilitation department Mean age (SD): 69 (16) years Sex: 57% female	AUC; sensitivity; specificity; PPV; NPV	19 falls identified	Inpatients admitted to the Orthopaedic Rehabilitation, Pulmonary Rehabilitation, and Neurological Rehabilitation units were included.

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
		Setting: Hospital setting, Italy			
Cattelani, 2015[9] InCHIANTI study dataset used	Falls Risk Assessment Tool (FRAT-UP) (n=1150)	Older patients (aged 65 and over) Mean age (SD): NR Sex: Not reported Setting: Community setting, Chianti region of Italy	AUC; Brier score; Hosmer-Lemeshow (calibration)		Mean age not specified, but all participants were over 65 years. FRAT-UP is a web-based fall assessment tool, using the InCHIANTI study dataset
Chow, 2019[10] Prospective cohort study Single centre	Chair test (30 seconds) (n=192) Duration of the study: 6 months follow-up	Adults in an Emergency Department of a Level 1 Trauma centre Mean age (SD): 74.4 (7.4) years Sex: 57.8% female Setting: Community setting, Pennsylvania, USA	Sensitivity; specificity; PPV; NPV	51 falls identified	
Coker, 2003[11] Prospective cohort study	STRATIFY (cut-off points ≥1-5) [2 to 5 was defined as high risk of falls]. (n=581) Duration of study: 18-month period	Hospitalised older adults; Mean age: 81 years. Sex: 69% female Setting: Geriatric assessment and rehabilitation unit, Canada	Sensitivity; specificity; PPV; NPV	73 falls identified	
Curiati 2024[12]	Carpenter instrument (cut off 0,1, 2, 3, 4)	Patients aged ≥ 65 years presenting at	Sensitivity; specificity; PPV, and NPV; AUC	68 falls identified	

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
Prospective cohort study	N = 779 Duration of study: 180 days	the emergency department in a tertiary hospital in São Paulo Sex: 46% female Mean age (SD): 79.4 (9) years Setting: emergency department in a tertiary hospital in São Paulo. Follow up in community.			
Del Brutto 2022[13] Prospective cohort study	Downton Fall Risk Index (cut off ≥3 points) N= 254 Duration of study: 10-year period	Community-dwellers aged ≥60 years living in a rural village Mean age (SD): 68.9 (6.9) years Sex: 57% female Setting: community-living in Atahualpa, a rural village located in coastal Ecuador.	Sensitivity; Specificity; AUC; PPV; NPV	158 falls identified	
Frisendahl, 2023[16] Cohort study	One leg stand test (cut-off point <5 seconds cut-off) (n=1194) Duration of study: 5 years follow-up	Community-living people Mean age (SD): 72.46 years (12.85) Sex: 62% female Setting: Community	Harrell's C	Injurious falls	The experimental tool was the First-time Injurious Fall (FIF) screening tool Data used from an ongoing longitudinal

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
		setting, Sweden			population-based study.
Greene, 2012[18] Prospective cohort study	TUG test (cut-off point 15.25 seconds) (n=349) Duration of study: 2 years	Older adults from Emergency Department or GP referral Mean age (SD): 71.53 (6.72) years Sex: 72.6% female Setting: Community setting, Dublin, Ireland	ROC; sensitivity; specificity; PPV; NPV	83 falls identified	Study included body-worn sensors in addition to TUG and BBS tests.
Grosshauser, 2022[19] Prospective cohort study 3 privately run, 3 non-statutory social welfare organisations, 1 welfare health centre	Clinical Frailty Scale (cut-offs range from 3-9) (n=246) Duration of study: 12-month follow-up	Nursing home residents Mean age (SD): 83.6 (8.3) years Sex: 67.1% female Setting: Care home setting, Germany	Sensitivity; specificity	158 falls identified	This study also included the FRAIL-NH scale
Haines, 2008[20] Prospective cohort study Multicentre (17 inpatient geriatric and rehabilitation wards)	Functional reach test (cut-off point <4 cm) TUG test (cut-off point >30 seconds for high risk) (n=1373)	Hospital patients Mean age (SD): 74.9 (13.72) years Sex: 57.8% female Setting: Hospital setting, Australia	Sensitivity; specificity; Youden Index.	180 falls identified	Geriatric rehabilitation wards
Hars, 2018[21] Prospective cohort study	TUG test (cut-off point <29.5 seconds) N = 807	Older inpatients. Mean age (SD): 85 years (6.9)	AUC; sensitivity; specificity; PPV; NPV;Youden Index	118 falls identified	Geriatric and acute rehabilitation hospital setting

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
One geriatric hospital	Follow up: Duration of stay in centre (median (IQR) = 23 (14-36) days	Sex: 67.5% female Setting: Hospital setting, Geneva, Switzerland			Cut-off score determined using the Youden Index
Jung, 2022[22] Prospective cohort study	Clinical Frailty Scale (cut-off points ≥5) (n=1016) Follow up: Duration of inpatient stay (mean of 6.2 and 10.4 days in high and low risk groups, respectively)	Older adults Mean age (SD): 72.99 (6.17) years Sex: 40.9% female Setting: Hospital setting (tertiary hospital), South Korea	Sensitivity; specificity	6 falls identified	
Kang, 2017[23] Prospective cohort study	TUG test (cut-off point 15.96 seconds) (n=541) Duration of study: follow-up 1 year=	Older people aged 60 years and over Mean age (SD): 67.4 (5.6) years Sex: 46.7% female Setting: Community setting, China	AUC; sensitivity; specificity; PPV; NPV	113 falls identified	
Ma, 2014[25] Prospective cohort study	Royal Melbourne Hospital FRAT (cut-off point ≥15 point) (n=202) Duration of study: 6 months follow-up=	Post-stroke patients. Mean age (SD): NR Sex: 41% female Setting: Hospital setting, Sydney, Australia	Sensitivity; specificity; PPV; NPV	44 falls identified	Mean age not specified. Majority of participants included were over the age of 71 years and stroke patients.

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
Nordin, 2008[26] Prospective cohort study	TUG test (cut-off point 15 seconds) (n=183) Duration of study: 6 months follow-up=	Frail older persons (65 and over) Mean age (SD): 84.3 (6.6) years Sex: 73% female Setting: Residential care setting, Umea, Sweden	ROC; sensitivity; specificity	97 falls identified	TUG and modified Get-up-and-go test (GUG-m) and staff's judgement of global rating of fall risk (GLORF) and fall history included Other TUG cut-offs were included (12s, 20s, 25s, 30s, 35s and 40s
Olsson Muller, 2012[27] Data extracted from an RCT study	Downton Falls Risk Index and TUG (cut-off point (n=153) Duration of study: 12-month follow-up.	Frail older people (65 years and older). Mean age (SD): 81.5 years (6.3) Sex: 66.7% female Setting: Community setting, Southern Sweden	Sensitivity; specificity	18 falls identified	
Palumbo, 2016[28] 4 datasets from cohort studies (retrospective and prospective harmonisation) 4 European cohorts (ActiFE), Germany; ELSA, England; InCHIANTI, Italy; TILDA, Ireland	FRAT-up (cut-off point (n= 1416 ActiFE population) Follow up: not reported	Older people; Mean age (SD): 75.7 years (6.76) Sex: not reported Setting: Community setting, Germany, England, Italy and Ireland	AUC		Included the ActiFE data set only as this provided prospective data

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
Shimada, 2009[29] Prospective cohort study 213 day-care centres	Chair test TUG test (≥16 seconds cut-off point) Functional reach test (≤18 cm cut-off point) Gait speed (comfortable walking speed ≤0.7 m/s cut-off point Maximal walking speed ≤1 m/s cut-off point) (n=455) Follow up: not reported	Frail, older adults (aged 65 and over) Mean age (SD): 80.5 (7.2) years Sex: 68.1% female Setting: Community setting, Japan	Sensitivity; specificity	99 falls identified	Study included feasibility study and validation study; only the validation results were used.
Silva, 2023[30] Prospective cohort study Multiple clinics	FRAT (range 0-35 higher high risk but cut-off point not reported) STRATIFY (cut-off point ≥2 points is high risk) (n=102) Follow up: Not specified	Hospitalised older adults (60 years and over); Median age (range): 67 years (64 to 73) years Sex: 49% female Setting: Hospital setting, Rio de Janeiro, Brazil	Sensitivity; specificity; NPV; PPV.	3 falls identified	Study included Functional independence Measures (FIM); Morse Falls Score (MFS); STRATIFY; JH-FRAT (Portuguese-Brazilian versions of tools used)
Smith, 2006[31] Prospective cohort study 6 stroke rehabilitatio n units	STRATIFY (cut-off point ≥2 as high risk) (n=378 admitted to stroke unit, n=234 followed up)	Stroke patients Median age (range): 78 (34-100) years Sex: 51% female Setting: Hospital	Sensitivity; specificity; PPV; NPV	108 falls identified	In-patient study (reliability) and 3 months post-discharge study

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
	Duration of study: 6 months, including follow-up 3 months after discharge	setting (stroke rehabilitation units), North of England			
Strupeit, 2016[33]	STRATIFY (cut-off point 2) N= 124 Follow up: 3 weeks	Patients in a Geriatric hospital in Germany Mean age (SD): 83.52 years (8.15) Sex: 50% female Setting: Hospital setting (geriatric hospital) Germany	Sensitivity, specificity, PPV, and NPV	72 falls identified	
Vassallo, 2005[35] Prospective cohort study 2 acute medical wards	Downton (cut-off point 3) (n=135) STRATIFY (cut-off point ≥2 as high risk) Follow up: not reported	Older adults. Mean age (SD): 83.8 (8.01) years. Sex: 73.7% female Setting: Hospital setting (acute medical wards), Nottinghamshire, UK	Sensitivity; specificity; PPV; NPV	29 falls identified	This study also includes Tullamore and Tinetti tests.
Vassallo, 2008[34] Prospective cohort study One rehabilitation ward	Downton (cut-off point 3) STRATIFY (cut-off point ≥2 as high risk) (n=200) Follow up: not reported	Older adults. Mean age (SD): 80.9 (NR) years Sex: not reported Setting: Hospital setting (geriatric rehabilitation ward),	Sensitivity; specificity; PPV; NPV	51 falls identified	This study also included observation of wandering behaviour.

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
		Nottinghamshire, UK			
Wald, 2020[36] Prospective cohort study	TUG test (cut-off point 42.5 seconds) N = 173 Follow up: 12 months	Adults with acute hip fracture. Mean age (SD): 84 years (NR) Sex: 55.3% female Setting: Community setting Switzerland	AUC; sensitivity; specificity; PPV; NPV	38 falls identified	
Wang, 2021[37] Prospective cohort study	Gait speed (cut-off point 0.3742/kg/kg (n=875) Follow up: 1 year	Older people (60 years and over). Mean age (SD): 67.10 (5.94) years Sex: 59% female Setting: Community setting, Tianjin, China	ROC; sensitivity; specificity	112 falls identified	The ROC curve determined the cut-off points
Webster, 2010[38] Prospective cohort study	STRATIFY (cut-off point <2) N= 788 Follow up: not reported	Older participants Mean age (SD): 77.7 years (7.89) Sex: 51% female Setting: Hospital setting (tertiary hospital) Australia	Sensitivity; specificity; PPV; NPV	59 falls identified	Participants were admitted to internal medical, surgical, orthopaedic, psychiatric, oncology, or geriatric rehabilitation services.
Yang, 2021[39] Prospective cohort study One inpatient	Morse Falls Scale (cut-off point ≥45) (n=220) Follow up: not reported	Patients with acute stroke; Hospital setting Mean age (SD): fallers 72.3 (13.12);	AUC; sensitivity; specificity; PPV; NPV	48 falls identified	This study included another Stroke Assessment of Falls Risk (SAFR) which

Study	Risk tools	Population	Outcomes (including definitions)	Estimation of falls risk	Notes
stroke rehabilitation unit		non-fallers 69.57 (13.01) years Sex: 37% female Setting: stroke rehabilitation unit, Ontario, Canada			was not included in our review because it was specific to stroke
Yoo, 2015[40] Secondary analysis of prospective study	Morse Falls Scale (cut-off value 40 and 51) STRATIFY (cut-off point 2 and 3) Hendrich II Falls Risk Model (cut-off point 3 and 5). N = 1028 Follow up: not reported	Patients with neurological disorders; Hospital setting (acute) Mean age (SD): Fallers= 63.1 (14.3) years Non-fallers= 56.1 (14.8) years Sex: 47.3% female Setting: acute care setting, Korea	AUC; sensitivity; specificity; PPV; NPV; Youden Index	32 falls identified	Mean age reported by fallers and non-fallers. Secondary analysis of: Kim SR, Yoo SH, Shin YS, Jeon JY, Kim JY, Kang SJ, Choi HS, Lee HL, An YH. Comparison of the Reliability and Validity of Fall Risk Assessment Tools in Patients with Acute Neurological Disorders. Korean J Adult Nurs. 2013 Feb;25(1):24-32.

(a) Abbreviations: AUC, area under the curve; FRAT, Fall Risk Assessment Tool; NPV, negative predictive value; PPV, positive predictive value; ROC, Receiver Operating Characteristic Curve; STRATIFY, St. Thomas Risk Assessment Tool in Falling Elderly; TUG, Timed Up and Go test.

See Appendix D for full evidence tables.

1.1.6. Summary of prognostic evidence: Discrimination

1.1.6.1 Overview of outcome data

Table 3: Summary of results: AUC- Community setting – aged over 65 years

Tool	Subgroup	AUC (95% CI)
Timed up and go		
Greene, 2012[17], Almeida, 2016[1]	NA	Median 0.66 (NR) (range of medians 0.66 to 0.72)
Average walking speed		
Beauchamp, 2022[5]; Wang, 2021[37], Almeida, 2016[1]	NA	Median 0.57 (0.52, 0.62) (range of medians 0.57 to 0.76)
Chair test		
Beauchamp 2022[5]	NA	0.52 (0.47, 0.58)
The Falls Risk Assessment Tool		
Cattelani, 2015[9]; Palumbo, 2016[28]	NA	Median 0.56 (0.54, 0.60) (range 0.56 to 0.64)
Downton Fall Risk Index		
Del Brutto 2022[13]	NA	0.61 (0.57, 0.66)
Functional reach test		
Almeida, 2016[1]	NA	0.74 (0.67, 0.79)
Abbreviations: AUC, Area under the curve; DFRI, Downton Fall Risk Index; FROP, Falls Risk for older people;		

Table 4: Summary of results: AUC- Community setting aged 50-65 years

Downton Fall Risk Index		
Butler, 2019[7]	NA	0.65 (0.53, 0.76)

Table 5: Summary of results: AUC- Hospital setting over 65 years old

Tool	Subgroup	AUC (95% CI)
Timed up and go		
Hars, 2018[21]	NA	0.66 (NR)
STRATIFY		
Aranda-Gallardo, 2017[2]	NA	0.63 (0.50, 0.77)
DFRI		
Aranda-Gallardo 2017[2]	NA	0.55 (0.40, 0.70)
Hendrich II Falls Risk Tool		
Campanini, 2018[8]	NA	0.78 (0.69, 0.87)
Morse Fall Scale		
Yang 2021[39]	NA	0.56 (0.46, 0.65)
Carpenter Instrument		
Curiati 2024[12]	NA	0.62 (0.58, 0.66)
Abbreviations: AUC, Area under the curve; DFRI, Downton Fall Risk Index; FROP, Falls Risk for older people;		

Summary of results: AUC- Hospital setting aged 50-65 years old

STRATIFY		
Yoo, 2015[40]	NA	0.79 (0.72, 0.87)
Hendrich II Falls Risk Tool		
Yoo, 2015[40]	NA	0.71 (0.63, 0.80)
Morse Fall Scale		

Yoo, 2015[40]	NA	0.80 (0.72, 0.89)

Table 6: Summary of results: AUC- Residential care setting – aged over 65 years

Tool	Subgroup	AUC (95% CI)
Timed up and go		
Nordin 2008[26]	NA	0.69 (0.61, 0.77)
Global rating of fall risk		
Nordin 2008[26]	NA	0.68 (0.6, 0.76)
Abbreviations: AUC, Area under the curve; DFRI, Downton Fall Risk Index; FROP, Falls Risk for older people;		

Table 7: Summary of results: Sensitivity and specificity- Community setting – aged over 65 years

Tool	Cut-off values	Sensitivity (95% CI)	Specificity (95% CI)
Chair test			
Shimada, 2009[29]	≥13	0.61 (0.65, 0.89)	0.53 (0.48, 0.58)
Beauchamp, 2022[5]	15.9 seconds	0.47 (0.40, 0.54)	0.59 (0.56, 0.62)
Chow, 2019[10]	30 seconds	0.78 (0.65, 0.89)	0.23 (0.16, 0.31)
Downton Fall Risk Index			
Olsson Muller, 2012[27] Del brutto, 2022[13]	3	Median: 0.30 (0.23, 0.38) (range: 0.30 to 0.78)	Median: 0.93 (0.085, 0.97) (range: 0.24 to 0.92)
Olsson Muller, 2012[27]	4	0.39 (0.17, 0.64)	0.47 (0.36, 0.58)
Olsson Muller, 2012[27]	5	0.11 (0.01, 0.35)	0.70 (0.60, 0.80)
Functional Reach Test			
Almeida, 2016[1]	≤17 cm	0.56 (0.45, 0.67)	0.82 (0.75, 0.88)
Shimada, 2009[29]	≤18 cm	0.47 (0.37, 0.58)	0.59 (0.5, 0.64)
Ashburn, 2022[4]	≤21.5 cm	0.68 (0.55, 0.79)	0.54 (0.43, 0.64)

Tool	Cut-off values	Sensitivity (95% CI)	Specificity (95% CI)
Gait speed			
Shimada, 2009[29]; Wang, 2021[37]	Self-selected walking speed	Median: 0.44 (0.28, 0.60) (range: 0.44 to 0.56)	Median: 0.61 (0.58, 0.65) (range: 0.59 to 0.61)
Shimada, 2009[29]	Maximal walking speed	0.58 (0.47, 0.67)	0.58 (0.53, 0.63)
Beauchamp, 2022[5]	4 metre gait speed- 0.73 m/s	0.47 (0.40, 0.54)	0.66 (0.63, 0.69)
Almeida, 2016[1]	Gait speed (Dynamic gait index ≤19 points)	0.73 (0.62, 0.82)	0.72 (0.64, 0.80)
Hendrich II Fall Risk Model			
Arslan, 2022[3]	≥4.5	0.82 (0.48, 0.98)	0.50 (0.40, 0.60)
Morse Fall Scale			
Arslan, 2022[3]	≥66.2	0.91 (0.59, 1.0)	0.73 (0.64, 0.81)
Timed Up and Go Test			
Almeida, 2016[1]; Greene, 2012[17]; Kang, 2017[23]; Olsson Moller, 2012[27]; Shimada, 2009[29]; Wald, 2020[36]	>15 seconds	0.52 (0.27, 0.76)	0.73 (0.40, 0.92)
Carpenter Instrument			
Campanini, 2018[8]	≥5	1.00 (0.72, 1.00)	0.49 (0.41, 0.58)
Campanini, 2018[8]	≥6	0.91 (0.59, 1.0)	0.57 (0.49, 0.66)
Campanini, 2018[8]	≥7	0.82 (0.48, 0.98)	0.66 (0.58, 0.74)
Campanini, 2018[8]	≥8	0.73 (0.39, 0.94)	0.72 (0.64, 0.79)
Campanini, 2018[8]	≥9	0.45 (0.17, 0.77)	0.79 (0.71, 0.85)
Campanini, 2018[8]	≥5	1.00 (0.72, 1.00)	0.49 (0.41, 0.58)
Campanini, 2018[8]	≥6	0.91 (0.59, 1.0)	0.57 (0.49, 0.66)
Abbreviations: CI, confidence intervals; cm, centimetre; FRAT, Falls Risk Assessment tool; m/s, metre per second; NS, not specified			

Summary of results: Sensitivity and specificity- Community setting (aged 50-65 years)

Downton Fall Risk Index			
Butler, 2019[7]	3	0.78 (0.52, 0.94)	0.24 (0.15, 0.34)

Table 8: Summary of results: Sensitivity and specificity- Hospital setting – aged over 65 years

Tool	Cut-off values	Sensitivity (95% CI)	Specificity (95% CI)
Clinical Frailty Scale			
Jung, 2022[22]	5	0.83 (0.36, 1.0)	0.76 (0.73, 0.79)
Downton Fall Risk Index			
Vassallo, 2005[35]; Vassallo, 2008[34]	3	Median: 0.83 (0.64, 0.94) (range: 0.83 to 0.92)	Median: 0.25 (0.17, 0.34) (range: 0.25 to 0.36)
John's Hopkins Falls Risk Assessment Tool (JH-FRAT)			
Silva, 2023[30]	Moderate risk	0.33 (0.01, 0.91)	0.70 (0.56, 0.81)
Silva, 2023[30]	High risk	0.33 (0.01, 0.91)	0.69 (0.50, 0.84)
Functional Reach Test			
Haines, 2008[20]	<4 cm	0.70 (0.63, 0.77)	0.43 (0.38, 0.48)
Hendrich II Fall Risk Model			
Campanini, 2018[8]	≥5	1.00 (0.72, 1.00)	0.49 (0.41, 0.58)
Campanini, 2018[8]	≥6	0.91 (0.59, 1.0)	0.57 (0.49, 0.66)
Campanini, 2018[8]	≥7	0.82 (0.48, 0.98)	0.66 (0.58, 0.74)
Campanini, 2018[8]	≥8	0.73 (0.39, 0.94)	0.72 (0.64, 0.79)
Campanini, 2018[8]	≥9	0.45 (0.17, 0.77)	0.79 (0.71, 0.85)
Morse Fall Scale			
Yang, 2021[39]	≥45	0.46 (0.31, 0.61)	0.68 (0.60, 0.75)
Royal Melbourne Hospital FRAT			

Tool	Cut-off values	Sensitivity (95% CI)	Specificity (95% CI)
Ma, 2014[25]	12	0.84 (0.70, 0.93)	0.56 (0.46, 0.65)
STRATIFY			
Coker, 2003[11]; Silva, 2023[30]; Webster, 2010[38]	≥1	0.86 (0.11 0.99)	0.54 (0.03, 0.99)
Coker, 2003[11]; Silva, 2023[30]; Smith, 2006[31]; Vassallo, 2005[35]; Vassallo, 2008[34]; Webster, 2010[38]; Strupeit, 2016[33]	≥2	0.54 (0.27, 0.79)	0.70 (0.44, 0.87)
Coker, 2003[11]; Webster, 2010[38]	≥3	Median: 0.36 (0.25, 0.48) (range: 0.36 to 0.46)	Median: 0.84 (0.79, 0.89) (range: 0.83 to 0.84))
Coker, 2003[11]; Webster, 2010[38]	≥4	Median: 0.11 (0.05, 0.20) (range: 0.11 to 0.25)	Median: 0.95 (0.93, 0.96) (range: 0.95 to 0.96)
Coker, 2003[11]	≥5	0.10 (0.04, 0.19)	0.99 (0.98, 1.0)
Timed Up and Go Test			
Haines, 2008[20]; Hars, 2018[21]	>15 seconds	Median: 0.61 (0.52, 0.70) (range: 0.61 to 0.80)	Median: 0.22 (0.18, 0.26) (range: 0.22 to 0.67)

Abbreviations: CI, confidence intervals; FRAT, falls risk assessment tool; NS, not specified

Note: A STRATIFY score ≥2 is thought to be high risk. A STRATIFY score of 1 prompts to reassess if the patient’s condition changes or the patient falls. A Morse Fall Scale score of 45 or higher indicates high risk.

Table 9: Summary of results: Sensitivity and specificity- Hospital setting (aged 50-65 years)

Hendrich II Fall Risk Model			
Yoo, 2015[40]	3	0.81 (0.64, 0.93)	0.61 (0.58, 0.65)
Yoo, 2015[40]	≥5	0.59 (0.41, 0.76)	0.78 (0.76, 0.81)
Morse Fall Scale			
Yoo, 2015[40]	≥40	0.78 (0.60, 0.91)	0.82 (0.80, 0.84)

Yoo, 2015[40]	≥51	0.50 (0.32, 0.68)	0.91 (0.89, 0.93)
STRATIFY			
Yoo, 2015[40]	≥2	0.84 (0.67, 0.95)	0.74 (0.71 0.76)
Yoo, 2015[40]	≥3	0.41 (0.24, 0.59)	0.90 (0.88, 0.92)

Abbreviations: CI, Confidence intervals; cm, centimetre

Note: A STRATIFY score ≥2 is thought to be high risk. A STRATIFY score of 1 prompts to reassess if the patient's condition changes or the patient falls. A Morse Fall Scale score of 45 or higher indicates high risk.

Table 10: Summary of results: Sensitivity and specificity- Residential care setting – aged over 65 years

Tool	Cut-off values	Sensitivity (95% CI)	Specificity (95% CI)
Clinical Frailty Scale			
Residential care setting			
Grosshauser, 2022[19]	3	1.0 (0.98, 1.0)	0.11 (0.09, 0.13)
Grosshauser, 2022[19]	4	1.0 (0.98, 1.0)	0.20 (0.16, 0.25)
Grosshauser, 2022[19]	5	0.99 (0.93, 1.0)	0.23 (0.17, 0.30)
Grosshauser, 2022[19]	6	0.97 (0.93, 0.99)	0.23 (0.20, 0.26)
Grosshauser, 2022[19]	7	0.89 (0.89, 0.95)	0.91 (0.85, 0.95)
Grosshauser, 2022[19]	8	0.29 (0.22, 0.37)	1.00 (0.98, 1.00)
Grosshauser, 2022[19]	9	0.18 (0.13, 0.25)	1.00 (0.98, 1.00)
STRATIFY			
Bentzen, 2011[6]	≥2	0.56 (0.52, 0.60)	0.76 (0.72, 0.79)
Timed Up and Go Test			
Nordin, 2008	>15 seconds	0.96 (0.90, 0.99)	0.33 (0.23, 0.44)

Abbreviations: CI, confidence intervals; NS, not specified

Note: On a 7-point clinical frailty scale, a score between 1-4 is thought to be non-frail and 5-7 is thought to be frail, whereas on a 9-point scale a score between 1-4 is thought to be non-frail and a score between 5-9 is thought to be frail.

Tool	Cut-off values	Sensitivity (95% CI)	Specificity (95% CI)
Note: A STRATIFY score ≥2 is thought to be high risk. A STRATIFY score of 1 prompts to reassess if the patient's condition changes or the patient falls. A Morse Fall Scale score of 45 or higher indicates high risk.			

Table 11: Summary of results: Brier points

Tool and subgroup	Brier points	
FRAT- Community setting (Aged 65 years or older)		
Cattelani, 2015[9]	0.174	

Table 12: Summary of results: Harrell's C statistic

Tool	Cut-off value	C statistic	
		Women	Men
One leg stand test- Community setting (Aged 65 years or older)			
Frisendahl, 2020[15]	**<5 seconds**	**0.70**	**0.69**

Table 13: Summary of results: Youden Index

Tool and subgroup	Youden Index
Functional reach test- Hospital setting (Aged 65 years or older)	
Haines, 2008[20]	0.13 (0.03, 0.24)
Hendrich II Falls Risk Model (cut-off value 3)- Hospital setting (Aged 50 to 64 years)	
Yoo, 2015[40]	0.428
Hendrich II Falls Risk Model (cut-off value 5)- Hospital setting (Aged 50 to 64 years)	
Yoo, 2015[40]	0.379
Morse Fall Scale (cut-off value ≥40)- Hospital setting (Aged 50 to 64 years)	
Yoo, 2015[40]	0.603
Morse Fall Scale (cut-off value ≥51)- Hospital setting (Aged 50 to 64 years)	
Yoo, 2015[40]	0.401
Morse Fall Scale (cut-off value ≥55)- Hospital setting (Aged 65 years or older)	
STRATIFY (cut-off value 2)- Hospital setting (Aged 50 to 64 years)	
Yoo, 2015[40]	0.579
STRATIFY (cut-off value 3)- Hospital setting (Aged 50 to 64 years)	
Yoo, 2015[40]	0.306
Timed Up and Go Test- Hospital setting (Aged 65 years or older)	
Haines, 2008[20]	0.02 (-0.07, 0.11)
Hars, 2018[21]	0.281
a Values reported from validation cohort	

Table 14: Summary of results: AUC

Risk tool	No of studies	N	Risk of bias	Inconsistency	Indirectness	Imprecision	Area Under Curve: Individual study effects [point estimate (95% CI)]	Quality
Timed up and go test								
Timed up and go test (Hospital setting)	2	2491	Very serious risk of bias[a]	Serious inconsistency[b]	No serious indirectness	Very serious imprecision[e]	Median 0.66 (NR) (range 0.66 to 0.72)	VERY LOW
Timed up and go test (Residential care setting)	1	183	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	0.69 (0.61, 0.77)	VERY LOW
Timed up and go test (Community setting)	1	226	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[e]	0.65 (NR)	VERY LOW
Functional reach test								
Functional reach test (Hospital setting)	1	225	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	0.74 (0.67, 0.79)	VERY LOW
Average walking speed								
Average walking speed (Hospital setting)	1	225	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	0.76 (0.70, 0.82)	LOW
Average walking speed (Community setting)	2	1938	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	Median 0.57 (0.52, 0.62) (range 0.57 to 0.57)	LOW
STRATIFY								

Risk tool	No of studies	N	Risk of bias	Inconsistency	Indirectness	Imprecision	Area Under Curve: Individual study effects [point estimate (95% CI)]	Quality
STRATIFY (Hospital setting) (aged over 65 years)	1	597	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	0.63 (0.50, 0.77)	VERY LOW
STRATIFY (Hospital setting) (aged 50-65 years)	1	1018	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	0.79 (0.72, 0.87)	LOW
DFRI								
DFRI (Hospital setting)	1	597	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	0.55 (0.40, 0.70)	VERY LOW
Downton Fall Risk Index (community setting)	1	254	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	0.61 (0.57, 0.66)	LOW
Downton Fall Risk Index (community setting) aged 50-65	1	78	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	0.65 (0.53, 0.76)	VERY LOW
Chair test								
Chair test (Community setting)	1	860	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	0.52 (0.47, 0.58)	VERY LOW
Hendrich II Falls Risk tool								
Hendrich II Falls Risk tool (Hospital setting) aged 65 years and older	1	147	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision	0.78 (0.68, 0.87)	VERY LOW

Risk tool	No of studies	N	Risk of bias	Inconsistency	Indirectness	Imprecision	Area Under Curve: Individual study effects [point estimate (95% CI)]	Quality
Hendrich II Falls Risk tool (Hospital setting) aged 50-65 years	1	1018	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	0.71 (0.63, 0.80)	VERY LOW
The Falls Risk Assessment Tool								
The Falls Risk Assessment Tool (Community setting)	2	2393	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Median 0.57 (0.54, 0.60) range (0.54 to 0.64)	VERY LOW
Morse Fall Scale								
Morse Fall Scale (Hospital setting)	1	220	Very serious risk of bias[a]	no serious inconsistency	No serious indirectness	serious imprecision[c]	0.56 (0.46, 0.65)	VERY LOW
Morse Fall Scale (Hospital setting) aged 50-65 years	1	1018	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	0.80 (0.72, 0.89)	LOW
Global rating of fall risk								
Global rating of fall risk (Residential care setting)	1	183	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	0.68 (0.6, 0.76)	VERY LOW
Carpenter instrument								
Carpenter instrument (community setting)	1	779	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness[d]	No serious imprecision	0.62 (0.58, 0.66)	VERY LOW

a) Risk of bias was assessed using the PROBAST checklist. Downgraded by 1 increment if the majority of the evidence was ast high risk of bias and downgraded by 2 increments if the majority of the evidence was at very high risk of bias. Risk of bias was serious for some risk tools because of low event rate, assessment of outcomes, predictor definitions, or lack of information regarding the included population.
b) If no pooling were possible, inconsistency was assessed by inspection of the degree of overlap of confidence intervals between studies: if one of more CIs did not overlap then a rating of serious inconsistency was given. Reasons for heterogeneity between studies may include geographical/cultural/ethnic differences.
c) The judgement of precision was based on the spread of confidence interval across two clinical thresholds: C statistics of 50% and 70%. The threshold of 50% marked the boundary between no predictive value better than chance and a predictive value better than chance. The threshold of 70% marked the boundary above which the committee might consider recommendations. If the 95% CIs crossed one of these thresholds a rating of serious imprecision was given and if they crossed both of these thresholds a rating of very serious imprecision as given.
d) Marked down for indirectness due to setting indirectness. The study and the assessments took place in an emergency department, however participants were discharged back to the community where falls were recorded over 6 months.
e) No confidence interval reported and primary data not available so unable to calculate imprecision. Downgraded by 2 increments

Table 15: Summary of results: Sensitivity and specificity

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
Chair Test								
Chair test (cut-off ≥13)- Community setting (Aged 65 years or older)	1	455	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.61 (0.65, 0.89) Specificity= 0.53 (0.48, 0.58)	LOW
Chair test (cut-off value 15.9 seconds)- Community setting (Aged 65 years or older)	1	860	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity=0.47 (0.40, 0.54) Specificity= 0.59 (0.56, 0.62)	VERY LOW
Chair test (cut-off 30 seconds)- Community setting (Aged 65 years or older)	1	192	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.78 (0.65, 0.89) Specificity= 0.23 (0.16, 0.31)	VERY LOW
Clinical Frailty Scale								
Clinical Frailty Scale (cut-off value 3)- Residential care setting (Aged 65 years or older)	1	246	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	Sensitivity= 1.0 (0.98, 1.0) Specificity= 0.11 (0.09, 0.13)	LOW
Clinical Frailty Scale (cut-off value 4)- Residential	1	246	Very serious	No serious inconsistency	No serious indirectness	no serious imprecision	Sensitivity= 1.0 (0.98, 1.0) Specificity= 0.20, (0.16, 0.25)	LOW

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
care setting (Aged 65 years or older)			risk of bias[a]					
Clinical Frailty Scale (cut-off value 5)- Residential care setting (Aged 65 years or older)	1	246	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	no serious imprecision	Sensitivity= 0.99 (0.93, 1.0) Specificity= 0.23 (0.17, 0.30)	LOW
Clinical Frailty Scale (cut-off value 5)- Hospital setting (Aged 65 years or older)	1	1016	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.83 (0.36, 1.0) Specificity= 0.76 (0.73, 0.79)	VERY LOW
Clinical Frailty Scale (cut-off value 6)-Residential care setting (Aged 65 years or older)	1	246	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Sno serious imprecision	Sensitivity= 0.97 (0.93, 0.99) Specificity= 0.23 (0.20, 0.26)	LOW
Clinical Frailty Scale (cut-off value 7)- Residential care setting (Aged 65 years or older)	1	246	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	Sensitivity= 0.90 (0.84, 0.94) Specificity= 0.91 0.85, 0.95)	LOW
Clinical Frailty Scale (cut-off value 8)- Residential care setting (Aged 65 years or older)	1	246	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	Sensitivity=0.29 (0.22, 0.37) Specificity= 1.00 (0.98, 1.00)	LOW
Clinical Frailty Scale (cut-off value 9)- Residential care setting (Aged 65 years or older)	1	246	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	Sensitivity= 0.18 (0.13, 0.25) Specificity= 1.00 (0.98, 1.00)	LOW
Downton Fall Risk Index								
Downton Fall Risk Index (cut-off value 3)- Community setting	2	377	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity (Median)= 0.30 (0.23, 0.38) (range: 0.30 to 0.78) Specificity (median) = 0.93 (0.86, 0.98) range: (0.24, 0.93)	VERY LOW

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
Downton Fall Risk Index (cut-off value >4)- Community setting	1	106	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision	Sensitivity= 0.39 (0.17, 0.64) Specificity= 0.47 (0.36, 0.58)	LOW
Downton Fall Risk Index (cut-off value >5)- Community setting	1	106	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision	Sensitivity= 0.11 (0.01, 0.35) Specificity= 0.70 (0.60, 0.80)	LOW
Downton Fall Risk Index (cut-off value 3)- Hospital setting	2	335	Serious risk of bias[a]	Serious inconsistency	Serious indirectness	Very serious imprecision[c]	Sensitivity (Median)= 0.83 (0.64, 0.94) range (0.83 to 0.92) Specificity (Median)= 0.25 (0.17, 0.34) range (0.25 to 0.36)	VERY LOW
Downton Fall Risk Index (cut-off value 3)- hospital setting (Aged 50-64 years)	1	78	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.48 (0.35, 0.61) Specificity= 0.83 (0.52, 0.98)	LOW
John's Hopkins Falls Risk Assessment Tool (FRAT)								
FRAT (moderate risk)- Hospital setting (Aged 65 years or older)	1	102	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.33 (0.01, 0.91) Specificity= 0.70 (0.56, 0.81)	VERY LOW
FRAT (high risk)- Hospital setting (Aged 65 years or older)	1	102	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.33 (0.01, 0.91) Specificity= 0.69 (0.50, 0.84)	VERY LOW
Functional Reach Test								
Functional reach test (<4 cm)- Hospital setting (Aged 65 years or older)	1	570	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.70 (0.63, 0.77) Specificity= 0.43 (0.38, 0.48)	VERY LOW
Functional reach test (≤17cm)- Community setting (Aged 65 years or older)	1	225	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.56 (0.45, 0.67) Specificity= 0.82 (0.75, 0.88)	VERY LOW

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
Functional reach test (≤18cm)- Community setting	1	455	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity = 0.47 (0.37, 0.58) Specificity= 0.59 (0.54, 0.64)	LOW
Functional reach test (≤21.5cm)- Community setting (Aged 65 years or older)	1	115	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.68 (0.55, 0.79) Specificity= 0.54 (0.43, 0.64)	VERY LOW
Gait speed								
Self-selected walking speed- Community setting (Aged 65 years or older)	2	920	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity (Median)= 0.44 (0.28, 0.60) Specificity (Median)= 0.61 (0.58, 0.65)	VERY LOW
Maximal walking speed- Community setting (Aged 65 years or older)	1	455	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.58 (0.47, 0.67) Specificity= 0.58 (0.53, 0.63)	LOW
4 metre gait speed-0.73 m/s- Community setting (Aged 65 years or older)	1	1063	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.47 (0.40, 0.54) Specificity= 0.66 (0.63, 0.69)	VERY LOW
Dynamic gait index less than or equal to 19 points- Community setting	1	225	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.73 (0.62, 0.82) Specificity= 0.72 (0.64, 0.80)	LOW
Hendrich II Fall Risk Model								
Hendrich II Fall Risk Model (cut-off value 3)- Hospital setting (Aged 50-64 years)	1	1026	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.81 (0.64, 0.93) Specificity= 0.61 (0.58, 0.65)	LOW
Hendrich II Fall Risk Model (cut-off value ≥4.5)- Community setting (Aged 65 years or older)	1	125	No serious risk of bias	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.82 (0.48, 0.98) Specificity= 0.50 (0.40, 0.60)	LOW

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
Hendrich II Fall Risk Model (cut-off value ≥5)- (Aged 65 years or older)	1	147	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 1.0 (0.72, 1.0) Specificity= 0.49 (0.41, 0.58)	LOW
Hendrich II Fall Risk Model (cut-off value ≥5)- hospital setting (Aged 50-64 years)	1	1018	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.59 (0.41, 0.76) Specificity= 0.78 (0.76, 0.81)	VERY LOW
Hendrich II Fall Risk Model (cut-off value ≥6)- Hospital setting-(Aged 65 years or older)	1	147	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.91 (0.59, 1.0) Specificity= 0.57 (0.49, 0.66)	VERY LOW
Hendrich II Fall Risk Model (cut-off value ≥7)- Hospital setting-(Aged 65 years or older)	1	147	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.82 (0.48, 0.98) Specificity= 0.66 (0.58, 0.74)	VERY LOW
Hendrich II Fall Risk Model (cut-off value ≥8)- Hospital setting -(Aged 65 years or older)	1	147	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.73(0.39, 0.94) Specificity= 0.72 (0.64, 0.79)	VERY LOW
Hendrich II Fall Risk Model (cut-off value ≥9)- Hospital setting-(Aged 65 years or older)	1	147	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.45 (0.17, 0.77) Specificity= 0.79 (0.71, 0.85)	VERY LOW
Morse Fall Scale								
Morse Fall Scale (cut-off ≥40)- Hospital setting- (Aged 50-64 years)	1	1026	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.78 (0.60, 0.91) Specificity= 0.82 (0.80, 0.84)	VERY LOW
Morse Fall Scale (cut-off ≥45)- Hospital setting- (Aged 65 years or older)	1	220	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity = 0.46 (0.31, 0.61) Specificity = 0.68 (0.60, 0.75)	VERY LOW
Morse Fall Scale (cut-off ≥47.5)- Hospital setting- (Aged 65 years or older)	1	180	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.67 (0.09, 0.99) Specificity= 0.82 (0.75, 0.87)	VERY LOW

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
Morse Fall Scale (cut-off ≥51)- Hospital setting- (Aged 50-64 years)	1	1018	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.50 (0.32, 0.68) Specificity= 0.91 (0.89, 0.93)	VERY LOW
Morse Fall Scale (cut-off ≥66.2)- Community setting- (Aged 65 years or older)	1	125	No serious risk of bias[a]	No serious inconsistency	No serious indirectness	Very serious imprecision[c]	Sensitivity= 0.91 (0.59, 1.0) Specificity= 0.73 (0.64, 0.81)	VERY LOW
Royal Melbourne Hospital FRAT								
Royal Melbourne Hospital FRAT- Hospital setting- (Aged 65 years or older)	1	152	Very serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.84 (0.70, 0.93) Specificity= 0.56 (0.46, 0.65)	VERY LOW
STRATIFY								
STRATIFY (cut-off value ≥1)- Hospital setting - (Aged 65 years or older)	3	2299	Very serious risk of bias[a]	Very serious inconsistency[e]	Serious indirectness	Very serious imprecision[c]	Sensitivity= 0.86 (0.11, 0.99) Specificity= 0.54 (0.03, 0.99)	VERY LOW
STRATIFY (cut-off value≥2)- Hospital setting	7	4143	Very serious risk of bias[a]	Very serious inconsistency[e]	Serious indirectness	Very serious imprecision[c]	Sensitivity= 0.54 (0.27, 0.79) Specificity= 0.70 (0.44, 0.87)	VERY LOW
Re-STRATIFY (cut-off value≥2)- Residential care setting	1	1148	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.56 (0.52, 0.60) Specificity= 0.76 (0.72, 0.79)	VERY LOW
STRATIFY (cut-off value≥2)- hospital setting Aged 50 to 64 years	1	1026	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.84 (0.67, 0.95) Specificity= 0.74 (0.71, 0.76)	VERY LOW
STRATIFY (cut-off value ≥3)- Hospital setting	2	1065	Very serious risk of bias[a]	Serious inconsistency[b]	Serious indirectness	Very serious imprecision[c]	Sensitivity (Median)=0.36 (0.25, 0.48) Range = (0.36, 0.46) Specificity (Median)= 0.84 (0.79, 0.89))	VERY LOW

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
							Range = (0.83, 0.84))	
STRATIFY (cut-off value ≥3)- hospital setting Aged 50 to 64 years	1	1026	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	Serious imprecision[c]	Sensitivity= 0.41 (0.24, 0.59) Specificity= 0.90 (0.88, 0.92)	VERY LOW
STRATIFY (cut-off value ≥4)- Hospital setting (Aged 65 years or older)	2	1220	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness	No serious imprecision	Sensitivity (Median)= 0.11 (0.05, 0.20) Specificity (Median)= 0.95 (0.93, 0.96)	VERY LOW
STRATIFY (cut-off value ≥5)- Hospital setting (Aged 65 years or older)	1	432	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness	No serious imprecision	Sensitivity= 0.10 (0.04, 0.19) Specificity= 0.99 (0.98, 1.0)	VERY LOW
Timed Up and Go Test								
Timed Up and Go Test (cut off value >15 seconds)- Community setting (Aged 65 years or older)	6	2405	Very serious risk of bias[a]	Very serious inconsistency[e]	Serious indirectness	Very serious imprecision[c]	Pooled sensitivity= 0.52 (0.27, 0.76) Pooled specificity= 0.73 (0.40, 0.92)	VERY LOW
Timed Up and Go Test (cut off value >15 seconds)- Hospital setting (Aged 65 years or older)	2	1620	Very serious risk of bias[a]	Serious inconsistency[b]	No serious indirectness	Very serious imprecision[c]	Sensitivity= Median: 0.61 (0.52, 0.70) (range: 0.61 to 0.80) Specificity= Median: 0.22 (0.18, 0.26) (range: 0.22 to 0.67)	VERY LOW
Timed Up and Go Test (cut off value >15 seconds)- Residential care setting (Aged 65 years or older)	1	183	Serious risk of bias[a]	No serious inconsistency	No serious indirectness	No serious imprecision	Sensitivity= 0.96 (0.90, 0.99) Specificity= 0.33 (0.23, 0.44)	VERY LOW
Carpenter Instrument								

Risk tool	No of studies	n	Risk of bias	Inconsistency	Indirectness	Imprecision	Effect size (95% CI)	Quality
Carpenter instrument (cut off 0) Community setting (Aged 65 years or older)	1	779	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness[d]	No serious imprecision	Sensitivity= 0.100 (0.95, 100) Specificity= 0.0 (0.0, 0.5)	VERY LOW
Carpenter instrument (cut off 1) Communitysetting (Aged 65 years or older)	1	779	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness[d]	No serious imprecision	Sensitivity= 0.94 (0.86, 0.98) Specificity= 0.12 (0.10, 0.15)	VERY LOW
Carpenter instrument (cut off 2) Community setting (Aged 65 years or older)	1	779	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness[d]	Serious imprecision[c]	Sensitivity= 0.66 (0.54, 0.77) Specificity= 0.52 (0.48, 0.56)	VERY LOW
Carpenter instrument (cut off 3) Communitysetting (Aged 65 years or older)	1	779	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness[d]	No serious imprecision	Sensitivity= 0.29 (0.19, 0.42) Specificity= 0.87 (0.84, 0.89)	VERY LOW
Carpenter instrument (cut off 4) Communitysetting (Aged 65 years or older)	1	779	Very serious risk of bias[a]	No serious inconsistency	Serious indirectness[d]	No serious imprecision	Sensitivity= 0.0 (0.0, 0.05) Specificity= 1.00 (0.99, 1.00)	VERY LOW

a) Risk of bias was assessed using the PROBAST checklist. Downgraded by 1 increment if the majority of the evidence was at high risk of bias and downgraded by 2 increments if the majority of the evidence was at very high risk of bias. Risk of bias was serious for some risk tools because of low event rate, assessment of outcomes, predictor definitions, or lack of information regarding the included population.
b) If no pooling were possible, inconsistency was assessed by inspection of the degree of overlap of confidence intervals between studies: if one of more CIs did not overlap then a rating of serious inconsistency was given. Reasons for heterogeneity between studies may include geographical/cultural/ethnic differences.
c) The judgement of precision was based on the spread of confidence interval across two clinical thresholds: C statistics of 50% and 70%. The threshold of 50% marked the boundary between no predictive value better than chance and a predictive value better than chance. The threshold of 70% marked the boundary above which the committee might consider recommendations. If the 95% CIs crossed one of these thresholds a rating of serious imprecision was given and if they crossed both of these thresholds a rating of very serious imprecision as given.
d) Marked down for indirectness due to setting indirectness. The study and risk assessments took place in an emergency department setting, , however participants were discharged back to the community where falls were recorded over 6 months..
e) Inconsistency was assessed by inspection of the sensitivity and specificity plots and summary area under the curve (AUC) plots. Particular attention was placed on the sensitivity or specificity threshold(s) the committee set as an acceptable level to recommend a test. The evidence was downgraded if subgroup analyses did not explain the heterogeneity. The evidence was downgraded by 1 increment if the individual study values varied across 2 areas: where AUC values of individual studies are both above and below 50%, 2 increments if the individual study values varied across 3 areas, where AUC values of individual studies are above and below 50%

1.1.7. Calibration

Table 16: Summary of results: Hosmer-Lemeshow test

Tool and subgroup	Hosmer-Lemeshow test
FRAT- Community setting (Aged 65 years or older)	
Cattelani, 2015[9]	P = <.001

The Hosmer-Lemeshow test produces a very low P value (<.001) indicating statistical significance of miscalibration. The study shows miscalibration is due to risk overestimation that is consistent over the risk strata.

1.1.8. Reclassification

No reclassification data was identified.

1.1.9. Economic evidence

1.1.9.1. Included studies

Two health economic studies with the relevant comparison was included in this review.[14, 41] This is summarised in the health economic evidence profile below (Table 10) and the health economic evidence table in Appendix G.

1.1.9.2. Excluded studies

Two economic studies relating to this review question was identified but was excluded due to limited applicability and methodological issues. [24, 32] This is listed in Appendix I, with reasons for exclusion given.

See also the health economic study selection flow chart in Appendix F.

1.1.10. Summary of included economic evidence

Table 17: Health economic evidence profile: QTUG versus usual care

Study	Applicability	Limitations	Other comments	Incremental cost	Incremental effects	Cost effectiveness	Uncertainty
Franklin 2019 (United Kingdom)[14]	Directly Applicable	Minor limitations[(a)]	• Decision tree and Markov model • Cost-utility analysis (QALYs) • Population: The model includes 5 stratified age groups ranging from 65 to 89 years old. • Setting: Community • Comparators: 1. No assessment followed by no care pathway. 2. QTUG followed by Otago home-based exercise pathway. 3. QTUG followed by Falls Management group Exercise programme (FaME) pathway. 4. QTUG followed by Tai Chi pathway. 5. QTUG followed by home safety assessment and modification (HAM) pathway. Time horizon: 2 years	TUG-based pathways were included interventions but as these were dominated (more costly and less effective) by QTUG-based pathways in all cohorts these were not reported in the paper. -			

Abbreviations: ICER= incremental cost-effectiveness ratio; QALY= quality-adjusted life years; RCT= randomised controlled trial, CUA = Cost-utility Analysis, CCA= Computed complete analysis, QoL = Quality of Life, EQ-5D = EuroQol 5 dimension, NZ = New Zealand, OEP = Otago exercise programme, QTUG = Quantitative timed up and go, TUG = Timed up and go, DT = Decision tree, FaME = Falls Management group Exercise programme; HAM = Home safety assessment and modification, BBS = Berg balance scale.
(a) 2-year time horizon may not sufficiently long assess the full costs and benefits. One potential conflict of interest, Kinesis Health Technologies Ltd who developed the QTUG technology was a part of the Perfect Patient Pathway Test Bed, for which the model was developed, and representatives of Kinesis provided their thoughts on the initial design of the model however, they did not inform the overall development and analysis of the model and subsequent results in this manuscript.
(b) 2017 UK pounds. Health system costs included Intervention costs and falls related visits to primary care, community care and hospitalisations.

Table 18: Health economic evidence profile: GaitSmart vs. standard care

Study	Applicability	Limitations	Other comments	Incremental cost	Incremental effects	Cost effectiveness	Uncertainty
Zanghelini 2024[41] UK	Directly applicable [(a)]	Potentially serious limitations[(b)]	• Analytic decision tree based on a RCT • Cost-utility analysis (QALYs) • Population: Older people in the community, average age 79 years • Comparators: Standard care (1), GaitSmart (2) Time horizon: 12 months	-£2901.79[(c)]	1.07 QALYs	GaitSmart dominates[(d)]	Probability GaitSmart cost effective (£20/£30K threshold): 100%/NR

Abbreviations: ICER= incremental cost-effectiveness ratio; QALY= quality-adjusted life years; RCT= randomised controlled trial NR = Not reported
(a) UK study
(b) Based on a single RCT so may not represent the full body of evidence, 2018 costs used
(c) 2018 GBP
(d) Dominates means less costly and more effective.

1.1.11. Economic model

This area was not prioritised for de novo economic modelling.

1.1.12. Evidence statements

1.1.12.1. Effectiveness

1.1.12.2. Economic

Two cost utility studies compared various assessments for risk of falling compared to either another form of assessment or usual care.

- One cost utility study found that quantitative timed up and go (QTUG) dominated timed up and go (TUG). This analysis was assessed as directly applicable with minor limitations[14].
- Another cost utility study found that Gait Smart dominated usual care. This analysis was assessed as directly applicable with potentially serious limitations[41].

1.1.13. The committee's discussion and interpretation of the evidence

1.1.13.1. The outcomes that matter most

The committee discussed that all outcomes are considered to be equally important for decision making and therefore agreed that all outcomes are rated as critical. The review on screening tools which quantify or categorise the degree of risk of falling in identifying people at risk of falls found evidence for the outcomes of discrimination (sensitivity, specificity, predictive values), area under the ROC curve (c-statistic), Harrell's C, Brier score and Youden Index.

1.1.13.2. The quality of the evidence

The tools evaluated were in three categories:

- Externally validated screening tools:
    - The Falls Risk Assessment Tool (FRAT) (low, medium, high risk)
    - The St. Thomas Risk Assessment Tool in Falling Elderly (STRATIFY) (low, moderate, high risk)
    - Downton Fall Risk Index (DFRI) (≥3 – high risk of falls)
    - Morse Falls Scale (MFS) (no, low, moderate, high risk)
    - Hendrich II Falls Risk Tool (HIIFRM)

- Physical performance tests (less than 5 minutes):

    - Timed Up and Go Test (15 seconds)
    - Turn 180 degrees (more than 4 steps to complete a turn)
    - One leg standing test (5 seconds)
    - Chair test
    - Functional reach test
    - Gait speed

- Frailty scores that quantify risk:

- PRISMA-7 (>3 identifies frailty)
- Clinical frailty scale (CFS) (>3 identifies frailty)
- Electronic Frailty Index (eFI)

Default thresholds:

A value of 0.5 implies the model is no better than chance.

90%-100% indicates perfect discrimination

70-89% indicates moderate discrimination

50-69% indicates poor discrimination

The committee discussed the thresholds for sensitivity and specificity that would be acceptable for the assessment tools evaluated in this review. They agreed sensitivity and specificity thresholds for these types of tools would be different to diagnostic tests where a high sensitivity would be required and would not be achievable in any prognostic prediction tools. They also noted the wide margin in the default thresholds. They agreed specificity was not as important as it would be for a diagnostic test where the outcome of the result would often be having a treatment. They agreed a middle ground of 70% sensitivity and a lower specificity allowing for some flexibility within this range would be acceptable with which to base recommendations on.

1.1.13.3. Benefits and harms

Evidence for many of the assessment tools were based on small single studies and all outcomes were rated very low or low quality due to risk of bias and imprecision around the effect estimate. The committee discussed whether the populations within the studies were highly selected and so would not necessarily be replicated in different population. The committee agreed where there was only one small study in one defined population the committee would not use this for decision making.

Hospital settings

The committee noted it was not clear from the studies why certain cut-points had been used and they seemed quite variable across the different studies. The original STRATIFY tool specifies the cut-point of 3 should be used, however some studies carried out analysis using different cut-points, but the committee noted the majority of studies used a cut-point of 2 and over which aligns with what STRATIFY recommends. This was the tool that the committee agreed performed the best in terms of sensitivity and specificity using a cut-point of 3 or over in four studies. It has potential value in discriminating between fallers and non-fallers, although would not identify all people. The committee concluded the tool had potential, but the evidence was not sufficiently robust with which to base a recommendation on.

The committee agreed to rule out the use of functional tests in hospital because they would not be used. They agreed in many circumstances such tests would be unfeasible to do. For example, a person with severe delirium or with high blood pressure and feeling unwell would not be able to do a Functional Reach test or Timed Up and Go (TUG).

The committee noted that the Clinical Frailty Scale is already widely used in hospital as well as other settings for all people over 65. It is simple and quick to use. The committee agreed the scale is not designed to stratify people for falls risk and therefore should not be used for clinical decision making in relation to falls.

The committee discussed the complexity around risk of falling including how the environment, the individual and their specific situation can lead to falls, so it is not possible to predict a fall with any accuracy. They agreed risk assessment tools are not particularly useful and can be a distraction because they are just classifying people into high or low risk without any further intervention.

The current guideline does not recommend the use of a risk assessment tool within hospital mainly because of the low quality of the evidence, concerns about the number of confounders and the inability to replicate the study, and the resources required to carry out risk assessments. The committee confirmed risk assessment tools are not generally used in this setting, because the resources required to carry out the assessment are often not available, and the result of the assessment tool would not inform further management. Usual practice is to carry out a comprehensive risk assessment if the person is considered as being at high risk of falling. The current falls guideline advises that all older people should be treated as at risk of falling because there is no accurate way of identifying people in hospital who is at high risk and who isn't. All people over the age of 65 in hospital would have comprehensive falls risk assessment. On the basis of the updated evidence presented the consensus of the committee's aligned with this, and they agreed the evidence still does not support the use of any falls risk assessment tool in this setting and the current recommendation in the Falls guideline not to use a fall risk prediction tool remains valid.

Community settings

The committee discussed that the Hendrich Fall Risk model is used in hospital more than the community and therefore not relevant. The population within the study comprised of stroke patients in a community setting.

Six studies examined the Timed Up and Go test (TUG) which was the most widely reported test in this setting. The committee agreed that the paired values did not reach the thresholds for a useful test and explained that the test is primarily used for assessing gait and balance deficits but not as a screening tool for falls risk. The committee noted tests such as the timed up and go and measures of gait speed are good for observing gait and balance deficits in people, but they would not predict future risk of falling on their own. The committee agreed there is some confusion amongst professionals about the difference between tools that predict the risk of falls and case finding people at a population level who may be at risk of falls. Case finding of people who have had a previous fall or are presenting with gait and balance deficits, is useful to identify those who may require more detailed assessment.

The committee noted one tool which reached the paired sensitivity and specificity thresholds was the Morse falls scale, however this was based on one small study rated very low quality. The committee concluded that no single test can be recommended based on the evidence, much of which was rated very low quality and did not meet the agreed thresholds for sensitivity and specificity. Variations in the reported cut offs for some tests meant that meta-analysis of the data was not possible, and evidence was based on small single studies. The committee noted the current guideline does not recommend any specific risk prediction tool and agreed the evidence presented does not warrant any change from that position and the current recommendation in the guideline remains valid and applicable to the community setting as well.

At the time of publishing this version of the guideline the committee became aware that a wearable technology had become available that aimed to predict a person's falls risk. However, evidence supporting this that fits the risk assessment review guideline protocols was not available for this update. A research recommendation was made for wearable technologies in Appendix L of evidence review E, Falls methods of assessment.

Residential settings

The committee commented that most residents in care homes are likely to be frail, as a means of being there in the first place.

The committee discussed the results for the study on the Clinical Frailty Scale noting it indicates that people who are frail but can walk are at risk of falls, and as a person's frailty increases and are at the higher end of the scale (above 7) they become less able to walk and therefore are less likely to fall shown by the sensitivity and specificity of the scale decreasing. The committee agreed as there is only one study for this scale not much could be concluded from the findings, and as all the evidence found was for single studies they concluded it was not possible to recommend a tool to use for case finding in care homes. They agreed all people living in care homes should be considered at risk of falls, and this reflected current practice. All people in residential care would have a comprehensive falls risk assessment as part of care planning rather than a case finding or screening assessment.

1.1.13.4. Cost effectiveness and resource use

Two health economic studies were included in this review question. This was Franklin 2019[14] and Zangelini 2024[41]. Franklin 2019[14] was also included in the review assessing the most clinically and cost-effective methods for fall prevention. This study was deemed to be directly applicable with minor limitations. Zangelini 2024[41] was deemed to be directly applicable with potentially serious limitations. However along with the clinical evidence, the committee did not feel that the evidence was strong enough to recommend a specific type of assessment. It was felt that as the Quantitative Timed up and Go (QTUG) used body worn sensors and mobile software it was less likely to be helpful as the addition of these sensors would make the assessment more complex and longer without proven clinical benefit. When looking at all the clinical evidence the committee did not feel able to recommend a certain assessment tool.

1.1.14. Recommendations supported by this evidence review

This evidence review underpins recommendations 1.1.1 to 1.1.7 and 1.2.1 to 1.2.3 in the NICE guideline.

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34. Vassallo M, Poynter L, Sharma JC, Kwan J, Allen SC. Fall risk-assessment tools compared with clinical judgment: an evaluation in a rehabilitation ward. Age and Ageing. 2008; 37(3):277-281

35. Vassallo M, Stockdale R, Sharma JC, Briggs R, Allen S. A comparative study of the use of four fall risk assessment tools on acute medical wards. Journal of the American Geriatrics Society. 2005; 53(6):1034-1038

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38. Webster J, Courtney M, Marsh N, Gale C, Abbott B, Mackenzie-Ross A et al. The STRATIFY tool and clinical judgment were poor predictors of falling in an acute hospital setting. Journal of Clinical Epidemiology. 2010; 63(1):109-113

39. Yang C, Ghaedi B, Campbell TM, Rutkowski N, Finestone H. Predicting Falls Using the Stroke Assessment of Fall Risk Tool. PM & R : the journal of injury, function, and rehabilitation. 2021; 13(3):274-281

40. Yoo S-H, Kim SR, Shin YS. A prediction model of falls for patients with neurological disorder in acute care hospital. Journal of the Neurological Sciences. 2015; 356(12):113-117

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Appendices

Appendix A Review protocols

A.1 Review protocol for assessment tools for identifying people at risk of falls

Review protocol for *How accurate are screening tools which quantify or categorise the degree of risk of falling in identifying people at risk of falls?*

ID	Field	Content
1.	Review title	How accurate are screening tools which quantify or categorise the degree of risk of falling in identifying people at risk of falls?
2.	Review question	How accurate are screening tools which quantify or categorise the degree of risk of falling in identifying people at risk of falls?
3.	Objective	This review aims to look at the prognostic accuracy of screening tools (which quantify or categorise the risk of falling) in identifying people at risk of falls.
4.	Searches	The following databases (from inception) will be searched: • Embase • MEDLINE • Epistemonikos Searches will be restricted by: • English language studies

		Human studies The searches may be re-run 6 weeks before the final committee meeting and further studies retrieved for inclusion if relevant. The full search strategies will be published in the final review. Medline search strategy to be quality assured using the PRESS evidence-based checklist (see methods chapter for full details).
5.	Condition or domain being studied	• Falls: an unexpected event in which the participants come to rest on the ground, floor, or lower level.
6.	Population	Inclusion: • people aged 65 and over • people aged 50 to 64 who have a condition or conditions that may put them at higher risk of falling. Exclusion: any age group that does not fit the inclusion criteria Strata: settings (hospitals, community, long-term residential care); age group: people aged 50 to 64 who have a condition or conditions that may put them at higher risk of falling. The setting is stratified as a lot of the screening tests are not suitable for hospital settings.
7.	Risk prediction tool	To include externally validated screening tools which identify the degree of risk of falling, including: • The Falls Risk Assessment Tool (FRAT) (low, medium, high risk) • The St. Thomas Risk Assessment Tool in Falling Elderly (STRATIFY) (low, moderate, high risk)

		• Downton Fall risk index (DFRI) (>3 = high risk of falls) • Morse Falls Scale (MFS) (no, low, moderate, high risk) • Hendrich II Falls Risk Tool (HIIFRM) Physical performance tests that specifically screen the risk of falls (take less than 5 minutes, require minimal equipment or skill to administer) which use a cut-off point to determine degree of falls risk: • Timed up and go test (15 seconds) • Turn 180 degrees (more than 4 steps to complete a turn) • One leg standing test (5 seconds) • Chair test • Functional reach test (25 cm or greater low risk of falls; 25cm risk of falling is 2x greater than normal; 15cm or less risk of falling is 4x greater than normal; unwilling to reach, risk of falling is 8x greater than normal) • Gait speed Frailty scores that quantify risk: • PRISMA-7 (>3 identifies frailty) • Clinical frailty scale (CFS) (>3 identifies frailty) • Electronic Frailty Index (eFI)
8.	Target condition	• Falls: an unexpected event in which the participants come to rest on the ground, floor, or lower level.
9.	Types of study to be included	External validation studies (prospective cohort studies or systematic reviews of these) with a sample size of n=100 or more. Where tests are validated in a UK population, we will not include studies in other countries, otherwise we will include any country. External validation studies (tested on a different study sample to the derivation sample) are preferred. Published NMAs and IPDs will be considered for inclusion. **Exclusion:** • Case-control studies • Cross-sectional studies

10.	Other exclusion criteria	Non-English language studies.
11.	Context	All healthcare settings
12.	Primary outcomes (critical outcomes)	*All outcomes are considered equally important for decision making and therefore have all been rated as critical:* *Accuracy of estimation of risk of falls:* Statistical outputs may include: • Discrimination (sensitivity, specificity, predictive values) • Area under the ROC curve (c-statistic) • Predicted risk versus observed risk (calibration) • Reclassification Other statistical measures: for example, D statistic, R^2 statistic and Brier points
13.	Data extraction (selection and coding)	EndNote will be used for reference management, sifting, citations and bibliographies. All references identified by the searches and from other sources will be uploaded into EPPI reviewer and de-duplicated. 10% of the abstracts will be reviewed by two reviewers, with any disagreements resolved by discussion or, if necessary, a third independent reviewer. The full text of potentially eligible studies will be retrieved and will be assessed in line with the criteria outlined above. A standardised form will be used to extract data from studies (see Developing NICE guidelines: the manual section 6.4). 10% of all evidence reviews are quality assured by a senior research fellow. This includes checking:

		• papers were included /excluded appropriately • a sample of the data extractions • correct methods are used to synthesise data • a sample of the risk of bias assessments Disagreements between the review authors over the risk of bias in particular studies will be resolved by discussion, with involvement of a third review author where necessary. Study investigators may be contacted for missing data where time and resources allow.
14.	Risk of bias (quality) assessment	Risk of bias will be assessed using the PROBAST checklist as described in Developing NICE guidelines: the manual.
15.	Strategy for data synthesis	Analyses with and without accounting for competing risks will be included. Discrimination, calibration, and re-classification data will be reported separately. If appropriate, C statistic and net reclassification index data will be meta-analysed (if at least 3 studies reporting data at the same threshold) in RevMan. Summary outcomes will be reported from the meta-analyses with their 95% confidence intervals in adapted GRADE tables. Sensitivity and specificity data will be meta-analysed using a Bayesian approach (using WinBugs software) if 3 or more data points are found. Heterogeneity between the studies in effect measures will be assessed using visual inspection of the sensitivity/specificity or net reclassification index RevMan 5 plots, or summary area under the curve (AUC) plots. If data are pooled, an I^2 of 50-74% will be deemed serious inconsistency and an I^2 of 75% or above very serious inconsistency. If meta-analysis is not possible, data will be presented, and quality assessed as individual values in adapted GRADE profile tables and plots of un-pooled sensitivity and specificity from RevMan software. Publication bias will be considered with the guideline committee, and if suspected will be tested for when there are more than 5 studies for that outcome.

		The risk of bias across all available evidence will be evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/		
16.	Analysis of sub-groups	Subgroups that will be investigated if heterogeneity is present: none		
17.	Type and method of review	☐	Intervention	
		☐	Diagnostic	
		☒	Prognostic	
		☐	Qualitative	
		☐	Epidemiologic	
		☐	Service Delivery	
		☐	Other (please specify)	
18.	Language	English		
19.	Country	England		
20.	Anticipated or actual start date			
21.	Anticipated completion date			
22.	Stage of review at time of this submission	Review stage	Started	Completed
		Preliminary searches	☑	☑
		Piloting of the study selection process	☐	☐
		Formal screening of search results against eligibility criteria	☐	☐

		Data extraction	☐	☐
		Risk of bias (quality) assessment	☐	☐
		Data analysis	☐	☐
23.	Named contact	5a. Named contact Guideline Development Team NGC 5b Named contact e-mail Guidelines8@nice.org.uk 5e Organisational affiliation of the review National Institute for Health and Care Excellence (NICE)		
24.	Review team members	From NICE: Gill Ritchie [Guideline Lead] Julie Neilson [Senior systematic reviewer] Annette Chalker [Systematic reviewer] Sophia Kemmis-Betty [Senior Health economist] Steph Armstrong [Health economist] Joseph Runicles [Information specialist] [Others]		
25.	Funding sources/sponsor	Development of this systematic review is being funded by NICE.		
26.	Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of		

		practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.	
27.	Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: [NICE guideline webpage].	
28.	Other registration details	N/A	
29.	Reference/URL for published protocol	[Give the citation and link for the published protocol, if there is one.]	
30.	Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: • notifying registered stakeholders of publication • publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.	
31.	Keywords		
32.	Details of existing review of same topic by same authors	N/A	
33.	Current review status	x	Ongoing
		☐	Completed but not published
		☐	Completed and published

		☐	Completed, published and being updated
		☐	Discontinued
34.	Additional information		
35.	Details of final publication	www.nice.org.uk	

A.2 Health economic review protocol

Table 19: Health economic review protocol

Review question	All questions – health economic evidence
Objectives	To identify health economic studies relevant to any of the review questions.
Search criteria	• Populations, interventions and comparators must be as specified in the clinical review protocol above. • Studies must be of a relevant health economic study design (cost–utility analysis, cost-effectiveness analysis, cost–benefit analysis, cost–consequences analysis, comparative cost analysis). • Studies must not be a letter, editorial or commentary, or a review of health economic evaluations. (Recent reviews will be ordered although not reviewed. The bibliographies will be checked for relevant studies, which will then be ordered.) • Unpublished reports will not be considered unless submitted as part of a call for evidence. • Studies must be in English.
Search strategy	A health economic study search will be undertaken using population-specific terms and a health economic study filter – see appendix B below.
Review strategy	Studies not meeting any of the search criteria above will be excluded. Studies published before 2007, abstract-only studies and studies from non-OECD countries or the USA will also be excluded. Studies published after 2007 that were included in the previous guideline(s) will be reassessed for inclusion and may be included or selectively excluded based on their relevance to the questions covered in this update and whether more applicable evidence is also identified. Each remaining study will be assessed for applicability and methodological limitations using the NICE economic evaluation checklist which can be found in appendix H of Developing NICE guidelines: the manual (2014).[7] **Inclusion and exclusion criteria** • If a study is rated as both 'Directly applicable' and with 'Minor limitations', then it will be included in the guideline. A health economic evidence table will be completed, and it will be included in the health economic evidence profile. • If a study is rated as either 'Not applicable' or with 'Very serious limitations', then it will usually be excluded from the guideline. If it is excluded, then a health economic evidence table will not be completed, and it will not be included in the health economic evidence profile. • If a study is rated as 'Partially applicable', with 'Potentially serious limitations' or both then there is discretion over whether it should be included. **Where there is discretion** The health economist will make a decision based on the relative applicability and quality of the available evidence for that question, in discussion with the guideline committee if required. The ultimate aim is to include health economic studies that are helpful for decision-making in the context of the guideline and the current NHS setting. If several studies are considered of sufficiently high applicability and methodological quality that they could all be included, then the health economist, in discussion with the committee if required, may decide to include only the most applicable studies and to selectively exclude the remaining studies. All studies excluded on the basis of applicability or methodological limitations will be listed with explanation in the excluded health economic studies appendix below.

	The health economist will be guided by the following hierarchies. *Setting:* • UK NHS (most applicable). • OECD countries with predominantly public health insurance systems (for example, France, Germany, Sweden). • OECD countries with predominantly private health insurance systems (for example, Switzerland). • Studies set in non-OECD countries or in the USA will be excluded before being assessed for applicability and methodological limitations. *Health economic study type:* • Cost–utility analysis (most applicable). • Other type of full economic evaluation (cost–benefit analysis, cost-effectiveness analysis, cost–consequences analysis). • Comparative cost analysis. • Non-comparative cost analyses including cost-of-illness studies will be excluded before being assessed for applicability and methodological limitations. *Year of analysis:* • The more recent the study, the more applicable it will be. • Studies published in 2007 or later (including any such studies included in the previous guideline(s)) but that depend on unit costs and resource data entirely or predominantly from before 2007 will be rated as 'Not applicable'. • Studies published before 2007 (including any such studies included in the previous guideline(s)) will be excluded before being assessed for applicability and methodological limitations. *Quality and relevance of effectiveness data used in the health economic analysis:* • The more closely the clinical effectiveness data used in the health economic analysis match with the outcomes of the studies included in the clinical review the more useful the analysis will be for decision-making in the guideline.

Appendix B Literature search strategies

The literature searches for this review are detailed below and complied with the methodology outlined in Developing NICE guidelines: the manual (2014)

For more information, please see the Methodology review published as part of the accompanying documents for this guideline.

B.1.1 Clinical search literature search strategy

Searches were constructed using a PICO framework where population (P) terms were combined with Intervention (I) and in some cases Comparison (C) terms. Outcomes (O) are rarely used in search strategies as these concepts may not be indexed or described in the title or abstract and are therefore difficult to retrieve. Search filters were applied to the search where appropriate.

Table 20: Database parameters, filters and limits applied

Database	Dates searched	Search filter used
Medline ALL (OVID)	**01-01-1946 - 07-05-2024**	Systematic reviews Internal or external validation studies Exclusions (animal studies, letters, comments, editorials, news, historical articles, anecdotes, case studies/reports) English language
Embase (OVID)	**01-01-1974 - 07-05-2024**	Systematic reviews Internal or external validation studies Exclusions (animal studies, letters, comments, editorials, case studies/reports, conference abstracts or papers) English language
The Cochrane Library (Wiley)	Cochrane CDSR to 2024 Issue 5 of 12	
Epistemonikos (The Epistemonikos Foundation)	No date limits applied (searched 07/05/2024)	

Medline (Ovid) search terms

1	Accidental Falls/
2	(fall or falls or falling or faller* or fallen or slip* or trip* or collapse*).ti,ab.
3	or/1-2
4	letter/

5	editorial/
6	news/
7	exp historical article/
8	Anecdotes as Topic/
9	comment/
10	case report/
11	(letter or comment*).ti.
12	or/4-11
13	randomized controlled trial/ or random*.ti,ab.
14	12 not 13
15	animals/ not humans/
16	exp Animals, Laboratory/
17	exp Animal Experimentation/
18	exp Models, Animal/
19	exp Rodentia/
20	(rat or rats or mouse or mice or rodent*).ti.
21	or/14-20
22	3 not 21
23	limit 22 to english language
24	((risk* or frail* or screen* or gait or balance) adj2 (assess* or test* or tool* or scale* or process* or procedure* or protocol* or guide* or chart* or index or score*)).ti,ab,kf.
25	"timed up and go".ti,ab,kf.
26	(gait adj2 (technolog* or app or apps or measure*)).ti,ab,kf.
27	"gait speed".ti,ab,kf.
28	((Tinetti or Berg) and balance).ti,ab,kf.
29	"functional reach test*".ti,ab,kf.
30	("performance oriented" or "performance orientated").ti,ab,kf.
31	"turn 180 degrees".ti,ab,kf.
32	("PRISMA-7" or (morse adj2 scale) or "downton fall risk index" or "FRAT").ti,ab,kf.
33	(clinical adj (assess* or check* or examination* or test* or observ*)).ti,ab,kf.

34	((history or historical or prior or previous or repeat* or fear* or worry* or worries or worried or scared or frequent or frequency or severity) adj2 (question* or asking or observ*)).ti,ab,kf.
35	or/24-34
36	23 and 35
37	Meta-Analysis/
38	exp Meta-Analysis as Topic/
39	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
40	((systematic* or evidence*) adj3 (review* or overview*)).ti,ab.
41	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
42	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
43	(search* adj4 literature).ab.
44	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
45	cochrane.jw.
46	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
47	or/37-46
48	exp Cohort studies/
49	(cohort adj (study or studies or analys* or data)).ti,ab.
50	((longitudinal or retrospective or prospective) and (study or studies or review or analys* or cohort* or data)).ti,ab.
51	or/48-50
52	predict.ti.
53	(validat* or rule*).ti,ab.
54	(predict* and (outcome* or risk* or model*)).ti,ab.
55	((history or variable* or criteria or scor* or characteristic* or finding* or factor*) and (predict* or model* or decision* or identif* or prognos*)).ti,ab.
56	decision*.ti,ab. and Logistic models/
57	(decision* and (model* or clinical*)).ti,ab.
58	(prognostic and (history or variable* or criteria or scor* or characteristic* or finding* or factor* or model*)).ti,ab.
59	(stratification or discrimination or discriminate or c statistic or "area under the curve" or AUC or calibration or indices or algorithm or multivariable).ti,ab.
60	ROC curve/

61	or/52-60
62	36 and (47 or 51 or 61)

Embase (Ovid) search terms

1	falling/
2	(fall or falls or falling or faller* or fallen or fell or slip* or trip* or stumble* or tumble*).ti,ab.
3	or/1-2
4	letter.pt. or letter/
5	note.pt.
6	editorial.pt.
7	case report/ or case study/
8	(letter or comment*).ti.
9	(conference abstract or conference paper).pt.
10	or/4-9
11	randomized controlled trial/ or random*.ti,ab.
12	10 not 11
13	animal/ not human/
14	nonhuman/
15	exp Animal Experiment/
16	exp Experimental Animal/
17	animal model/
18	exp Rodent/
19	(rat or rats or mouse or mice or rodent*).ti.
20	or/12-19
21	3 not 20
22	limit 21 to english language
23	((risk* or frail* or screen* or gait or balance) adj2 (assess* or test* or tool* or scale* or process* or procedure* or protocol* or guide* or chart* or index or score*)).ti,ab,kf.
24	timed up and go.ti,ab,kf.
25	(gait adj2 (technolog* or app or apps or measure*)).ti,ab,kf.

26	gait speed.ti,ab,kf.
27	((Tinetti or Berg) and balance).ti,ab,kf.
28	functional reach test*.ti,ab,kf.
29	("performance oriented" or "performance orientated").ti,ab,kf.
30	turn 180 degrees.ti,ab,kf.
31	("PRISMA-7" or (morse adj2 scale) or "downton fall risk index" or "FRAT").ti,ab,kf.
32	(clinical adj (assess* or check* or examination* or test* or observ*)).ti,ab,kf.
33	((history or historical or prior or previous or repeat* or fear* or worry* or worries or worried or scared or frequent or frequency or severity) adj2 (question* or asking or observ*)).ti,ab,kf.
34	or/23-33
35	22 and 34
36	systematic review/
37	meta-analysis/
38	(meta analy* or metanaly* or metaanaly* or meta regression).ti,ab.
39	((systematic* or evidence*) adj3 (review* or overview*)).ti,ab.
40	(reference list* or bibliograph* or hand search* or manual search* or relevant journals).ab.
41	(search strategy or search criteria or systematic search or study selection or data extraction).ab.
42	(search* adj4 literature).ab.
43	(medline or pubmed or cochrane or embase or psychlit or psyclit or psychinfo or psycinfo or cinahl or science citation index or bids or cancerlit).ab.
44	cochrane.jw.
45	((multiple treatment* or indirect or mixed) adj2 comparison*).ti,ab.
46	or/36-45
47	cohort analysis/
48	follow-up/
49	cohort*.ti,ab.
50	48 and 49
51	(cohort adj (study or studies or analys* or data)).ti,ab.
52	((longitudinal or retrospective or prospective or cross sectional) and (study or studies or review or analys* or cohort* or data)).ti,ab.
53	or/47,50-52

54	predict.ti.
55	(validat* or rule*).ti,ab.
56	(predict* and (outcome* or risk* or model*)).ti,ab.
57	((history or variable* or criteria or scor* or characteristic* or finding* or factor*) and (predict* or model* or decision* or identif* or prognos*)).ti,ab.
58	decision*.ti,ab. and Statistical model/
59	(decision* and (model* or clinical*)).ti,ab.
60	(prognostic and (history or variable* or criteria or scor* or characteristic* or finding* or factor* or model*)).ti,ab.
61	(stratification or discrimination or discriminate or c statistic or "area under the curve" or AUC or calibration or indices or algorithm or multivariable).ti,ab.
62	Receiver operating characteristic/
63	or/54-62
64	35 and (46 or 53 or 63)

Cochrane Database of Systematic Reviews search terms

#1	MeSH descriptor: [Accidental Falls] explode all trees
#2	(fall or falls or falling or faller* or fallen or slip* or trip* or collapse*):ti,ab
#3	#1 or #2
#4	((risk* or frail* or screen* or gait or balance) near/2 (assess* or test* or tool* or scale* or process* or procedure* or protocol* or guide* or chart* or index or score*)):ti,ab
#5	timed up and go:ti,ab
#6	(gait near/2 (technolog* or app or apps or measure*)):ti,ab
#7	gait speed:ti,ab
#8	((Tinetti or Berg) and balance):ti,ab
#9	functional reach test*:ti,ab
#10	("performance oriented" or "performance orientated"):ti,ab
#11	turn 180 degrees:ti,ab
#12	("PRISMA-7" or (morse near/2 scale) or "downton fall risk index" or "FRAT"):ti,ab
#13	(clinical near/1 (assess* or check* or examination* or test* or observ*)):ti,ab
#14	((history or historical or prior or previous or repeat* or fear* or worry* or worries or worried or scared or frequent or frequency or severity) near/2 (question* or asking or observ*)):ti,ab

#15	(or #4-#14)

Epistemonikos search terms

(title:((title:((fall OR falls OR falling OR faller* OR fallen OR slip* OR trip* OR collapse*)) OR abstract:((fall OR falls OR falling OR faller* OR fallen OR slip* OR trip* OR collapse*)))) OR abstract:((title:((fall OR falls OR falling OR faller* OR fallen OR slip* OR trip* OR collapse*)) OR abstract:((fall OR falls OR falling OR faller* OR fallen OR slip* OR trip* OR collapse*)))))

B.2 Health Economics literature search strategy

Health economic evidence was identified by applying economic evaluation and quality of life filters to the clinical literature search strategy in Medline and Embase. The following databases were also searched: NHS Economic Evaluation Database (NHS EED - this ceased to be updated after 31st March 2015), Health Technology Assessment database (HTA - this ceased to be updated from 31st March 2018) and The International Network of Agencies for Health Technology Assessment (INAHTA)

Table 21: Database parameters, filters and limits applied

Database	Dates searched	Search filters and limits applied
Medline (OVID)	Health Economics 1 January 2014 – 8 May 2024 Quality of Life 1 January 2004 to – 8 May 2024	Health economics studies Quality of Life studies Exclusions (animal studies) English language
Embase (OVID)	Health Economics 1 January 2014 – 8 May 2024 Quality of Life 1 January 2004 to – 8 May 2024	Health economics studies Quality of Life studies Exclusions (animal studies) English language
NHS Economic Evaluation Database (NHS EED) (Centre for Research and Dissemination - CRD)	Inception – 31 March 2015 (database no longer updated as of this date)	
Health Technology Assessment Database (HTA) (Centre for Research and Dissemination – CRD)	Inception – 31 March 2018 (database no longer updated as of this date)	
The International Network of Agencies for Health Technology Assessment (INAHTA)	Inception - 8 May 2024	English language

Medline (Ovid) search terms

1	Accidental Falls/
2	(fall or falls or falling or faller* or fallen or slip* or trip or trips or tripped or tripping or tumbl*).ti,ab.
3	or/1-2
4	letter/
5	editorial/
6	news/
7	exp historical article/
8	Anecdotes as Topic/
9	comment/
10	case report/
11	(letter or comment*).ti.
12	or/4-11
13	randomized controlled trial/ or random*.ti,ab.
14	12 not 13
15	animals/ not humans/
16	exp Animals, Laboratory/
17	exp Animal Experimentation/
18	exp Models, Animal/
19	exp Rodentia/
20	(rat or rats or mouse or mice or rodent*).ti.
21	or/14-20
22	3 not 21
23	limit 22 to english language
24	limit 23 to yr="2004 -Current"
25	23 and 24
26	Economics/
27	Value of life/
28	exp "Costs and Cost Analysis"/
29	exp Economics, Hospital/
30	exp Economics, Medical/
31	Economics, Nursing/

32	Economics, Pharmaceutical/
33	exp "Fees and Charges"/
34	exp Budgets/
35	budget*.ti,ab.
36	cost*.ti.
37	(economic* or pharmaco?economic*).ti.
38	(price* or pricing*).ti,ab.
39	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
40	(financ* or fee or fees).ti,ab.
41	(value adj2 (money or monetary)).ti,ab.
42	or/26-41
43	quality-adjusted life years/
44	sickness impact profile/
45	(quality adj2 (wellbeing or well being)).ti,ab.
46	sickness impact profile.ti,ab.
47	disability adjusted life.ti,ab.
48	(qal* or qtime* or qwb* or daly*).ti,ab.
49	(euroqol* or eq5d* or eq 5*).ti,ab.
50	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
51	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
52	(hui or hui1 or hui2 or hui3).ti,ab.
53	(health* year* equivalent* or hye or hyes).ti,ab.
54	discrete choice*.ti,ab.
55	rosser.ti,ab.
56	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
57	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
58	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
59	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
60	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
61	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
62	or/43-61
63	25 and 42
64	limit 63 to yr="2014 -Current"

65	25 and 62

Embase (Ovid) search terms

1	falling/
2	(fall or falls or falling or faller* or fallen or slip* or trip or trips or tripped or tripping or tumbl*).ti,ab.
3	or/1-2
4	letter.pt. or letter/
5	note.pt.
6	editorial.pt.
7	case report/ or case study/
8	(letter or comment*).ti.
9	(conference abstract or conference paper).pt.
10	or/4-9
11	randomized controlled trial/ or random*.ti,ab.
12	10 not 11
13	animal/ not human/
14	nonhuman/
15	exp Animal Experiment/
16	exp Experimental Animal/
17	animal model/
18	exp Rodent/
19	(rat or rats or mouse or mice or rodent*).ti.
20	or/12-19
21	3 not 20
22	limit 21 to english language
23	limit 22 to yr="2004 -Current"
24	health economics/
25	exp economic evaluation/
26	exp health care cost/
27	exp fee/
28	budget/
29	funding/
30	budget*.ti,ab.

31	cost*.ti.
32	(economic* or pharmaco?economic*).ti.
33	(price* or pricing*).ti,ab.
34	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
35	(financ* or fee or fees).ti,ab.
36	(value adj2 (money or monetary)).ti,ab.
37	or/24-36
38	quality adjusted life year/
39	"quality of life index"/
40	short form 12/ or short form 20/ or short form 36/ or short form 8/
41	sickness impact profile/
42	(quality adj2 (wellbeing or well being)).ti,ab.
43	sickness impact profile.ti,ab.
44	disability adjusted life.ti,ab.
45	(qal* or qtime* or qwb* or daly*).ti,ab.
46	(euroqol* or eq5d* or eq 5*).ti,ab.
47	(qol* or hql* or hqol* or h qol* or hrqol* or hr qol*).ti,ab.
48	(health utility* or utility score* or disutilit* or utility value*).ti,ab.
49	(hui or hui1 or hui2 or hui3).ti,ab.
50	(health* year* equivalent* or hye or hyes).ti,ab.
51	discrete choice*.ti,ab.
52	rosser.ti,ab.
53	(willingness to pay or time tradeoff or time trade off or tto or standard gamble*).ti,ab.
54	(sf36* or sf 36* or short form 36* or shortform 36* or shortform36*).ti,ab.
55	(sf20 or sf 20 or short form 20 or shortform 20 or shortform20).ti,ab.
56	(sf12* or sf 12* or short form 12* or shortform 12* or shortform12*).ti,ab.
57	(sf8* or sf 8* or short form 8* or shortform 8* or shortform8*).ti,ab.
58	(sf6* or sf 6* or short form 6* or shortform 6* or shortform6*).ti,ab.
59	or/38-58
60	23 and 37
61	limit 60 to yr="2014 -Current"
62	23 and 59

NHS EED and HTA (CRD) search terms

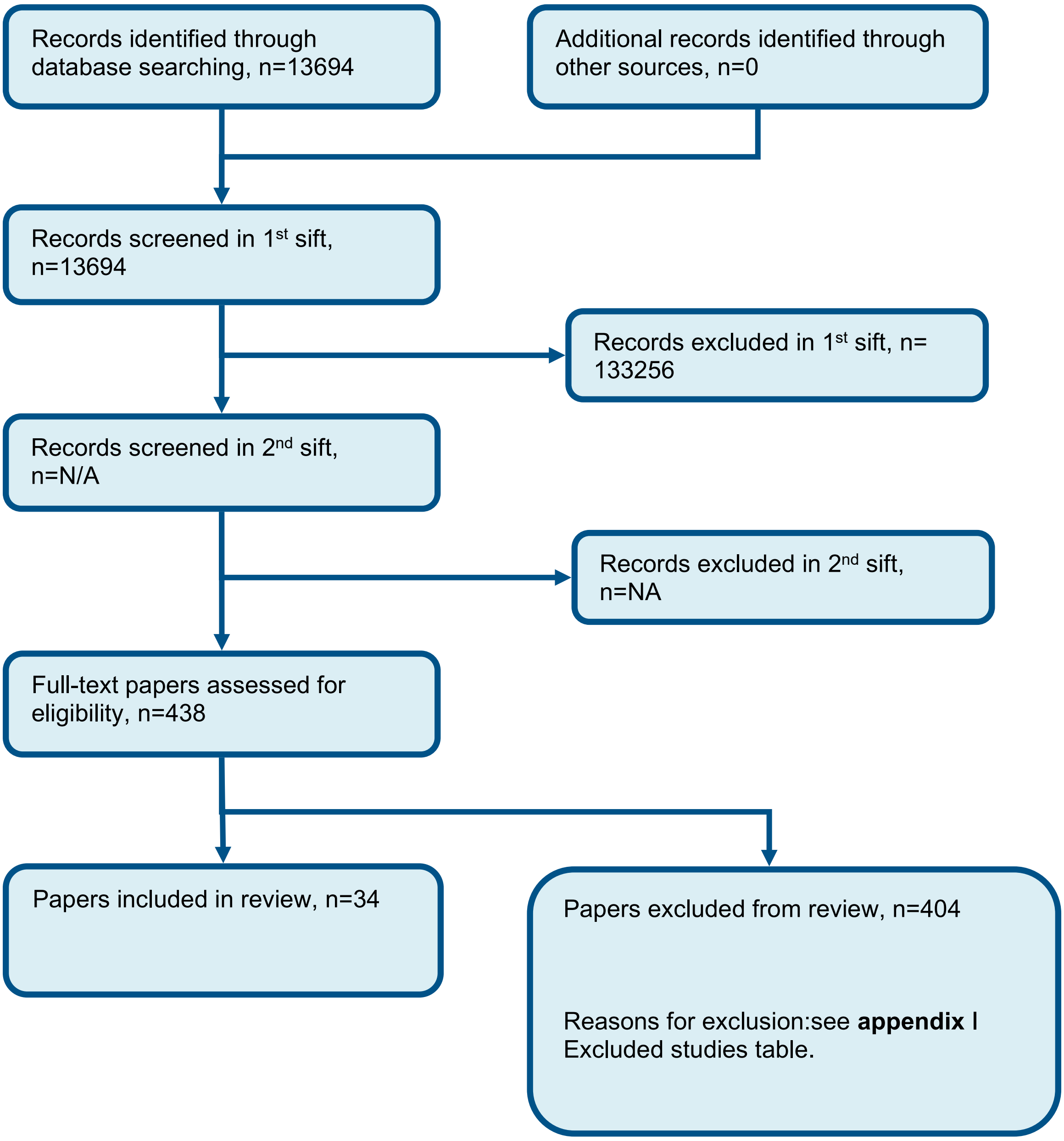
1	MeSH DESCRIPTOR Accidental Falls EXPLODE ALL TREES
2	((fall or falls or falling or faller* or fallen or slip* or trip or trips or tripped or tripping or tumbl*))
3	#1 OR #2
4	(#3) IN NHSEED
5	(#3) IN HTA

INAHTA search terms

1	("Accidental Falls"[mh]) OR (fall or falls or falling or faller* or fallen or slip* or trip or trips or tripped or tripping or tumbl*)
2	limit to english language
3	2004 - current

Appendix C Prognostic evidence study selection

Figure 1: Flow chart of clinical study selection for the review of assessment tools identifying people at risk of falls



Appendix D Prognostic evidence

Almeida, 2016

Bibliographic Reference	**Almeida, Lorena R S; Valenca, Guilherme T; Negreiros, Nadja N; Pinto, Elen B; Oliveira-Filho, Jamary; Comparison of Self-report and Performance-Based Balance Measures for Predicting Recurrent Falls in People With Parkinson Disease: Cohort Study.; Physical therapy; 2016; vol. 96 (no. 7); 1074-84**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Brazil
Study setting	Movement disorders clinic
Study dates	April 2010 - June 2013
Sources of funding	No additional information

Study sample	710 outpatients were screened for potential inclusion, with 324 approached for participation, 229 undergoing baseline assessments, and 225 completing the study and being included in the analysis
Inclusion criteria	Able to walk with or without an assistive device or assistive person Diagnosed with idiopathic Parkinson's Disease
Exclusion criteria	Neurological conditions other than Parkinson's Disease Cognitive impairment (MMSE using cut-offs specific to education level) Dementia Severe visual disturbance Vestibular dysfunction Comorbidities that could affect locomotion or balance
Population subgroups	No additional information
Risk tool(s)	Timed up and go test The timed up and go requires participants to stand up from an armchair, walk forward for 3 m, turn around, walk back to the chair, and sit down; results are recorded in seconds. For the present study, participants were allowed to wear their regular footwear and use their customary walking aids. Two trials were performed by participants; the second trial was recorded as the test result. Functional reach test

	The FRT is used as a test of anticipatory balance control without a change in the base of support. It measures, in centimetres, the maximum distance that a person can reach forward beyond arm's length while standing with a stable base of support. Dynamic gait index (gait speed) The dynamic gait index was used in this study - an 8-item test used to evaluate a person's ability to adjust balance while walking in response to changing gait task demands. Items include walking forward, changing gait speed, pivot turning, stepping over obstacles, and stair climbing. Scores on each item range from 0 point (worst) to 3 points (best), with the total score ranging from 0 to 24 points.
Predictors	Not specified
Model development and validation	To select the best-fitting model for predicting recurrent falls, a 3-step model building process was followed. ROC curves were developed for each self-report and performance-based balance measure as a predictor of recurrent falls. This approach was chosen because cutoff scores that were previously developed for elderly people (although not specifically people with PD) were reported to have low sensitivity for people with PD. In the present study, optimal cutoff points were chosen on the basis of the Youden Index. Noninferiority tests were used to compare the AUCs of the self-report measures with each other and with those of each performance-based measure and, therefore, to determine whether the accuracy of each self-report measure was not inferior to that of the performance-based measures. Each combination of 1, 2, and 3 dichotomous scales to be used as a predictor was evaluated with a separate logistic regression model, with recurrent falls as the dependent variable. The Akaike information criterion (AIC) was calculated for each model. The model with the lowest AIC value was chosen as the best-fitting model for predicting recurrent falls
Outcome	Participants were classified as recurrent fallers if they had ≥2 falls, or non-recurrent fallers if they had ≤1 fall in the 12-month follow-up period

Duration of follow-up	12 months
Indirectness	Dynamic gait index is an indirect assessment of gait speed, including aspects other than just gait speed
Additional comments	No additional comments

Study arms

Timed up and go test (>15.2 seconds) (N = 225)

Functional reach test (≤17 cm) (N = 225)

Gait speed (Dynamic gait index ≤19 points) (N = 225)

Characteristics

Study-level characteristics

Characteristic	Study (N =)
% Female Sample size	n = 103; % = 45.8
Mean age (SD) Mean (SD)	70.66 (6.56)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

12-month

Prognostic Accuracy for Recurrent Falls (2 or more)

Outcome	Timed up and go test (>15.2 seconds), 12-month, N = 225	Functional reach test (≤17 cm) , 12 month, N = 225	Gait speed (Dynamic gait index ≤19 points), 12-month, N = 225
AUC Mean (95% CI)	0.72 (0.66 to 0.78)	0.74 (0.67 to 0.79)	0.76 (0.7 to 0.82)
Sensitivity Mean (95% CI)	0.63 (0.52 to 0.73)	0.56 (0.45 to 0.67)	0.73 (0.62 to 0.82)
Specificity Mean (95% CI)	0.74 (0.66 to 0.81)	0.82 (0.75 to 0.88)	0.72 (0.64 to 0.79)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to predictor information not being described)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Aranda-Gallardo, 2017

Bibliographic Reference	Aranda-Gallardo, Marta; Enriquez de Luna-Rodriguez, Margarita; Vazquez-Blanco, Maria J; Canca-Sanchez, Jose C; Moya-Suarez, Ana B; Morales-Asencio, Jose M; Diagnostic validity of the STRATIFY and Downton instruments for evaluating the risk of falls by hospitalised acute-care patients: a multicentre longitudinal study.; BMC health services research; 2017; vol. 17 (no. 1); 277

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Spain
Study setting	Primary care (acute care hospitals)
Study dates	May 2014 - March 2016
Sources of funding	Funded by the Regional Health Ministry of Andalusia
Study sample	Adult patients (aged over 16 years) admitted to inpatient with an expected stay exceeding 48 hours

Inclusion criteria	None reported
Exclusion criteria	Obstetric, paediatric and psychiatric patients Treated in A&E departments, medical and surgical day-care units Short-stay patients Patients in areas of post-surgical recovery Could not be followed up for the periods determined
Population subgroups	No additional information
Risk tool(s)	Age Sex Centre Type of unit (medical, surgical or ICU) Falls prevention measures in place Number of falls occurred Level of consciousness during the fall Date and time of the fall Circumstances and consequences of falls All items required for the Downton and STRATIFY tools
Predictors	St. Thomas Risk Assessment Tool in Falling Elderly (STRATIFY) and Downton Fall risk index (DFRI)

	The tools were administered to the patients by nurses during the first 24 hours of hospital admission, then, every 72 hours until discharge the risk of falls was re-evaluated with both instruments
Model development and validation	Diagnostic validity was assessed by calculations of sensitivity, specificity, positive and negative predictive values and ratios of positive and negative probability. ROC curves were analysed to determine cut-off points, assuming non-parametric distribution. In addition, the rates of correct classification (performance test) were calculated. Analyses of predictive validity were performed, using the values obtained throughout the follow-up periods, in order to assess fluctuations in the level of risk and its influence on the diagnostic performance of the scales.
Outcome	The occurrence of falls was verified by three different sources for each case, to minimise the risk of underreporting: by asking the patient and/or relative directly, by analysis of the falls record kept by the hospital unit, and by examining the patient’s clinical history, in addition to consulting with the nurse responsible. The definition employed for this event was that proposed by the World Health Organization, which defines a fall as “an event which results in a person coming to rest inadvertently on the ground or floor or other lower level”. In all cases of falls, the nurses collaborating with the project filled in a report form stating the circumstances and consequences for the patients.
Duration of follow-up	All participants were hospitalised for at least 72 hours, then followed up until discharge, death or transfer to another unit
Indirectness	Study includes any adults; protocol specifies over 50s. However, mean age suggests the majority of the population were over 50 years of age.
Additional comments	None

Study arms

STRATIFY (cut point 1) (N = 977)

STRATIFY (cut point 2) (N = 977)

DFRI (cut point 2) (N = 977)

DFRI (cut point 3) (N = 977)

Characteristics

Study-level characteristics

Characteristic	Study (N = 977)
% Female Sample size	n = 459; % = 47
Mean age (SD) Mean (SD)	65.58 (17.55)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

Discharge, transfer or death

Prognostic accuracy for falling

Outcome	STRATIFY (cut point 1), Discharge, transfer or death, N = 977	STRATIFY (cut point 2), Discharge, transfer or death, N = 977	DFRI (cut point 2), Discharge, transfer or death, N = 977	DFRI (cut point 3), Discharge, transfer or death, N = 977
Sensitivity Nominal	47.6	41	66.7	58
Specificity Nominal	85	84	55.3	54
PPV Nominal	10.9	1.8	5.5	0.9
NPV Nominal	97.7	99.5	97.7	99.5
AUC Mean (95% CI)	0.69 (0.57 to 0.8)	NR (NR to NR)	0.6 (0.48 to 0.72)	NR (NR to NR)

Prognostic accuracy data (over 65 years subgroup analysis)

Outcome	STRATIFY (cut point 1), Discharge, transfer or death, N = 597	STRATIFY (cut point 2), Discharge, transfer or death, N = NR	DFRI (cut point 2), Discharge, transfer or death, N = 597	DFRI (cut point 3), Discharge, transfer or death, N = NR
AUC (95% CI) Mean (95% CI)	0.63 (0.5 to 0.77)	NR (NR to NR)	0.55 (0.4 to 0.7)	NR (NR to NR)

Arslan, 2022

Bibliographic Reference	**Arslan, Ozge; Tosun, Zeynep; Comparison of the psychometric properties of three commonly used fall risk assessment tools: a prospective observational study for stroke patients.; Topics in stroke rehabilitation; 2022; vol. 29 (no. 6); 430-437**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study type	Prospective cohort study
Study location	Turkey
Study setting	Community setting
Study dates	NR
Sources of funding	No specific funding received
Study sample	Patients who had previously experienced a stroke

Inclusion criteria	18 years or older Diagnosed with acute ischemic or hemorrhagic stroke Not having any disease that could affect functional status other than stroke
Exclusion criteria	Not reported
Population subgroups	None
Risk tool(s)	Itaki FRS: A scale consisting of 11 minor and 8 major risk factors for falls. The risk of fall is determined by giving 1 point to the minor risk factor and 5 points for any major risk factor. Patients with a score of 5 or more are considered to be of high risk of falling HIIFRM: Highest possible score is 16 with a score of 5 or more indicating a high risk of falling. MFS: Scale consisting of 6 items reflecting the risk of falling. Total scores of 125 are possible, with scores over 51 indicating a high risk of falls.
Predictors	NA
Model development and validation	NA
Outcome	Falls
Duration of follow-up	NR
Indirectness	NR
Additional comments	

Study arms

Morse Fall Scale (MFS) (≥ 66.2)) (N = 125)

Itaki Falls Risk Scale (Itaki FRS) (≥ 14)) (N = 125)

Hendrich II Fall Risk Model (HIIFRM) (≥ 4.5 cut off) (N = 125)

Characteristics

Study-level characteristics

Characteristic	Study (N = 125)
% Female Nominal	48.8
Mean age (SD) Mean (SD)	71.47 (11.16)

Outcomes

Outcome	Morse Fall Scale (MFS) (≥ 66.2)), , N = 125	Itaki Falls Risk Scale (Itaki FRS) (≥ 14)), , N = 125	Hendrich II Fall Risk Model (HIIFRM) (≥ 4.5 cut off), , N = 125
Sensitivity (%) Nominal	91.67	75	83.33
Specificity % Nominal	73.45	63.72	50.44
PPV	26.83	18	15.15

Nominal			
NPV Nominal	98.81	96	96.61

Critical appraisal - PROBAST tool 2.2

Section	**Question**	**Answer**
Overall Risk of bias and Applicability	Risk of bias	Low
Overall Risk of bias and Applicability	Concerns for applicability	Low

Ashburn, 2008

Bibliographic Reference	**Ashburn, A; Hyndman, D; Pickering, R; Yardley, L; Harris, S; Predicting people with stroke at risk of falls.; Age and ageing; 2008; vol. 37 (no. 3); 270-6**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	UK
Study setting	Assessed at discharge after hospitalisation for a stroke
Study dates	No additional information
Sources of funding	Funded by The Stroke Association
Study sample	Consecutively hospitalised patients with a stroke in the were recruited at the point of discharge from hospital
Inclusion criteria	Independently mobile prior to the stroke and were able to give informed consent

Exclusion criteria	None reported
Population subgroups	No additional information
Risk tool(s)	Functional reach test Participants completed tests within 2 weeks of being discharged from hospital to the community and at 12 months post-discharge from hospital
Predictors	Demographic data (age, gender, time in hospital, side of lesion and Oxford Stroke Classification of cerebral infarct) Information on impaired vision, hearing, and musculoskeletal and vestibular deficits History of previous strokes Other neurological conditions
Model development and validation	Predictive scores based on the selected variables and on all variables emerging from the initial screening were created using regression estimates. The accuracy of individual variables and the two predictive scores was examined using sensitivity, specificity, positive and negative predictive values at cut-points chosen to optimise sensitivity and specificity
Outcome	Fall data was collected whilst participants had returned to the community. Diaries were kept that recorded when falls occurred. A fall was defined as 'an event that results in a person coming to rest unintentionally on the ground or other lower level, not as a result of a major intrinsic event or overwhelming hazard'. Participants were classified as repeat fallers if they experienced ≥2 falls in the following year, and as single fallers if they had one fall.
Duration of follow-up	12 months
Indirectness	None
Additional comments	None

Study arms

Functional reach test (≤21.5 cm) (N = 115)

Characteristics

Study-level characteristics

Characteristic	Study (N = 115)
% Female Sample size	n = 38; % = 33
Mean age (SD) Mean (SD)	70.1 (12.4)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

12 months

Prognostic accuracy of repeat falls

Outcome	Functional reach test (≤21.5 cm), 12-month, N = 115
Sensitivity Mean (95% CI)	69 (54 to 80)
Specificity Mean (95% CI)	54 (42 to 65)
PPV Mean (95% CI)	51 (39 to 63)
NPV Mean (95% CI)	71 (58 to 82)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to exclusion criteria was not specified)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Beauchamp, 2022

Bibliographic Reference	**Beauchamp, Marla K; Kuspinar, Ayse; Sohel, Nazmul; Mayhew, Alexandra; D'Amore, Cassandra; Griffith, Lauren E; Raina, Parminder; Mobility screening for fall prediction in the Canadian Longitudinal Study on Aging (CLSA): implications for fall prevention in the decade of healthy ageing.; Age and ageing; 2022; vol. 51 (no. 5)**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Canada
Study setting	Community
Study dates	No additional information
Sources of funding	Funding for the Canadian Longitudinal Study on Aging was provided by the Government of Canada through the Canadian Institutes of Health Research

Study sample	The Canadian Longitudinal Study on Aging (CLSA) was a study of >50,000 community-dwelling men and women aged 45-85 years across Canada. This study included people aged 65 and older from the comprehensive CLSA, which involved home-based interviews and comprehensive physical assessments at baseline, who also provided data at 18 months follow-up.
Inclusion criteria	Reported a fall in the 12 months prior to baseline, or reported difficulty with mobility during daily activities
Exclusion criteria	None specified
Population subgroups	None
Risk tool(s)	The following measures were included as covariates in the adjusted analysis: Age Sex Depression (score ≥10 on the Centre for Epidemiologic Studies Short Depression Scale (CES-D)) Cognitive impairment (mental alteration test (MAT) score of <35) Fair or poor self-rated vision Secondary or lower education Moderate or severe self-rated pain Urinary incontinence Use of psychotropic medication
Predictors	The Single Leg Stance Test Participants placed their hands on their hips, lifted one foot off the floor and held this position for a maximum of 60 seconds

	The Timed up and go Participants were timed whilst they stood up from a chair, walked 3-m, turned 180 degrees, walked back to the chair and sat down The 5-repetition Chair-rise Test Participants stood up and sat down from a chair five times as quickly as possible The 4-m Gait Speed Test Participants speed was measured over 4-m at their usual walking speed
Model development and validation	Each individual test was examined for accuracy of predicting fallers and recurrent fallers using proc logistic procedure for calculating the area AUC of the ROC curve along with the 95% confidence interval. Sensitivity, specificity, PPV and NPV were calculated and considered the optimum cut-off values as those with the maximum value of sensitivity plus specificity. We also examined AUC values for ROC curves with the mobility test and other fall risk factors included in the model. The adjusted models used the optimum cut-off values for the mobility tests we observed from the original ROC analysis to explore any improvements in the model with the inclusion of other risk factors.
Outcome	Participants were asked at follow-up to recall falls in the previous year that resulted in limitations to their normal activities using the question: 'In the past 12-months did you have any falls?' The response options were yes or no. If they responded yes, participants were also asked 'How many times have you fallen in the past 12-months?' Individuals who reported one or more falls were classified as a faller. A subgroup of fallers with ≥2 falls were considered recurrent fallers.
Duration of follow-up	12 months
Indirectness	None
Additional comments	None

Study arms

One leg stand test (Single Leg Stance Test, cut-off: 4.47 s for falls, 5.24 s for recurrent falls) (N = 810)

Timed up and go test (cut-off: 14.21 s for falls, 13.71 s for recurrent falls) (N = 1056)

Chair test (5-repetition chair-rise test, cut-off: 15.90 s for falls, 15.75 s for recurrent falls) (N = 860)

Gait speed (4-m gait speed, cut-off: 0.73 m/s for both falls and recurrent falls) (N = 1063)

Characteristics

Study-level characteristics

Characteristic	Study (N = 1121)
% Female Sample size	n = 747 ; % = 66.6
Mean age (SD) Mean (SD)	75.2 (5.91)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

12 months

Prognostic accuracy for falls

Outcome	One leg stand test (Single Leg Stance Test, cut-off: 4.47 s for falls, 5.24 s for recurrent falls), 12-month, N = 810	Timed up and go test (cut-off: 14.21 s for falls, 13.71 s for recurrent falls), 12-month, N = 1056	Chair test (5-repetition chair-rise test, cut-off: 15.90 s for falls, 15.75 s for recurrent falls), 12-month, N = 860	Gait speed (4-m gait speed, cut-off: 0.73 m/s for both falls and recurrent falls), 12-month, N = 1063
AUC Mean (95% CI)	0.52 (0.47 to 0.58)	0.6 (0.55 to 0.64)	0.52 (0.47 to 0.58)	0.57 (0.53 to 0.62)
Sensitivity Nominal	0.43	0.36	0.46	0.47
Specificity Nominal	0.66	0.82	0.59	0.66
PPV Nominal	0.2	0.32	0.19	0.25
NPV Nominal	0.85	0.84	0.84	0.83

Prognostic accuracy for repeat falls

Outcome	One leg stand test (Single Leg Stance Test, cut-off: 4.47 s for falls, 5.24 s for recurrent falls), 12-month, N = 810	Timed up and go test (cut-off: 14.21 s for falls, 13.71 s for recurrent falls), 12-month, N = 1056	Chair test (5-repetition chair-rise test, cut-off: 15.90 s for falls, 15.75 s for recurrent falls), 12-month, N = 860	Gait speed (4-m gait speed, cut-off: 0.73 m/s for both falls and recurrent falls), 12-month, N = 1063
AUC Mean (95% CI)	0.62 (0.53 to 0.71)	0.68 (0.62 to 0.75)	0.6 (0.51 to 0.69)	0.65 (0.59 to 0.72)
Sensitivity Nominal	0.68	0.56	0.65	0.63
Specificity Nominal	0.63	0.78	0.58	0.65
PPV Nominal	0.09	0.17	0.08	0.13
NPV Nominal	0.97	0.96	0.97	0.96

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to exclusion criteria not being specified, a standard outcome definition was not provided, all enrolled participants were not included in the analysis, and assessments being made with knowledge of the outcome data)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Bentzen, 2011

Bibliographic Reference	**Bentzen, Hege; Bergland, Astrid; Forsen, Lisa; Diagnostic accuracy of three types of fall risk methods for predicting falls in nursing homes.; Aging clinical and experimental research; 2011; vol. 23 (no. 3); 187-95**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Norway
Study setting	Nursing homes
Study dates	May 2005 - December 2006
Sources of funding	Funded by the Norwegian Institute for Health and Rehabilitation
Study sample	A prospective observational cohort study was carried out within the framework of a hip protector trial in 18 Norwegian nursing homes. All residents living permanently in these nursing homes between May 2005 and December 2006 were asked to participate.

Inclusion criteria	None specified
Exclusion criteria	None specified
Population subgroups	None
Risk tool(s)	No additional information
Predictors	The St. Thomas Risk Assessment Tool in Falling Elderly (STRATIFY) A modified version for use in nursing homes (Guidelines for the prevention and management of falls in the elderly) was used. STRATIFY consists of five questions: Has the resident had a fall within the last 3 months? Do you think the resident is agitated? Do you think the resident is visually impaired to the extent that everyday function is affected? Do you think the resident is in need of especially frequent toileting? Do you think the resident has a transfer score and mobility score of 3 or 4? (based on the transfer and mobility items of the Barthel ADL index) The sum score in STRATIFY ranges from 0 to 5. A sum score of two or more was used as the cut-off value between low and high risk.
Model development and validation	Diagnostic accuracy was evaluated in terms of sensitivity, specificity, and positive and negative predictive value. The first fall was the reference standard. For these analyses, participants were observed for falls during a period of 30, 90 and 180 days. For the analyses for these three periods, we included only those with more than 30, 90 and 180 days of observation, respectively. Sensitivity was defined as the percentage of fallers correctly identified as at high risk. Specificity was defined

	as the percentage of non-fallers correctly defined as at low risk. The positive predictive value was defined as the percentage of high-risk residents who had had one or more fall, and the negative predictive value was the percentage of low-risk residents who did not fall.
Outcome	A faller was defined as “a person who has fallen at least once in a given time period”. A fall was defined as “any event when the resident, unintentionally and regardless of cause comes to rest on the floor”. All falls occurring among participants were recorded from the time of inclusion to time of death, transfer, or end of study. The staff in each nursing home recorded falls prospectively soon after the occurrence of the fall.
Duration of follow-up	180 days
Indirectness	None
Additional comments	None

Study arms

STRATIFY (cut-off: ≥2) (N = 1148)

Characteristics

Study-level characteristics

Characteristic	Study (N = 1148)
% Female Sample size	n = 830 ; % = 72.3
Mean age (SD) Mean (SD)	84.6 (8.1)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

30-day

90-day

180-day

Prognostic accuracy for falls

Outcome	STRATIFY (cut-off: ≥2), 30-day, N = 1100	STRATIFY (cut-off: ≥2), 90-day, N = 987	STRATIFY (cut-off: ≥2), 180-day, N = 867
Sensitivity Mean (95% CI)	65 (57 to 72)	58 (52 to 64)	56 (51 to 62)
Specificity Mean (95% CI)	71 (68 to 74)	73 (69 to 76)	76 (72 to 79)
PPV Mean (95% CI)	31 (27 to 36)	45 (40 to 50)	58 (53 to 64)
NPV Mean (95% CI)	91 (88 to 93)	82 (78 to 85)	74 (70 to 78)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to lack of information regarding predictors.)*
Overall Risk of bias and Applicability	Concerns for applicability	Low

Butler Forslund, 2019

Bibliographic Reference	**Butler Forslund, Emelie; Jorgensen, Vivien; Skavberg Roaldsen, Kirsti; Hultling, Claes; Wahman, Kerstin; Franzen, Erika; Predictors of falls in persons with spinal cord injury-a prospective study using the Downton fall risk index and a single question of previous falls.; Spinal cord; 2019; vol. 57 (no. 2); 91-99**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Norway and Sweden
Study setting	Assessments carried out at rehabilitation centres for spinal cord injuries
Study dates	No additional information
Sources of funding	Financially supported by the Rehab Station Stockholm, Sunnaas Rehabilitation Hospital, Neuro Sweden, Praktikertjänst, the Promobilia Foundation, the Spinalis Foundation and the Doctoral School in Health Care Sciences at Karolinska Institutet

Study sample	This study was part of the Spinal Cord Injury Prevention of Falls Study (SCIP Falls). A consecutive sample of 224 persons with spinal cord injuries were included. Participants, (151 wheelchair users, 73 ambulatory), were recruited from Rehab Station Stockholm/Spinalis, Sweden and Sunnaas Rehabilitation Hospital, Norway at regular lifelong SCI follow up
Inclusion criteria	Aged ≥18 years At least one year post traumatic SCI (American Spinal Cord Injury Impairment Scale [AIS] A-D)
Exclusion criteria	Motor complete injuries (AIS A and B) above C5 level and injuries below L5
Population subgroups	Prognostic accuracy data reported separately for wheelchair users and ambulatory patients
Risk tool(s)	None
Predictors	Downton Fall risk index (DFRI). The DFRI is based on 11 items: falls during the previous year (score 0/1), medication (maximum score 5), visual, hearing and limb impairment (maximum score 3), cognitive orientation (score 0/1), and ability to walk safely (score 0/1). The total sum (0–11) is calculated, and a score of ≥3 is used to indicate a high risk of falls.
Model development and validation	Sensitivity and specificity for predicting falls were analysed for allocation to low and high-risk groups. The area under the ROC curve was calculated with a value >0.7 considered as sufficient. After three, six-, and twelve-months specificity, sensitivity, PPV, NPV and Prognostic Separation Index were calculated with 95% confidence intervals.
Outcome	Falls were registered prospectively for one year with a text message delivered every second week with the question “Have you fallen the previous two weeks? (yes or no)”. If no answer was forthcoming, a reminder and a telephone follow-up were sent. A semi-structured telephone interview was performed when a fall was reported. Falls during sports were registered but excluded.
Duration of follow-up	12 months
Indirectness	None
Additional comments	None

Study arms

Downton Fall risk index (cut-off: ≥3) (N = 224)

Characteristics

Study-level characteristics

Characteristic	Study (N = 224)
% Female Sample size	n = 51; % = 22.8
Mean age (SD) Mean (SD)	49.65 (14.93)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

3-month

6-month

12-month

Prognostic accuracy for falls

Outcome	Downton Fall risk index (cut-off: ≥3), 3-month, N = 224	Downton Fall risk index (cut-off: ≥3), 6-month, N = 224	Downton Fall risk index (cut-off: ≥3), 12-month, N = 224
Wheelchair users Mean (95% CI)	36 (23 to 51)	36 (25 to 48)	37 (27 to 47)
Ambulatory Mean (95% CI)	57 (41 to 72)	50 (36 to 64)	47 (35 to 61)
Wheelchair users Mean (95% CI)	74 (65 to 82)	78 (67 to 86)	85 (72 to 93)
Ambulatory Mean (95% CI)	81 (61 to 93)	79 (54 to 94)	83 (52 to 98)
Wheelchair users Mean (95% CI)	39 (24 to 55)	61 (46 to 76)	82 (67 to 92)

Outcome	Downton Fall risk index (cut-off: ≥3), 3-month, N = 224	Downton Fall risk index (cut-off: ≥3), 6-month, N = 224	Downton Fall risk index (cut-off: ≥3), 12-month, N = 224
Ambulatory Mean (95% CI)	80 (65 to 90)	87 (73 to 94)	93 (80 to 94)
Wheelchair users Mean (95% CI)	72 (62 to 80)	55 (45 to 65)	42 (33 to 52)
Ambulatory Mean (95% CI)	58 (48 to 67)	36 (28 to 44)	23 (18 to 31)

Critical appraisal - PROBAST tool 2.2

Section	**Question**	**Answer**
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to limited information regarding predictors)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Campanini, 2018

Bibliographic Reference	**Campanini, Isabella; Mastrangelo, Stefano; Bargellini, Annalisa; Bassoli, Agnese; Bosi, Gabriele; Lombardi, Francesco; Tolomelli, Stefano; Lusuardi, Mirco; Merlo, Andrea; Feasibility and predictive performance of the Hendrich Fall Risk Model II in a rehabilitation department: a prospective study.; BMC health services research; 2018; vol. 18 (no. 1); 18**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Italy
Study setting	Orthopaedic, pulmonary and neurological rehabilitation units
Study dates	No additional information
Sources of funding	Funded by the AUSL of Reggio Emilia
Study sample	Adult patients consecutively admitted to orthopaedic, pulmonary or neurological rehabilitation units

Inclusion criteria	None specified
Exclusion criteria	None specified
Population subgroups	None
Risk tool(s)	Age Length of observation period
Predictors	The Hendrich Fall Risk Model II (HIIFRM) Participants risk of falling was evaluated within 24 hours of admission by two physiotherapists. The HIIFRM consists of eight weighted items assessing confusion/disorientation/impulsivity (score 4), symptomatic depression (score 2), altered elimination (score 1), dizziness or vertigo (score 1), male sex (score 1), antiepileptic prescription (score 2), benzodiazepine prescription (score 1), and “get up from chair” test (score ranging between 0 and 4). In this scale, the term altered elimination is qualified by the presence of any of the following symptoms: urinary or faecal incontinence, urgency or stress incontinence, diarrhoea, frequent urination, and nocturia. The specific scores are based on their likelihood to cause a fall. These are summed up to a total score that can range between 0 (lowest risk) and 16 (highest risk). A participant was considered at high risk of falling if the total score was ≥5. When the chair test could not be administered, the item associated was scored 0. Participants who could not attempt the rising-from-chair test were classified as at-risk in the case of a total score from the remaining items equal to, or greater than the cut-off score
Model development and validation	The dependency of HIIFRM feasibility on age and length of the observation period was investigated by the non-parametric Mann-Whitney U-test. Its dependency on gender was assessed with the Chi-Square test (or the Fisher’s exact test as appropriate). The overall predictive power of the tool, using the HIIFRM but-off, was obtained as the area under the ROC curve. Sensitivity, specificity, PPV and NPV of the scale were computed along with their 95% confidence intervals. The threshold that provided the best predictive power was found by applying the Hendrich’s classification rule (total score of the available items equal to or greater than the selected cut-off score) for all possible cut-offs. Sensitivity, specificity, PPV and NPV were also calculated for the optimal threshold.

Outcome	The occurrence of falls was checked and recorded on a daily basis by professionals (nurses, physiotherapists, physicians), from their admission until discharge, death or transfer to another unit. A fall was registered when “an event which results in a person coming to rest inadvertently on the ground or floor or other lower level” occurred.
Duration of follow-up	Participants were observed until discharge, transfer to another unit, or death. Mean (SD) observation time was 52 (23) days.
Indirectness	None
Additional comments	None

Study arms

Hendrich II Falls Risk Tool (cut-off: ≥5) (N = 147)

Hendrich II Falls Risk Tool (cut-off: ≥6) (N = 147)

Hendrich II Falls Risk Tool (cut-off: ≥7) (N = 147)

Hendrich II Falls Risk Tool (cut-off: ≥8) (N = 147)

Hendrich II Falls Risk Tool (cut-off: ≥9) (N = 147)

Characteristics

Study-level characteristics

Characteristic	Study (N = 147)
% Female Sample size	n = 86; % = 59
Mean age (SD) Mean (SD)	69 (16)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

End of observation period; Prognostic accuracy for falls

Outcome	Hendrich II Falls Risk Tool (cut-off: ≥5), End of observation period, N = 147	Hendrich II Falls Risk Tool (cut-off: ≥6), End of observation period, N = 147	Hendrich II Falls Risk Tool (cut-off: ≥7), End of observation period, N = 147	Hendrich II Falls Risk Tool (cut-off: ≥8), End of observation period, N = 147	Hendrich II Falls Risk Tool (cut-off: ≥9), End of observation period, N = 147
AUC Mean (95% CI)	0.78 (0.69 to 0.87)	NR (NR to NR)	NR (NR to NR)	NR (NR to NR)	NR (NR to NR)
Sensitivity Mean (95% CI)	100 (NR to NR)	91 (74 to 100)	82 (59 to 100)	73 (46 to 99)	45 (16 to 75)
Specificity Mean (95% CI)	49 (40 to 57)	57 (48 to 65)	66 (58 to 74)	72 (65 to 80)	79 (73 to 86)
PPV Mean (95% CI)	14 (6 to 21)	14 (6 to 23)	16 (7 to 26)	17 (6 to 28)	15 (3 to 27)
NPV Mean (95% CI)	100 (NR to NR)	99 (96 to 100)	98 (95 to 100)	97 (94 to 100)	95 (91 to 99)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of data due to missing participant data)*
Overall Risk of bias and Applicability	Concerns for applicability	Low

Cattelani, 2015

Bibliographic Reference	**Cattelani, Luca; Palumbo, Pierpaolo; Palmerini, Luca; Bandinelli, Stefania; Becker, Clemens; Chesani, Federico; Chiari, Lorenzo; FRAT-up, a Web-based fall-risk assessment tool for elderly people living in the community.; Journal of medical Internet research; 2015; vol. 17 (no. 2); e41**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Italy
Study setting	Community
Study dates	1998 - 2006
Sources of funding	Received funding from the European Union Seventh Framework Programme
Study sample	Data was obtained from the InCHIANTI database - an ongoing population-based epidemiological study investigated age-related declines in mobility. For this study, data from the first 3 waves, from 1998 to 2006 was used.

Inclusion criteria	Aged ≥65 years
Exclusion criteria	None specified
Population subgroups	None
Risk tool(s)	No additional information
Predictors	The Falls Risk Assessment Tool (FRAT) The FRAT tool is a risk-assessment algorithm based on probability contributions from single risk factors to give an individual their probability of falling in a given time frame: Age Cognitive impairment Depression Diabetes Comorbidity Dizziness and vertigo Fear of falling Female sex Gait problems Hearing impairment History of falls History of stroke

	Instrumental disability Living alone Number of medications Pain Parkinson's Physical activity limitation Physical disability Poor self-perceived health status Rheumatic disease Urinary incontinence Use of anti-epileptics Use of anti-hypertensives Use of sedatives Visual impairment Walking aid use
Model development and validation	The discriminative ability and calibration of FRAT were validated by means of receiver operating characteristic curve, area under the ROC curve, Brier score, and the Hosmer-Lemeshow test
Outcome	At each wave, the risk factors of each participant were used prospectively to calculate their risk of falling at the subsequent wave (e.g., the risk factors from the clinical evaluation at baseline were used to calculate the future risk of falling, which was compared with the recorded information on the occurrence of any falls in the 12 months before follow-up 1, and so on).

Duration of follow-up	8 years
Indirectness	Outcome indirectness - no definition of what was considered a fall
Additional comments	None

Study arms

The Falls Risk Assessment Tool (N = 977)

Characteristics

Study-level characteristics

Characteristic	Study (N = 977)
% Female Nominal	NR
Mean age (SD) Nominal	NR
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

12-monthly assessments

Prognostic accuracy for falls

Outcome	The Falls Risk Assessment Tool, 12-monthly assessments , N = 977
AUC Mean (95% CI)	0.64 (0.61 to 0.67)
Brier score Nominal	0.17

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	Low
Overall Risk of bias and Applicability	Concerns for applicability	Low

Chow, 2019

Bibliographic Reference	**Chow, Richard B; Lee, Andre; Kane, Bryan G; Jacoby, Jeanne L; Barraco, Robert D; Dusza, Stephen W; Meyers, Matthew C; Greenberg, Marna Rayl; Effectiveness of the "Timed Up and Go" (TUG) and the Chair test as screening tools for geriatric fall risk assessment in the ED.; The American journal of emergency medicine; 2019; vol. 37 (no. 3); 457-460**

Study details

Secondary S-publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study type	Prospective cohort study
Study location	USA
Study setting	Community setting
Study dates	Not reported
Sources of funding	Community grant from the Ann and Carl Anderson Trust
Study sample	Adults who have previously visited and were discharged from the Trauma Centre in Northeastern Pennsylvania

Inclusion criteria	≥65 years old Discharged from the Emergency Department English speaking Capacity for consent Personally, identified a risk factor for falling.
Exclusion criteria	Not reported
Population subgroups	None
Risk tool(s)	30s Chair test: Participants were seated in a 17inch highchair with arms folded across the chest and required to stand and sit down again as often as possible within 30 seconds. The total number of repeated cycles were recorded.
Predictors	NA
Model development and validation	NA
Outcome	Falls
Duration of follow-up	6 months
Indirectness	None

Study arms

TUG test (N = 192)

Chair test (N = 192)

Characteristics

Study-level characteristics

Characteristic	Study (N = 192)
% Female Nominal	57.8
Mean age (SD) Mean (SD)	74.4 (7.4)

Outcomes

Study timepoints

6-month

Outcomes

Outcome		Chair test, 6-month, N = 192
Sensitivity (%) Nominal		78.4
Specificity % Nominal		23.4
PPV % Nominal		27
NPV % Nominal		75

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to exclusion criteria not being specified, predictors were not specified, and)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concerns)*

Coker, 2003

Bibliographic Reference	**Coker, Esther; Oliver, David; Evaluation of the STRATIFY falls prediction tool on a geriatric unit.; Outcomes management; 2003; vol. 7 (no. 1); 8-6**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Canada
Study setting	Geriatric assessment and rehabilitation unit
Study dates	February 1999 - October 2001
Sources of funding	None reported
Study sample	Participants were staying at a geriatric assessment and rehabilitation centre having been referred from acute medical and surgical units within the hospital and the community, but not from the emergency department. Admission criteria for the ward included frailty; multiple medical, functional, and psychosocial problems; and medical stability

Inclusion criteria	None reported
Exclusion criteria	None reported
Population subgroups	None
Risk tool(s)	None
Predictors	The St. Thomas Risk Assessment Tool in Falling Elderly (STRATIFY) The STRATIFY form was completed by a nurse within 24 hours of admission, answering yes or no to the 5 questions
Model development and validation	STRATIFY scores of 2, 3, 4, or 5 assigned by nurses were later classified as “higher risk for falls,” and scores of 0 or 1 were classified as “lower risk for falls.” The performance of STRATIFY in predicting those who were likely to fall was examined using sensitivity, specificity PPV and NPV
Outcome	The clinical nurse specialist, who was not involved in completing STRATIFY forms, recorded falls events by monitoring the incoming participant incident reports that were completed by staff after a fall occurs. Reports were completed when an event occurs where the participant comes to rest on the floor from a lying, standing, or sitting position. Any reports that did not fit this definition were excluded from analysis.
Duration of follow-up	Unclear
Indirectness	None
Additional comments	None

Study arms

STRATIFY (cut-off: ≥1) (N = 432)

STRATIFY (cut-off: ≥2) (N = 432)

STRATIFY (cut-off: ≥3) (N = 432)

STRATIFY (cut-off: ≥4) (N = 432)

STRATIFY (cut-off: ≥5) (N = 432)

Characteristics

Study-level characteristics

Characteristic	Study (N = 32)
% Female Nominal	NR
Mean age (SD) Nominal	NR
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes: Study timepoints

Fall at any point: Prognostic accuracy for falls

Outcome	STRATIFY (cut-off: ≥1), Fall at any point, N = 432	STRATIFY (cut-off: ≥2), Fall at any point, N = 432	STRATIFY (cut-off: ≥3), Fall at any point, N = 432	STRATIFY (cut-off: ≥4), Fall at any point, N = 432	STRATIFY (cut-off: ≥5), Fall at any point, N = 432
Sensitivity 95%CI for ≥5 cut-off reported as -0.86 - 2.7 Mean (95% CI)	94.6 (90.4 to 98.8)	65.8 (56.9 to 74.6)	36 (27.1 to 45)	10.8 (5 to 16.6)	9 (NR to NR)
Specificity Mean (95% CI)	17.1 (13.1 to 21.3)	46.7 (41.3 to 52.2)	84.7 (80.8 to 88.7)	96.3 (94.2 to 98.3)	99.7 (99.1 to 100)
PPV Mean (95% CI)	28.3 (23.7 to 32.9)	29.9 (24.2 to 35.7)	44.9 (34.6 to 55.3)	50 (30 to 70)	50 (-19.3 to 119.3)
NPV Mean (95% CI)	90.2 (82.7 to 97.6)	79.8 (74.1 to 85.5)	79.3 (75 to 83.6)	75.7 (71.6 to 79.9)	74.4 (70.3 to 78.5)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to missing outcome data.)*
Overall Risk of bias and Applicability	Concerns for applicability	Low

Curiati, 2024

Bibliographic Reference	**Curiati, Pedro K; Arruda, Marcela Dos S; Carpenter, Christopher R; Morinaga, Christian V; Melo, Hugo M A; Avelino-Silva, Thiago J; Aliberti, Marlon R; Predicting posthospitalization falls in Brazilian older adults: External validation of the Carpenter instrument.; Academic emergency medicine: official journal of the Society for Academic Emergency Medicine; 2024**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NR
Study location	Brazil
Study setting	Emergency department of a philanthropic tertiary hospital in São Paulo, Brazil hospital setting
Study dates	2021-2022
Sources of funding	NR

Study sample	Patients aged ≥ 65 years hospitalized through the ED of a philanthropic tertiary hospital in São Paulo, Brazil, from November 2021 to April 2022.
Inclusion criteria	Patients aged ≥ 65 years hospitalized through the ED of a philanthropic tertiary hospital in São Paulo, Brazil, from November 2021 to April 2022.
Exclusion criteria	Exclusion criteria encompassed patients who were unable to communicate without a proxy, clinically unstable or requiring urgent procedures, inaccessible to research assistants, unwilling to participate, and admitted for fall related complaints.
Population subgroups	NR
Risk tool(s)	Carpenter instrument. This instrument evaluates nonhealing foot sores, self-reported depression, inability to self-clip toenails, and prior falls as independent fall risk factors and assigns a point for each risk factor present, with scores from 0 to 4.
Predictors	This instrument evaluates nonhealing foot sores, self-reported depression, inability to self-clip toenails, and prior falls as independent fall risk factors and assigns a point for each risk factor present, with scores from 0 to 4.
Model development and validation	NR
Outcome	The outcome of the study was the occurrence of falls within 180 days following hospital admission.
Duration of follow-up	180 days
Indirectness	NA

Study arms

Carpenter instrument (cut off 0) (N = 779)

This instrument evaluates nonhealing foot sores, self-reported depression, inability to self-clip toenails, and prior falls as independent fall risk factors and assigns a point for each risk factor present, with scores from 0 to 4.

Carpenter instrument (cut off 1) (N = 779)

Carpenter instrument (cut off 2) (N = 779)

Carpenter instrument (cut off 3) (N = 779)

Carpenter instrument (cut off 4) (N = 779)

Characteristics

Study-level characteristics

Characteristic	Study (N = 779)
% Female Sample size	n = 359; % = 46.1
Mean age (SD) Mean (SD)	79.4 (9)

Outcomes

Prognostic outcome data

Outcome	Carpenter instrument (cut off 0), , N = 779	Carpenter instrument (cut off 1), , N = 779	Carpenter instrument (cut off 2), , N = 779	Carpenter instrument (cut off 3), , N = 779	Carpenter instrument (cut off 4), , N = 779
Sensitivity (%) Mean (95% CI)	100 (94.7 to 100)	94.1 (85.6 to 98.4)	66.2 (53.7 to 77.2)	29.4 (19 to 41.7)	0 (0 to 5.3)
Specificity % Mean (95% CI)	0 (0 to 0.5)	12.24 (9.9 to 14.9)	51.8 (48 to 55.5)	86.92 (84.2 to 89.3)	99.9 (99.2 to 100)
PPV % Mean (95% CI)	8.7 (8.7 to 8.7)	9.3 (8.8 to 9.9)	11.6 (9.8 to 13.6)	17.7 (12.4 to 24.6)	NR (NR to NR)
NPV % Mean (95% CI)	NR (NR to NR)	95.6 (89.2 to 98.3)	94.1 (91.9 to 95.7)	92.8 (91.7 to 93.8)	91.3 (91.2 to 91.3)
AUC (95% CI) Mean (95% CI)	0.62 (0.58 to 0.66)	NR (NR to NR)	NR (NR to NR)	NR (NR to NR)	NR (NR to NR)

Critical appraisal - PROBAST tool 2.1

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(Due to outcome predictors and number of fallers <100)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(due to ED setting)*

Del Brutto, 2022

Bibliographic Reference	**Del Brutto, O.H.; Mera, R.M.; Rumbea, D.A.; Recalde, B.Y.; Sedler, M.J.; Testing the reliability of the Downton Fall Risk Index for predicting incident falls in community-dwelling older adults. A prospective population-based study; Revista Ecuatoriana de Neurologia; 2022; vol. 31 (no. 3); 16-21**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NR
Study type	Prospective cohort study
Study location	Ecuador
Study setting	The study was conducted in community-dwellers aged ≥60 years living in Atahualpa, a rural village located in coastal Ecuador.
Study dates	2012 to 2022
Sources of funding	This study was partially supported by an unrestricted grant from Universidad Espiritu Santo – Ecuador, Samborondón, Ecuador

Study sample	Atahualpa residents aged ≥60 years identified by means of annual door-to-door surveys and enrolled in the Atahualpa Project from June 2012 to May 2018 were invited to participate, and those who remained actively enrolled in the cohort as of January 2019 and signed a comprehensive informed consent were considered eligible for follow-up.
Inclusion criteria	NR
Exclusion criteria	NR
Population subgroups	NR
Risk tool(s)	Downton Fall Risk Index (cut off ≥3 points)
Predictors	NR
Model development and validation	NR
Outcome	Falls. A structured questionnaire was used for baseline falls assessment. This questionnaire consisted of four questions: 1) Have you experienced an unintentional fall in the year before this test (if positive, how many falls can you recall); 2) What was (were) the most likely cause(s) of the fall(s)?; 3) Did a fall resulted in hospitalization?; and 4) Were there any bone fracture(s) due to a fall? (specify which bones). At follow up, (March 2022) a similar questionnaire was given to all participants, the only difference being that the follow-up exam inquired about falls during the previous three years.
Duration of follow-up	3 years
Indirectness	NR
Additional comments	NR

Study arms

Downton Fall Risk Index (cut off ≥3 points) (N = 254)

Characteristics

Study-level characteristics

Characteristic	Study (N = 254)
% Female Sample size	n = 146; % = 57
Mean age (SD) Mean (SD)	68.9 (6.9)

Outcomes

Predicative accuracy

Outcome	Downton Fall Risk Index (cut off ≥3 points), N = 254
Sensitivity (%) Mean (95% CI)	29.7 (22.8 to 37.6)
Specificity % Mean (95% CI)	92.7 (85.1 to 96.8)
AUC (95% CI) Mean (95% CI)	0.61 (0.57 to 0.66)
PPV %	87 (74.5 to 94.2)

Outcome	Downton Fall Risk Index (cut off ≥3 points), N = 254
Mean (95% CI)	
NPV % Mean (95% CI)	44.5 (37.5 to 51.7)

Critical appraisal - PROBAST tool 2.1

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(Due to lack of inclusion/exclusion criteria and missing data)*
Overall Risk of bias and Applicability	Concerns for applicability	Low

Frisendahl, 2022

Bibliographic Reference	**Frisendahl, Nathalie; Ek, Stina; Rosendahl, Erik; Franzen, Erika; Bostrom, Anne-Marie; Welmer, Anna-Karin; Can the 1-Leg Standing Test Be Replaced by Self-reported Balance in the First-Time Injurious Fall Screening Tool?; Journal of Geriatric Physical Therapy 2023 46(2):p 103-109, April/June 2023.**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Retrospective cohort study
Study location	Sweden
Study setting	Community
Study dates	2010 - 2012

Sources of funding	No additional information
Study sample	Data of adults 60 years and older from an ongoing longitudinal population-based Swedish National Study on Aging and Care in Kungsholmen (SNAC-K) was used. This study used data from the fourth wave of baseline data, collected from 2010-2012.
Inclusion criteria	Aged ≥60 years Community dwelling
Exclusion criteria	Lived in an institution/missing accommodation data Experienced an injurious fall in the last 3 years
Population subgroups	None
Risk tool(s)	No additional information
Predictors	One leg stand test One leg stand test was measured as the time in seconds that the participants could stand on 1 leg with their eyes open, for a maximum time of 60 seconds. The participants had to have no shoes on, their arms hanging along their sides, and they each chose which leg to stand on first. The test was attempted 3 times per leg, and the best overall score was used. A cut-off of 5 seconds was used to indicate high risk of falling.
Model development and validation	Harrell’s C statistics was used to evaluate the predictive ability of the scores for the 1-leg standing test
Outcome	An injurious fall was defined as a receipt of inpatient care because of a fall. This information was retrieved from the National Patient Register. External cause codes (W00, W01, W05-W10, and W17- W19) from the International Classification of Diseases, Tenth Revision were used, representing low energy falls from the same level, with no other person involved.

Duration of follow-up	Up to 5 years - participants were censored at the date of their first injurious fall (mean follow-up time was 4.25 (1.38) years)
Indirectness	None
Additional comments	None

Study arms

One leg stand test (cut-off: <5 seconds) (N = 1194)

Characteristics

Study-level characteristics

Characteristic	Study (N = 1194)
% Female Sample size	n = 740; % = 62
Mean age (SD) Mean (SD)	72.46 (12.85)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

5 years (or date of first injurious fall (mean 4.25 years))

Prognostic accuracy for injurious falls

Outcome	One leg stand test (cut-off: <5 seconds), 5 years (or date of first injurious fall (mean 4.25 years)), N = 1194
Women Nominal	0.7
Men Nominal	0.69

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to lack of information regarding predictors.)*
Overall Risk of bias and Applicability	Concerns for applicability	High (This study was marked down due to outcome indirectness. The outcome was limited to patients who experienced injurious falls, which could exclude populations who experience non-injurious falls)

Greene, 2012

Bibliographic Reference	**Greene, Barry R; Doheny, Emer P; Walsh, Cathal; Cunningham, Clodagh; Crosby, Lisa; Kenny, Rose A; Evaluation of falls risk in community-dwelling older adults using body-worn sensors.; Gerontology; 2012; vol. 58 (no. 5); 472-80**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Ireland
Study setting	Community, assessments conducted at an independent living research centre
Study dates	No additional information
Sources of funding	Funded by Intel Corporation, the Industrial Development Agency Ireland and GE Healthcare, with operational and laboratory support from St. James's Hospital, Dublin.
Study sample	Community-dwelling older adults as part of a larger study on ageing. Forty-seven participants (13.47%) were referred to the TRIL Clinic from the Emergency Department, 36 (10.32%) from the Falls and Blackout Unit, 19 referred by their family

	practitioner and 13 (5.44%) by a specialist outpatient clinic. The remainder of the participants (234, 67.05%) was self-referred.
Inclusion criteria	≥60 years of age Able to walk independently with or without a walking aid Cognitively intact
Exclusion criteria	None specified
Population subgroups	None
Risk tool(s)	No additional information
Predictors	Timed up and go test Participants were asked to get up from a chair (46 cm high seat, 65 cm armrests), walk 3 m, turn at a designated spot, return to the seat and sit down. The time taken to complete the task was recorded by the clinician using a stopwatch. The time was measured from the moment the clinician said 'go' to the moment the participant sat back on the chair. The task was demonstrated to each participant and participants were given time to familiarise themselves with the test. Participants completed the TUG once but were allowed to repeat the test if they did not complete the first one correctly. Participants were not allowed to use a walking aid during the test. A time greater than 15.25 seconds was categorised as high risk of falling.
Model development and validation	The classification accuracy is defined as the percentage of participants correctly identified by the system as being a faller or a non-faller. The sensitivity is defined as the percentage of fallers correctly identified by the system. The specificity is defined as the percentage of non-fallers correctly identified as such by the algorithm. The area under the receiver operator characteristic (ROC) curve is used as an additional metric of algorithm performance as it has been shown to provide a reliable overall index of diagnostic performance. Positive and negative predictive values were also calculated to provide a measure of the predictive power of positive and negative (faller and non-faller) classifications.

Outcome	Participants were contacted by telephone approximately 2 years following their baseline assessment and asked to complete a survey on their falls history subsequent to their initial assessment. Falling was defined as a sudden, unintentional change in position causing an individual to land at a lower level, on an object, the floor, the ground or other surface. Falls outcome data were verified using collateral history from relatives as well as comparison with hospital records. Participants with two or more falls in the follow-up period were deemed recurrent fallers.
Duration of follow-up	2 years
Indirectness	None
Additional comments	None

Study arms

Timed up and go (cut-off: 15.25 s) (N = 226)

Characteristics: Study-level characteristics

Characteristic	**Study (N = 226)**
% Female Sample size	n = 164; % = 72.6
Mean age (SD) Mean (SD)	71.53 (6.72)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

2-year

Prognostic accuracy for falls

Outcome	Timed up and go (cut-off: 15.25 s), 2-year, N = 226
Sensitivity Nominal	42.83
Specificity Nominal	62.62
PPV Nominal	41.21
NPV Nominal	65.12
ROC Nominal	0.65

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to lack of information regarding predictors.)*
Overall Risk of bias and Applicability	Concerns for applicability	Low

Grosshauser, 2022

Bibliographic Reference	**Grosshauser, Franz J; Schoene, Daniel; Kiesswetter, Eva; Sieber, Cornel C; Volkert, Dorothee; Frailty in Nursing Homes-A Prospective Study Comparing the FRAIL-NH and the Clinical Frailty Scale.; Journal of the American Medical Directors Association; 2022; vol. 23 (no. 10); 1717e1-1717e8**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Study type	Prospective cohort study
Study location	Germany
Study setting	Nursing homes
Study dates	November 2018 - January 2019
Sources of funding	No funding from agencies in the public, commercial or not-for-profit sectors was received.
Study sample	Participants were recruited from 12 randomly selected Nursing homes in Nuremberg. All residents in long-term care were eligible for participation.
Inclusion criteria	No specific inclusion criteria.

Exclusion criteria	No specific exclusion criteria.
Population subgroups	None
Risk tool(s)	Clinical Frailty Scale (CFS): Iconographic scale displaying 9 health stages from very fit (stage 1) to terminally ill (stage 9). Patients in stages 1-4 were considered non frail, stages 5-6 mild to moderately frail, and stages 7 and beyond severely frail.
Predictors	None
Model development and validation	NA
Outcome	Falls
Duration of follow-up	12 months
Indirectness	None

Study arms

CFS (3 cut-off) (N = 246)

CFS (4 cut-off) (N = 246)

CFS (5 cut-off) (N = 246)

CFS (6 cut-off) (N = 246)

CFS (7 cut-off) (N = 246)

CFS (8 cut-off) (N = 246)

CFS (9 cut-off) (N = 246)

Characteristics

Study-level characteristics

Characteristic	Study (N = 246)
% Female Nominal	67.1
Mean age (SD) Mean (SD)	83.6 (8.3)
Severe Dementia Nominal	60
Mild Dementia Nominal	91

Characteristic	Study (N = 246)
Urinary incontinence Nominal	171
Temporarily Urinary Incontinence Nominal	52

Outcomes

Outcome	**CFS (3 cut-off), N = 246**	**CFS (4 cut-off), N = 246**	**CFS (5 cut-off), N = 246**	**CFS (6 cut-off), N = 246**	**CFS (7 cut-off), N = 246**	**CFS (8 cut-off), N = 246**	**CFS (9 cut-off), N = 246**
Sensitivity (%) Nominal	100	100	99.4	97.1	89.7	29.1	18.3
Specificity % Nominal	88.7	80.3	77.5	77.5	8.5	0	0

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to inclusion and exclusion criteria not specified, predictors were not specified, and outcome definition not provided)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Haines, 2008

Bibliographic Reference	**Haines, Terry; Kuys, Suzanne S; Morrison, Greg; Clarke, Jane; Bew, Paul; Balance impairment not predictive of falls in geriatric rehabilitation wards.; The journals of gerontology. Series A, Biological sciences and medical sciences; 2008; vol. 63 (no. 5); 523-8**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Australia
Study setting	Inpatient geriatric and rehabilitation wards
Study dates	May 2005 - May 2006
Sources of funding	Supported by The University of Queensland New Staff Research Fund
Study sample	Participants were recruited from multiple inpatient geriatric and rehabilitation wards

Inclusion criteria	Admitted for rehabilitation and referred for physiotherapy
Exclusion criteria	Paraplegia, tetraplegia or lower limb amputation
Population subgroups	Study split cohort into two separate groups - development and validation. The development group was used for developing optimal cut-offs for the tests, and the validation group had these cut-offs applied
Risk tool(s)	Functional reach test No information given, other than that participants were not given a practice attempt at the test. Timed up and go No information given, other than that participants were given a practice test where possible for familiarisation. Participants who were unable to complete the test were assigned a time of 999 seconds.
Predictors	No additional information
Model development and validation	Study centres were randomly allocated to the development or validation data sets. The development set was used to identify optimal cut-off points for each of the tests. Predictive accuracy of the balance tests in classifying patients as fallers or non-fallers (the incidence rate perspective) was assessed using sensitivity, specificity, and Youden Index. The optimal cut-off point for the purposes of this study was defined as that which maximized the Youden Index. This study also selected cut-off points based on the event rate (falls per time) perspective. Optimal cut-off points identified from the development data set were applied to the validation data set. This data set was independent from the development data set both in terms of patients and research locations.
Outcome	Number of in-hospital patient falls as recorded in patient histories and through hospital incident reporting systems. A fall was defined as ‘‘any event where a patient unexpectedly comes to rest on the ground, the floor, or another lower level"
Duration of follow-up	Duration of stay in the centre (development cohort mean (SD) = 35.4 (27) days, validation cohort = 32 (26) days)
Indirectness	None

Additional comments	None

Study arms

Functional reach test (cut-off: <4 cm (single fall), <14 cm (repeat falls)) (N = 570)

Timed up and go test (cut-off: >30 s (single fall), >25 s (repeat falls)) (N = 570)

Characteristics

Study-level characteristics

Characteristic	Study (N = 1172)
% Female Sample size	n = 694; % = 59.2
Mean age (SD) Mean (SD)	74.98 (13.72)
Ethnicity Nominal	NR
Stroke Sample size	n = 289; % = 24.7
Other neurological condition Sample size	n = 107; % = 9.1
Elective orthopaedic	n = 80; % = 6.8

Characteristic	Study (N = 1172)
Sample size	
Other geriatric Sample size	n = 123; % = 10.5
Other Sample size	n = 231; % = 19.7

Outcomes

Study timepoints

Duration of stay

Prognostic accuracy for falls

Outcome	Functional reach test (cut-off: <4 cm (single fall), <14 cm (repeat falls)), Duration of stay, N = 1172	Timed up and go test (cut-off: >30 s (single fall), >25 s (repeat falls)), Duration of stay, N = 1172
Development cohort (n= 602) Mean (95% CI)	0.6 (0.52 to 0.69)	0.76 (0.68 to 0.83)
Validation cohort (n= 570) Mean (95% CI)	0.7 (0.61 to 0.79)	0.8 (0.71 to 0.89)
Development cohort (n= 602) Mean (95% CI)	0.6 (0.56 to 0.65)	0.44 (0.4 to 0.49)
Validation cohort (n= 570) Mean (95% CI)	0.43 (0.38 to 0.47)	0.22 (0.19 to 0.26)
Development cohort (n= 602) Mean (95% CI)	0.21 (0.11 to 0.31)	0.2 (0.11 to 0.29)

Outcome	Functional reach test (cut-off: <4 cm (single fall), <14 cm (repeat falls)), Duration of stay, N = 1172	Timed up and go test (cut-off: >30 s (single fall), >25 s (repeat falls)), Duration of stay, N = 1172
Validation cohort (n= 570) Mean (95% CI)	0.13 (0.03 to 0.24)	0.02 (-0.07 to 0.11)

Prognostic accuracy for rate of falls

Outcome	Functional reach test (cut-off: <4 cm (single fall), <14 cm (repeat falls)), Duration of stay, N = 1172	Timed up and go test (cut-off: >30 s (single fall), >25 s (repeat falls)), Duration of stay, N = 1172
Development cohort (n= 602) Mean (95% CI)	0.81 (0.72 to 0.88)	0.87 (0.81 to 0.93)
Validation cohort (n= 570) Mean (95% CI)	0.63 (0.45 to 0.81)	0.74 (0.53 to 0.89)
Development cohort (n= 602) Mean (95% CI)	0.29 (0.24 to 0.33)	0.2 (0.17 to 0.24)
Validation cohort (n= 570) Mean (95% CI)	0.29 (0.25 to 0.34)	0.16 (0.13 to 0.2)
Development cohort (n= 602) Mean (95% CI)	0.09 (0.01 to 0.16)	0.08 (0.02 to 0.14)
Validation cohort (n= 570) Mean (95% CI)	-0.08 (-0.25 to 0.09)	-0.09 (-0.28 to 0.05)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to predictor information not being available)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Hars, 2018

Bibliographic Reference	**Hars, Melany; Audet, Marie-Claude; Herrmann, Francois; De Chassey, Jean; Rizzoli, Rene; Reny, Jean-Luc; Gold, Gabriel; Ferrari, Serge; Trombetti, Andrea; Functional Performances on Admission Predict In-Hospital Falls, Injurious Falls, and Fractures in Older Patients: A Prospective Study.; Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research; 2018; vol. 33 (no. 5); 852-859**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	Switzerland
Study setting	Geriatric acute and rehabilitation hospital
Study dates	Ongoing from June 2015
Sources of funding	Supported by the Geneva University Hospitals Private Foundation.
Study sample	Consecutively admitted in-patients who received a battery of functional tests

Inclusion criteria	None specified
Exclusion criteria	Too medically unwell to complete tests Unable to follow simple instructions
Population subgroups	No additional information
Risk tool(s)	No additional information
Predictors	Timed up and go test The test measured the time (recorded to the tenth of a second) needed to complete a series of basic functional manoeuvres: to rise from sitting from a standard armchair, walk 3 meters at a comfortable pace, turn, walk back to the chair, and sit down. A time >29.5 seconds categorised a participant as at-risk of falling
Model development and validation	The area under the receiver operating characteristic curve from regression models was used as a measure of the overall predictive accuracy for incident in-hospital falls and injurious falls outcomes. Sensitivity, specificity and the Youden index were also calculated.
Outcome	Participants' falls were prospectively collected until discharge using standardised computer-based incident report forms completed after each fall by nurses and electronic patients' case notes or medical reports. A fall was defined as an event that resulted in a participant unintentionally coming to rest on the ground, floor, or other lower levels. Injurious falls were defined as falls that resulted in contusions, abrasions, lacerations, sprains or strains, pain, head injuries, other unspecified injuries, or any serious injury.
Duration of follow-up	Duration of stay in centre (median (IQR) = 23 (14-36) days)
Indirectness	None
Additional comments	None

Study arms

Timed up and go (cut-off: >29.5 s) (N = 807)

Characteristics

Study-level characteristics

Characteristic	Study (N = 807)
% Female Sample size	n = 545; % = 67.5
Mean age (SD) Mean (SD)	85 (6.9)
Ethnicity Nominal	NR
Comorbidities Nominal	NR

Outcomes

Study timepoints

Duration of stay in centre

Prognostic accuracy for falls

Outcome	Timed up and go (cut-off: >29.5 s), Duration of stay in centre, N = 807
Sensitivity Nominal	61
Specificity Nominal	67.1
PPV Nominal	27.2
NPV Nominal	89.5
Younden Index Nominal	0.28
AUC Nominal	0.66

Prognostic accuracy for injurious falls

Outcome	Timed up and go (cut-off: >29.5 s), Duration of stay in centre, N = 807
Sensitivity Nominal	65.3
Specificity Nominal	66
PPV Nominal	20
NPV Nominal	93.6
Younden Index Nominal	0.31
AUC Nominal	0.67

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to lack of information regarding predictors.)*
Overall Risk of bias and Applicability	Concerns for applicability	Low

Jung, 2022

Bibliographic Reference	**Jung, Hee-Won; Baek, Ji Yeon; Kwon, Young Hye; Jang, Il-Young; Kim, Dae Yul; Kwon, Hyouk-Soo; Lee, Sun Hee; Oh, Hyun Jin; Lee, Eunju; Koh, Younsuck; At-Point Clinical Frailty Scale as a Universal Risk Tool for Older Inpatients in Acute Hospital: A Cohort Study.; Frontiers in medicine; 2022; vol. 9; 929555**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	South Korea
Study setting	Tertiary teaching hospital - 9 acute inpatient units encompassing 24 medical disciplines
Study dates	May 2021 onwards
Sources of funding	No funding received
Study sample	All older (≥65 years) inpatients admitted

Inclusion criteria	≥65 years of age
Exclusion criteria	Quarantined for infection issues Received radiation therapy within 24 hours Discharged within 24 hours
Population subgroups	None
Risk tool(s)	Demographic factors Pathway of admission (ED vs outpatient clinic) Vital signs on day of assessment Clinical diagnosis of; angina, arthritis, dementia, diabetes, depression, asthma, cancer, chronic lung disease, congestive heart disease, myocardial infarction, hypertension, chronic kidney disease, spine problems and stroke
Predictors	Clinical Frailty Scale The CFS was measured once on the day after admission by a geriatric nurse specialist who had completed a 2-year geriatric nurse specialist course and >10 years of experience in clinical units of rehabilitation medicine, neurology, and geriatrics. The Korean-translated version of the CFS was used. participants' activity of daily living, the instrumental activity of daily living, and self-rated health status were investigated by a geriatric nurse. The at-point CFS, which combines both the baseline functional status and acute deterioration and presents the current functional state, was used. A CFS score of ≥5 was deemed indicative of frailty. For participants who were unable to communicate due to altered mental status or cognitive problems, functional status was assessed by interviewing their direct caregivers in person or over the phone.
Model development and validation	The association between the CFS and dichotomized outcomes, namely, falls, new pressure ulcers, delirium, death, length of stay 14 days or longer, 30-day ED visit, readmission, the composite outcome (falls, new pressure ulcers, delirium, death, 30-day ED visit, and readmission), and discharge to a chronic care facility, was assessed by logistic analyses (unadjusted

	and adjusted models with covariables of age and sex). To evaluate the prediction ability for falls and new pressure ulcers, ROC analyses with the CFS as a classifier and these outcomes as references were carried out. Sensitivities and specificities for each CFS score and C-statistics predicting the outcomes were calculated.
Outcome	By medical record fall incidence was acquired from the fall reports that are mandatory for every fall event throughout the hospital
Duration of follow-up	Duration of inpatient stay (mean of 6.2 and 10.4 days in high and low risk groups, respectively)
Indirectness	None
Additional comments	None

Study arms

Clinical Frailty Scale (cut-off: ≥5) (N = 1016)

Characteristics

Study-level characteristics

Characteristic	Study (N = 1016)
% Female Sample size	n = 415; % = 40.8
Mean age (SD) Mean (SD)	72.99 (6.17)
Ethnicity Nominal	NR
Hypertension Sample size	n = 524; % = 51.6
Diabetes Sample size	n = 281; % = 27.7
Cancer Sample size	n = 365; % = 35.9
Fall in previous year Sample size	n = 157; % = 15.5

Outcomes

Study timepoints

Discharge

Prognostic accuracy for falls

Outcome	Clinical Frailty Scale (cut-off: ≥5), Discharge, N = 1016
Sensitivity Nominal	88.9
Specificity Nominal	76.6

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to predictor assessments were likely made with knowledge of the predictors)*
Overall Risk of bias and Applicability	Concerns for applicability	Low

Kang, 2017

Bibliographic Reference	**Kang, Li; Han, Peipei; Wang, Jiazhong; Ma, Yixuan; Jia, Liye; Fu, Liyuan; Yu, Hairui; Chen, Xiaoyu; Niu, Kaijun; Guo, Qi; Timed Up and Go Test can predict recurrent falls: a longitudinal study of the community-dwelling elderly in China.; Clinical interventions in aging; 2017; vol. 12; 2009-2016**

Study details

Secondary publication of another included study- see primary study for details	No additional information
Other publications associated with this study included in review	No additional information
Trial name / registration number	No additional information
Study type	Prospective cohort study
Study location	China
Study setting	Community
Study dates	March 2013 - March 2014
Sources of funding	Supported by the National Natural Science Foundation of China and Tianjin Municipal Science and Technology Commission
Study sample	Residents of a suburban hospital who had joined China's free physical examination program

Inclusion criteria	Aged ≥60 years Community dwelling
Exclusion criteria	Inability to perform basic activities of daily living. Visually impaired. Currently using psychotropic drugs, cardiovascular drugs, hypoglycaemic agents, non-steroidal anti-inflammatory drugs, analgesics, dopaminergic drugs, Parkinson's disease drugs, or more than four kinds of complex drugs
Population subgroups	None
Risk tool(s)	Timed up and go test. The test assessed the number of seconds needed for an individual to stand up from a chair, walk 3 meter at their usual pace past a line on the floor, turn around, walk back to the chair, and sit down again
Predictors	None
Model development and validation	Predictive values of the cut-offs for one or more future falls and recurrent falls were calculated as the areas under the curve of the receiver operating characteristic curves. ROC curves were constructed to analyse sensitivity and specificity, and Bootstrap was used to calculate the AUC confidence intervals. Two cut-offs were defined: the cut-off maximising the Youden index and the cut-off maximising the sum of the positive predictive value and negative predictive value
Outcome	A fall was defined as an event that results in a person coming to rest unintentionally on the ground or other lower level, and the fall not being caused by a violent blow, loss of consciousness, sudden onset paralysis, or epileptic seizure. The fall data were obtained via face-to-face questioning, and the date, site, and circumstances of any falls at the baseline and after a year of follow-up were recorded.
Duration of follow-up	1-year
Indirectness	None
Additional comments	None

Study arms

Timed up and go test (cut-off: 10.15 s) (N = 541)

Optimal cut-off based on Younden Index

Timed up and go test (cut-off: 15.96 s) (N = 541)

Optimal cut-off based on PPV and NPV

Characteristics

Study-level characteristics

Characteristic	Study (N = 541)
% Female Sample size	n = 307; % = 56.7
Mean age (SD) Mean (SD)	67.4 (5.6)
Ethnicity Nominal	NR
Diabetes Sample size	n = 50; % = 9.3
Hypertension Sample size	n = 245; % = 45.2
Hyperlipidaemia	n = 36; % = 6.7

Sample size	
Heart disease Sample size	n = 126; % = 23.2
Peptic ulcer Sample size	n = 34; % = 6.3
Stroke Sample size	n = 39; % = 7.2
Gout Sample size	n = 12; % = 2.2
Cancer Sample size	n = 7; % = 1.3
Kidney disease Sample size	n = 15; % = 2.8
Hepatic disease Sample size	n = 7; % = 1.3
Bilarary tract disease Sample size	n = 26; % = 4.8
Thyroid disease	n = 10; % = 1.9

Sample size	
Osteoarthritis Sample size	n = 140; % = 25.8
Anaemia Sample size	n = 7; % = 1.3

Outcomes

Study timepoints

12-month

Prognostic accuracy for falls

Outcome	Timed up and go test (cut-off: 10.15 s), 12-month, N = 541	Timed up and go test (cut-off: 15.96 s), 12-month, N = 541
Sensitivity Nominal	67.5	13.9
Specificity Nominal	56.3	98.4
PPV Nominal	10.2	70
NPV Nominal	95.9	81.3
AUC Mean (95% CI)	0.61 (0.55 to 0.67)	NA (NA to NA)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to missing participant data, and no information provided regarding the predictors and the time interval)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Ma, 2014

Bibliographic Reference	**Ma, Colleen; Evans, Kelly; Bertmar, Carin; Krause, Martin; Predictive value of the Royal Melbourne Hospital Falls Risk Assessment Tool (RMH FRAT) for post-stroke patients.; Journal of clinical neuroscience: official journal of the Neurosurgical Society of Australasia; 2014; vol. 21 (no. 4); 607-11**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study type	Prospective cohort study
Study location	Australia
Study setting	Hospital setting
Study dates	NA
Sources of funding	Staff specialist trust fund Royal North Shore Hospital
Study sample	Patients were part of the Royal North Shore Hospital post-acute Community Stroke Care Program after being admitted to the Neurology medical ward with an acute stroke or transient ischaemic attack.

Inclusion criteria	Not reported
Exclusion criteria	Not reported
Risk tool(s)	RMH FRAT (Royal Melbourne Hospital Falls Risk Assessment Tool): Risk factors include age, sex, previous history of falls or seizures, disorientation, sensory impairment, impaired coordination, medications and continence status. Low risk was considered 0-4 points, medium risk 5-14 points, and high risk more than 15 points.
Predictors	NA
Model development and validation	NA
Outcome	Falls
Duration of follow-up	6 months
Indirectness	None

Study arms

RM FRAT (N = 152)

Characteristics

Study-level characteristics

Characteristic	Study (N = 152)
% Female Nominal	38.2
Comorbidities Nominal	152
Ischaemic stroke Nominal	131
TIA Nominal	16
Haemorrhagic stroke Nominal	5

Outcomes

Study timepoints

6-month

Outcomes

Outcome	RM FRAT, 6-month, N = 152
Sensitivity (%) Nominal	84.1
Specificity % Nominal	55.6
PPV % Nominal	43.5
NPV % Nominal	89.6

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to inclusion and exclusion criteria not being specified, predictor information not being specified, and an outcome definition not being provided.)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Nordin, 2008

Bibliographic Reference	**Nordin, Ellinor; Lindelof, Nina; Rosendahl, Erik; Jensen, Jane; Lundin-Olsson, Lillemor; Prognostic validity of the Timed Up-and-Go test, a modified Get-Up-and-Go test, staff's global judgement and fall history in evaluating fall risk in residential care facilities.; Age and ageing; 2008; vol. 37 (no. 4); 442-8**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	Not reported
Study type	Prospective cohort study
Study location	Sweden
Study setting	Residential care facilities
Study dates	Not reported
Sources of funding	Swedish Research Council. Swedish Council for Working Life and Social Research. The Aldrecentrum Vasterbotten. The Erik and Anne-Marie Detlof's Foundation. Ume°a University. The SJCKMS and Gun and Bertil Stohne's Foundation

Study sample	
Inclusion criteria	65 years of age or older. Mini-Mental State Examination (MMSE) scores of 10 or more. Physician's approval to participate in the study
Exclusion criteria	Not reported
Population subgroups	NA
Risk tool(s)	TUG (Timed-up-and-Go-test): Used an armchair of standard height and a distance of 3m was marked. Participants started by sitting on the chair with resting hands resting on the arms of the chair. Participants had to cross the 3m line before turning around and sitting down again. Participants performed this test once before timing. GUG-m (Get-up-and-go-test): Participants performed the same test as during the TUG but were scored according to 'no fall risk', 'low fall risk', ; some fall risk', 'high fall risk', and 'very high fall risk'. GLORF (global rating of fall risk): Scored by licensed nursed with personal knowledge of the resident.
Predictors	Not specified
Model development and validation	NA
Outcome	Falls
Duration of follow-up	6 months
Indirectness	None

Study arms

TUG (15s cut-off) (N = 183)

GUG-m (N = 183)

GLORF (N = 183)

Characteristics

Study-level characteristics

Characteristic	Study (N = 183)
% Female Nominal	73
Mean age (SD) Mean (SD)	84.3 (6.6)
Hearing impaired Nominal	29
Vision impaired Nominal	45
Dementia Nominal	109
Depression Nominal	108

Delirium Nominal	51
Heart disease Nominal	123
previous stroke Nominal	38
Urinary incontinence Nominal	48
Fracture (previous years) Nominal	65

Outcomes

Outcome	TUG (15s cut-off), N = 183	GUG-m, N = 183	GLORF, N = 183
ROC Curve Mean (95% CI)	0.69 (0.61 to 0.77)	0.62 (0.54 to 0.7)	0.68 (0.6 to 0.76)
Sensitivity (%) Mean (95% CI)	96 (92 to 100)	*empty data* (*empty data* to *empty data*)	56 (46 to 65)
GUG-m (Cut-off 1) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	94 (87 to 97)	*empty data* (*empty data* to *empty data*)
GUG-m (Cut-off 2) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	62 (52 to 71)	*empty data* (*empty data* to *empty data*)
GUG-m (Cut-off 3) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	28 (19 to 37)	*empty data* (*empty data* to *empty data*)
GUG-m (Cut-off 4) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	7 (2 to 12)	*empty data* (*empty data* to *empty data*)
Specificity % Mean (95% CI)	32 (21 to 42)	*empty data* (*empty data* to *empty data*)	80 (71 to 87)
GUG-m (Cut-off 1) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	16 (10 to 26)	*empty data* (*empty data* to *empty data*)

Outcome	TUG (15s cut-off), N = 183	GUG-m, N = 183	GLORF, N = 183
GUG-m (Cut-off 2) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	60 (50 to 70)	*empty data* (*empty data* to *empty data*)
GUG-m (Cut-off 3) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	83 (75 to 91)	*empty data* (*empty data* to *empty data*)
GUG-m (Cut-off 4) Mean (95% CI)	*empty data* (*empty data* to *empty data*)	92 (86 to 98)	*empty data* (*empty data* to *empty data*)

Critical appraisal - PROBAST tool 2.2

Section	**Question**	**Answer**
Overall Risk of bias and Applicability	Risk of bias	High *(Exclusion criteria and predictor information not specified)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Olsson Moller, 2012

Bibliographic Reference	**Olsson Moller, U.; Jakobsson, U.; Predictive validity and cut-off scores in four diagnostic tests for falls-a study in frail older people at home; European Geriatric Medicine; 2012; vol. 3 (no. suppl1); 49**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Study type	Prospective cohort study
Study location	Sweden
Study setting	Community setting
Study dates	2006-2008
Sources of funding	The Governmental Funding of Clinical Research within the NHS The Swedish Research Council
Inclusion criteria	65 years or older Living in the municipality where the study was conducted Needing help with at least two activities of daily living

	Admitted to hospital at least twice or with at least four contacts with outpatient or primary healthcare during the previous 12 months Being able to communicate verbally and have no cognitive impairments, i.e., ≥25 in Mini Mental State Examination (MMSE)
Exclusion criteria	Not reported
Risk tool(s)	DFRI (Downton Fall Risk Index): Includes 11 fall risk items including history of falls in preceding 12 months, use of tranquilisers or sedatives, diuretics, antihypertensive drugs, antiparkinsonian drugs, antidepressants, visual impairments, hearing impairment, limb impairment, cognitive impairment, and walking ability. TUG (Timed-up-an-go-test): Measures the time it takes to get up from a chair walk 3m turn around and sit down again. Participants were allowed one practice run before the actual test. RT (Romberg test): Static balance test whereby participants stand with their feet together with arms crossed and eyes closed. Time of failure of test was measured (i.e. opening eyes, making compensatory movements, or losing balance and/or falling). SRT (Semitandem Romberg test): Static balance test whereby participants stand semitandem with arms crossed and eyes closed. Time of failure of test was measured (i.e. opening eyes, making compensatory movements, or losing balance and/or falling). TRT (Tandem Romberg test): Static balance test whereby participants stand tandem with arms crossed and eyes closed. Time of failure of test was measured (i.e. opening eyes, making compensatory movements, or losing balance and/or falling).
Predictors	
Model development and validation	Not reported
Outcome	Falls
Duration of follow-up	NR

Study arms

DFRI (N = 153)

TUG (N = 153)

RT (N = 153)

SRT (N = 153)

TRT (N = 153)

Characteristics

Study-level characteristics

Characteristic	Study (N = 153)
% Female Nominal	67
Mean age (SD) Mean (SD)	81.5 (6.3)

Outcomes

Study timepoints

12-month

Outcomes

Outcome	DFRI, 12-month, N = 153	TUG, 12-month, N = 153	RT, 12-month, N = 153	SRT, 12-month, N = 153	TRT, 12-month, N = 153
Sensitivity Nominal	*empty data*	50	*empty data*	*empty data*	*empty data*
DFRI (cut-off <1) Nominal	100	*empty data*	*empty data*	*empty data*	*empty data*
DFRI (cut-off <2) Nominal	96.5	*empty data*	*empty data*	*empty data*	*empty data*
DFRI (cut-off <3) Nominal	79.3	*empty data*	*empty data*	*empty data*	*empty data*
DFRI (cut-off <4) Nominal	41.4	*empty data*	*empty data*	*empty data*	*empty data*

Outcome	**DFRI, 12-month, N = 153**	**TUG, 12-month, N = 153**	**RT, 12-month, N = 153**	**SRT, 12-month, N = 153**	**TRT, 12-month, N = 153**
DFRI (cut-off <5) Nominal	13.8	*empty data*	*empty data*	*empty data*	*empty data*
RT (cut-off>15s) Nominal	*empty data*	*empty data*	22.2	22.2	94.4
RT (cut-off>30s) Nominal	*empty data*	*empty data*	22.2	33.3	94.4
RT (cut-off>60s) Nominal	*empty data*	*empty data*	*empty data*	38.6	94.4
Specificity % Nominal	*empty data*	55.8	*empty data*	*empty data*	*empty data*
DFRI (cut-off <1) Nominal	0.013	*empty data*	*empty data*	*empty data*	*empty data*
DFRI (cut-off <2) Nominal	5.3	*empty data*	*empty data*	*empty data*	*empty data*

Outcome	DFRI, 12-month, N = 153	TUG, 12-month, N = 153	RT, 12-month, N = 153	SRT, 12-month, N = 153	TRT, 12-month, N = 153
DFRI (cut-off <3) Nominal	24	*empty data*	*empty data*	*empty data*	*empty data*
DFRI (cut-off <4) Nominal	46.7	*empty data*	*empty data*	*empty data*	*empty data*
DFRI (cut-off <5) Nominal	70.7	*empty data*	*empty data*	*empty data*	*empty data*
RT (cut-off>15s) Nominal	*empty data*	*empty data*	90.7	72.1	11.6
RT (cut-off>30s) Nominal	*empty data*	*empty data*	81.4	70.4	4.6
RT (cut-off>60s) Nominal	*empty data*	*empty data*	*empty data*	67.4	*empty data*

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to exclusion criteria and predictor information not being specified)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Palumbo, 2016

Bibliographic Reference	**Palumbo, Pierpaolo; Klenk, Jochen; Cattelani, Luca; Bandinelli, Stefania; Ferrucci, Luigi; Rapp, Kilian; Chiari, Lorenzo; Rothenbacher, Dietrich; Predictive Performance of a Fall Risk Assessment Tool for Community-Dwelling Older People (FRAT-up) in 4 European Cohorts.; Journal of the American Medical Directors Association; 2016; vol. 17 (no. 12); 1106-1113**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study type	Prospective cohort study
Study location	England
Study setting	Community setting
Study dates	Not reported
Sources of funding	National Institute of Aging in the United States and a consortium of United Kingdom government departments coordinated by the Office for National Statistics.

Study sample	Cohort is representative of a population of noninstitutionalised men and women aged 50 years and older living in England.
Inclusion criteria	Non-institutionalized adults aged 50 years or older living in England
Exclusion criteria	Not reported
Population subgroups	None
Risk tool(s)	FRAT-up score (calculated from 4 cohort-specific prediction models):
Predictors	NA
Outcome	Falls
Duration of follow-up	NA
Indirectness	None
Additional comments	Study reported 3 different European cohorts, only the UK cohort (ELSA study) is reported here.

Study arms

FRAT-up (N = 3303)

Characteristics

Study-level characteristics

Characteristic	Study (N = 3303)
% Female Nominal	56.7
Mean age (SD) Mean (SD)	74.56 (7.31)
Urinary incontinence Nominal	17.4
Diabetes mellitus Nominal	10.8
Parkinson's disease Nominal	0.7
History of arthritis or rheumatism Nominal	44.7
Cognitive impairment Nominal	0.6

History of stroke Nominal	6.8
Depression Nominal	10
Pain Nominal	43.1
Physical disability Nominal	19.3
Instrumental disability Nominal	14.4
Reported fear of falling Nominal	7.5
History of dizziness Nominal	22.4
Current vision impairment Nominal	25.5
Current hearing impairment Nominal	27.2

Outcomes

Outcome	FRAT-up, N = 1416
AUC Mean (95% CI)	0.56 (0.53, 0.59)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to exclusion criteria not being specified and predictor information not being specified.)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Shimada, 2009

Bibliographic Reference	**Shimada, Hiroyuki; Suzukawa, Megumi; Tiedemann, Anne; Kobayashi, Kumiko; Yoshida, Hideyo; Suzuki, Takao; Which neuromuscular or cognitive test is the optimal screening tool to predict falls in frail community-dwelling older people? Gerontology; 2009; vol. 55 (no. 5); 532-8**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	Not reported
Study type	Prospective cohort study
Study location	Japan
Study setting	Nursing home facilities
Study dates	Not reported
Sources of funding	Grant-in-Aid for the Japan Society for the Promotion of Science (JSPS). Injury Trauma and Rehabilitation (ITR) Research Fellowship funded through an Australian NHMRC Capacity Building Grant in Population Health
Inclusion criteria	65 years of age or older. Certified as needing long-term care by the Japanese public long-term care insurance system

Exclusion criteria	Non-ambulatory
Risk tool(s)	GS (Grip strength) ≤17 cut-off: Measured in kg using Smedley-type hand-held dynamometer. CST (Chair stand test) ≥13 cut-off: Participants were seated and asked to stand up 5 times. Time it took to perform 5 repetitions was measured. OLS (One leg standing test) ≤3 cut-off: Participants stood on one leg for 120s. The best time out of 2 trials was recorded. FRT (Functional reach test) ≤18 cut-off: Measures the maximal distance participants can stretch forward beyond arms lengths while keeping a fixed base of support in the standing position. The best trial out of 2 was recorded. TWT (tandem walking test) ≤2 cut-off: Participants walked with feet placed in the tandem position during the double support period of the gait cycle. Participants tried to complete 10 steps with the maximum number out of 2 trials was recorded. Comfortable walking speed ≤0.7 cut-off: Participants walked on a flat 6m long surface with 3m acceleration and 3m deceleration. MWS (Maximal walking speed) ≤1 cut-off: Participants walked on a flat 6m long surface with 3m acceleration and 3m deceleration. TUG (Timed up and go test) ≥16 cut-off: If participants usually used a walking aid this was also used during this test. MSQ (Mental status questionnaire) ≥4 cut-off: Questionnaire was used to measure cognitive function with a score of 3 or more errors indicating moderate to severe cognitive function.
Model development and validation	
Outcome	Falls
Duration of follow-up	
Indirectness	None

Study arms

GS (Grip strength) ≤17 cut-off (N = 455)

CST (Chair stand test) ≥13 cut-off (N = 455)

OLS (One leg standing test) ≤3 cut-off (N = 455)

FRT (Functional reach test) ≤18 cut-off) (N = 455)

TWT (tandem walking test) ≤2 cut-off (N = 455)

Comfortable walking speed ≤0.7 cut-off (N = 455)

MWS (Maximal walking speed) ≤1 cut-off (N = 455)

TUG (Timed up and go test) ≥16 cut-off (N = 455)

MSQ (Mental status questionnaire) ≥4 cut-off (N = 455)

Characteristics

Study-level characteristics

Characteristic	Study (N = 455)
% Female Nominal	68.1
Mean age (SD) Mean (SD)	80.5 (7.2)

Outcomes

Outcome	GS (Grip strength) ≤17 cut-off, N = 455	CST (Chair stand test) ≥13 cut-off, N = 455	OLS (One leg standing test) ≤3 cut-off, N = 455	FRT (Functional reach test) ≤18 cut-off), N = 455	TWT (tandem walking test) ≤2 cut-off, N = 455	Comfortable walking speed ≤0.7 cut-off, N = 455	MWS (Maximal walking speed) ≤1 cut-off, N = 455	TUG (Timed up and go test) ≥16 cut-off, N = 455	MSQ (Mental status questionnaire) ≥4 cut-off, N = 455
Sensitivity (%) Nominal	55	61	51	47	52	56	58	63	52
Specificity % Nominal	55	53	61	59	65	59	58	63	52

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	Unclear *(Unclear risk of bias due to no information provided regarding predictors.)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Silva, 2023

Bibliographic Reference	**Silva, Sabrina de Oliveira; Barbosa, Jessica Bandeira; Lemos, Thiago; Oliveira, Laura Alice Santos; Ferreira, Arthur de Sa; Agreement and predictive performance of fall risk assessment methods and factors associated with falls in hospitalized older adults: A longitudinal study.; Geriatric nursing (New York, N.Y.); 2023; vol. 49; 109-114**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	national regulation No. 466/2012.
Study location	Brazil
Study setting	Hospital
Study dates	Not specified
Sources of funding	This study was supported by the Fundacao Carlos Chagas Filho de Apoio a Pesquisa do Estado do Rio de Janeiro (FAPERJ, grant number E-26/203.512/2021), Coordenacao de Aperfeicoamento de Pessoal de Nível Superior - Brasil (CAPES, Finance Code 001; grant number 88881.708719/2022-01, and grant number 88887.708718/2022-00), and Conselho Nacional de Desenvolvimento Científico e Tecnologico (CNPq, grant number 315453/2021-4).
Study sample	102 hospitalised older adults

Inclusion criteria	Age 60 years or older, either sex, admission to the sectors of the medical clinics, surgical clinic, or emergency, minimum score of 13 on the Mini Mental State Examination, being cooperative and alert at eligibility assessment session, and a negative result for a nasal and/or nasopharyngeal swab for SARS-COV-2 by polymerase chain reaction method.
Exclusion criteria	Not specified
Population subgroups	NA
Risk tool(s)	STRATIFY FRAT
Predictors	Not specified
Model development and validation	NA
Outcome	Sensitivity, specificity, PPV, and NPV
Duration of follow-up	Not specified
Indirectness	None

Study arms

STRATIFY (N = 102)

FRAT (N = 102)

Characteristics

Study-level characteristics

Characteristic	Study (N = 102)
% Female Sample size	n = 52; % = 51
Mean age (SD) Custom value	67 (64-73)
Comorbidities Sample size	n = NA; % = NA
Hypertension Sample size	n = 79; % = 77
Diabetes Sample size	n = 37; % = 36

Outcomes

Sensitivity

Outcome	STRATIFY, N = 102	FRAT, N = 102
Sensitivity Custom value	33% (10-70)	17% (2-58)

Specificity

Outcome	STRATIFY, N = 102	FRAT, N = 102
Specificity Custom value	96% (89-99)	70% (60-78)

PPV

Outcome	STRATIFY, N = 102	FRAT, N = 102
PPV Custom value	33% (10-70)	3% (0-18)

NPV

Outcome	STRATIFY, N = 102	FRAT, N = 102
NPV Custom value	96% (89-99)	93% (84-97)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to not specifying the exclusion criteria, and limited information regarding the predictors)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Smith, 2006

Bibliographic Reference	**Smith, Jane; Forster, Anne; Young, John; Use of the 'STRATIFY' falls risk assessment in patients recovering from acute stroke.; Age and ageing; 2006; vol. 35 (no. 2); 138-43**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	United Kingdom
Study setting	Stroke rehabilitation units
Study dates	Not specified
Sources of funding	Funded by The Stroke Association
Study sample	359 participants
Inclusion criteria	All patients with a diagnosis of acute stroke admitted to the participating stroke units during a 6-month study period.
Exclusion criteria	Not specified

Population subgroups	NA
Risk tool(s)	STRATIFY
Predictors	Not specified
Model development and validation	NA
Outcome	Sensitivity, specificity, PPV, NPV
Duration of follow-up	3 months
Indirectness	None
Additional comments	Post-discharge study participants= 284

Study arms

STRATIFY (N = 359)

Characteristics

Study-level characteristics

Characteristic	Study (N = 359)
Mean age (SD) Median (range) Custom value	78 (34-100)

Outcomes

Sensitivity

Outcome	STRATIFY, N = 284
Sensitivity (95%CI) Custom value	16.3% (8.2 to 24.3)

Specificity

Outcome	STRATIFY, N = 284
Specificity (95%CI) Custom value	86.4% (80.9 to 91.8)

PPV

Outcome	STRATIFY, N = 284
PPV (95%CI) Custom value	38.2 (21.9 to 54.6)

NPV

Outcome	STRATIFY, N = 284
NPV (95%CI) Custom value	66.5 (60.0 to 73.0)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to limited information regarding exclusion criteria and predictors.)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Strupeit, 2016

Bibliographic Reference	Strupeit, Steve; Buss, Arne; Wolf-Ostermann, Karin; Assessing Risk of Falling in Older Adults-A Comparison of Three Methods.; Worldviews on evidence-based nursing; 2016; vol. 13 (no. 5); 349-355

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	Germany
Study setting	Geriatric hospital
Study dates	May 2008 to September 2009
Sources of funding	Not specified
Study sample	124 patients
Inclusion criteria	An established diagnosis of functional mobility impairment of the musculoskeletal system or stroke, age older than 60 years, no spatial or temporal orientation deficits, no function-impairing cognitive impairments, the ability to communicate

	(motorically, cognitively, and psychologically), the ability to speak German, residence in the extended urban area of Hamburg (home or nursing home), and the provision of written informed consent.
Exclusion criteria	A score of less than 25 points on the Mini-Mental State Examination (MMSE), presence of a disease expected to result in death during the study period, and discharge within the study's first week.
Population subgroups	NA
Risk tool(s)	STRATIFY
Predictors	Falls prior to and after admission, agitation, visual impairment, the need for frequent toileting, and high transfer and mobility needs.
Model development and validation	NA
Outcome	Sensitivity, specificity, PPV, and NPV
Duration of follow-up	3 weeks
Indirectness	None

Study arms

STRATIFY (cut off 2) (N = 124)

Characteristics

Study-level characteristics

Characteristic	Study (N = 124)
% Female Sample size	n = 62; % = 50
Mean age (SD) Mean (SD)	83.52 (8.15)

Outcomes

Sensitivity

Outcome	STRATIFY, N = 124
Sensitivity Custom value	37.5%

Specificity

Outcome	STRATIFY, N = 124
Specificity Custom value	68.5%

PPV

Outcome	STRATIFY, N = 124
PPV Custom value	10.7%

NPV

Outcome	STRATIFY, N = 124
NPV Custom value	91.7%

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	Low *(Low risk of bias)*
Overall Risk of bias and Applicability	Concerns for applicability	Low *(Low concern)*

Vassallo, 2005

Bibliographic Reference	**Vassallo M; Stockdale R; Sharma JC; Briggs R; Allen S; A comparative study of the use of four fall risk assessment tools on acute medical wards.; Journal of the American Geriatrics Society; 2005; vol. 53 (no. 6)**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study type	Prospective cohort study
Study location	UK
Study setting	Hospital setting
Study dates	Not reported
Sources of funding	Not reported
Study sample	Participants were elderly patients admitted to medical wards for various medical conditions.
Inclusion criteria	Not reported

Exclusion criteria	Not reported
Population subgroups	None
Risk tool(s)	Downton Fall risk tool: Based on history of falls, medications, sensory deficits, limb abnormalities, confusion and unsafe gait. Scored of 3 or above identify patients at risk. STRATIFY: Consists of 5 factors associated with falling: presenting with a fall or having a fall on the ward, presence of agitation, visual impairment, need for frequent toileting, impaired ability to transfer and walk. Scores of 2 or more were considered to be high risk.
Predictors	See risk tools
Model development and validation	Not reported
Outcome	Falls
Duration of follow-up	Not reported
Indirectness	None
Additional comments	

Study arms

Downton (N = 135)

STRATIFY (N = 135)

Characteristics

Study-level characteristics

Characteristic	Study (N = 135)
% Female Nominal	67
Mean age (SD) Mean (SD)	83.8 (8.01)

Outcomes

Outcomes

Outcome	Downton, N = 135	STRATIFY, N = 135
Sensitivity (%) Nominal	81.8	68.2
Specificity % Nominal	24.7	66.4
PPV % Nominal	17.5	28.3

Outcome	Downton, N = 135	STRATIFY, N = 135
NPV % Nominal	87.5	91.5

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to inclusion and exclusion criteria not being specified)*
Overall Risk of bias and Applicability	Concerns for applicability	High *(High concern)*

Vassallo, 2008

Bibliographic Reference	**Vassallo, Michael; Poynter, Lynn; Sharma, Jagdish C; Kwan, Joseph; Allen, Stephen C; Fall risk-assessment tools compared with clinical judgment: an evaluation in a rehabilitation ward.; Age and ageing; 2008; vol. 37 (no. 3); 277-81**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	United Kingdom
Study setting	Geriatric rehabilitation hospital
Study dates	Not specified
Sources of funding	Not specified
Study sample	200 patients
Inclusion criteria	Patients who were admitted for rehabilitation after treatment.

Exclusion criteria	Not specified
Population subgroups	NA
Risk tool(s)	STRATIFY and Downton
Predictors	Downton- past history of falls, medications (tranquillisers/ sedatives, diuretics, antihypertensives excluding diuretics, anti-parkinsonian drugs, and antidepressants), sensory deficits (visual impairment, hearing impairment), limb abnormalities (such as hemiparesis), confusion and an unsafe gate. STRATIFY- Presenting with a fall or having a fall in the ward, the presence of agitation, visual impairment, need for frequent visits to the toilet and impaired ability to transfer and walk.
Model development and validation	NA
Outcome	Sensitivity, specificity, NPV, and PPV
Duration of follow-up	Not specified
Indirectness	None

Study arms

STRATIFY (N = 200)

Downton (N = 200)

Characteristics

Study-level characteristics

Characteristic	Study (N = 200)
% Female Sample size	n = 123; % = NR
Mean age (SD) Mean (SD)	80.9 (NR)

Outcomes

Sensitivity

Outcome	STRATIFY, N = 200	Downton, N = 200
Sensitivity Custom value	82.3 (0.69 to 0.90)	92.2 (0.82 to 0.97)

Specificity

Outcome	STRATIFY, N = 200	Downton, N = 200
Specificity Custom value	34.2 (0.27 to 0.42)	35.8 (0.28 to 0.43)

NPV

Outcome	STRATIFY, N = 200	Downton, N = 200
NPV Custom value	85.0 (0.73 to 0.91)	92.9 (0.83 to 0.97)

PPV

Outcome	STRATIFY, N = 200	Downton, N = 200
PPV Custom value	30.0 (0.23 to 0.38)	33.1 (0.25 to 0.41)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to limited information regarding inclusion and exclusion criteria)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear risk of bias)*

Wald, 2020

Bibliographic Reference	**Wald, Patricia; Chocano-Bedoya, Patricia O; Meyer, Ursina; Orav, Endel J; Egli, Andreas; Theiler, Robert; Bischoff-Ferrari, Heike A; Comparative Effectiveness of Functional Tests in Fall Prediction After Hip Fracture.; Journal of the American Medical Directors Association; 2020; vol. 21 (no. 9); 1327-1330**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	Switzerland
Study setting	Community
Study dates	January to December 2007
Sources of funding	This study was supported by Swiss National Foundations (NFP-53) (H.A.B-F. and R.T.), Vontobel Foundation (H.A.B-F.), Baugarten Foundation (H.A.B-F.), and Swiss National foundations professorship grant PP00B-114864 (H A.B-F.).
Study sample	173 participants with acute hip fracture

Inclusion criteria	Individuals aged 65 years or older, no prior fractures, or prior surgical treatment at the newly fractured hip, Folstein Mini-Mental State Examination score of at least 15, and no severe visual or hearing impairment. Participants were also required to walk 3 meters before their hip fracture.
Exclusion criteria	Not specified
Population subgroups	NA
Risk tool(s)	Timed Up and Go Test
Predictors	Age, gender, body mass index, and baseline 25-hydroxyvitamin D.
Model development and validation	NA
Outcome	AUC, sensitivity, specificity, NPV, and PPV
Duration of follow-up	12 months
Indirectness	None
Additional comments	No falls= 91 Single Fallers= 38 Recurrent Fallers= 54

Study arms

Timed Up and Go Test (42.5 seconds) (N = 173)

Acute hip fracture patients

Characteristics

Study-level characteristics

Characteristic	Study (N = 173)
% Female Sample size	n = NA; % = NA
No Falls Sample size	n = 63; % = 77.8
Single fallers Sample size	n = 27; % = 71.1
Recurrent Fallers Sample size	n = 47; % = 75.9
Mean age (SD) Mean (SD)	84 (NR)

Outcomes

AUC

Outcome	Timed Up and Go Test (42.5 seconds), N = 173
AUC (95%CI) Custom value	NA
Fallers vs. non-fallers Custom value	0.57 (0.47, 0.67)
Recurrent fallers vs. All Custom value	0.60 (0.50, 0.70)

Sensitivity

Outcome	Timed Up and Go Test (42.5 seconds), N = 173
Sensitivity (95%CI) Custom value	0.78 (0.66, 0.90)

Specificity

Outcome	Timed Up and Go Test (42.5 seconds), N = 173
Specificity (95%CI) Custom value	0.44 (0.34, 0.55)

NPV

Outcome	Timed Up and Go Test (42.5 seconds), N = 173
NPV (95%CI) Custom value	0.80 (0.69, 0.91)

PPV

Outcome	Timed Up and Go Test (42.5 seconds), N = 173
PPV (95%CI) Custom value	0.41 (0.31, 0.52)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to exclusion criteria not being specified)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Wang, 2021

Bibliographic Reference	**Wang, Lu; Song, Peiyu; Cheng, Cheng; Han, Peipei; Fu, Liyuan; Chen, Xiaoyu; Yu, Hairui; Yu, Xing; Hou, Lin; Zhang, Yuanyuan; Guo, Qi; The Added Value of Combined Timed Up and Go Test, Walking Speed, and Grip Strength on Predicting Recurrent Falls in Chinese Community-dwelling Elderly.; Clinical interventions in aging; 2021; vol. 16; 1801-1812**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	China
Study setting	Community setting
Study dates	March 2016 to 2018
Sources of funding	This work was supported by the National Natural Science Foundation of China (grant number 81372118), Tianjin Municipal Science and Technology Commission (grant number 16ZXMJSY00070) and Health and Family Planning Commission of Binhai New Area (2017BWKZ005).
Study sample	875 elderly residents of the Hangu suburb of Tianjin China

Inclusion criteria	Participants aged 60 years or older and had been enrolled in the National Free Physical Examination Program and attended re-assessment.
Exclusion criteria	Suffering from disturbing functional impairment, like visual disorders without adequate correction, cognitive problems, injury-induced loss of mobility and cause-specific muscle weakness interfering with daily activities, using medications disturbing physical abilities or falls (i.e. psychotropic drugs cardiovascular drugs, hypoglycaemic agents, nonsteroidal anti-inflammatory drugs, analgesics, dopaminergic drugs, Parkinson's disease drugs or more than four kinds of complex drugs which were evaluated with their medical history and doctors' diagnosis), and refusing to complete assessments after one year.
Population subgroups	NA
Risk tool(s)	Timed Up and Go Test Walking speed
Predictors	Age, gender, living status, occupation, medicine use, history of falls, educational level, illness history (responses regarding hypertension, hyperlipidaemia, stroke, coronary heart disease, peptic ulcer, gout, cancer, hepatic disease, biliary tract disease, thyroid disease, osteoarthritis, anaemia, and kidney disease) corresponding medicine use and physician diagnosis, smoking, drinking habits, BMI, and physical activity.
Model development and validation	NA
Outcome	ROC, sensitivity, and specificity
Duration of follow-up	1 year follow-up
Indirectness	None

Study arms

Timed Up and Go Test (N = 875)

Walking Speed (N = 875)

Characteristics

Study-level characteristics

Characteristic	Study (N = 875)
% Female Sample size	n = 513; % = NR
Mean age (SD) Mean (SD)	67.1 (5.94)
Comorbidities Sample size	n = NA; % = NA
Diabetes Sample size	n = NR; % = 12.1
Hypertension Sample size	n = NR; % = 50.2
Hyperlipidaemia Sample size	n = NR; % = 25.3
Heart disease	n = NR; % = 24.6

Characteristic	Study (N = 875)
Sample size	
Peptic ulcer Sample size	n = NR; % = 5.2
Stroke Sample size	n = NR; % = 7.3
Gout Sample size	n = NR; % = 1.4
Cancer Sample size	n = NR; % = 1.3
Kidney disease Sample size	n = NR; % = 2.9
Hepatic disease Sample size	n = NR; % = 1.7
Biliary tract disease Sample size	n = NR; % = 4.2
Thyroid disease Sample size	n = NR; % = 1.7

Characteristic	Study (N = 875)
Osteoarthritis Sample size	n = NR; % = 21.7
Anemia Sample size	n = NR; % = 0.6

Outcomes

ROC

Outcome		**Walking Speed, N = 875**
ROC Custom value	0	0.570 (0.523 to 0.616)

Any falls

Sensitivity

Outcome		**Walking Speed, N = 875**
Sensitivity Custom value		0.435

Any falls

Specificity

Outcome		Walking Speed, N = 875
Specificity Custom value		0.614

Any falls

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	Low *(Low risk of bias)*
Overall Risk of bias and Applicability	Concerns for applicability	Low *(Low concern)*

Webster, 2010

Bibliographic Reference	**Webster, J.; Courtney, M.; Marsh, N.; Gale, C.; Abbott, B.; Mackenzie-Ross, A.; McRae, P.; The STRATIFY tool and clinical judgment were poor predictors of falling in an acute hospital setting; Journal of Clinical Epidemiology; 2010; vol. 63 (no. 1); 109-113**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	Australia
Study setting	Any hospital unit (internal medicine, surgical, orthopaedic, psychiatric, oncology, or geriatric rehabilitation services)
Study dates	17 March to 24 October 2007
Sources of funding	The study was funded by a ‘Queensland Nursing Council’ grant and a ‘Strengthening Aged Care’ grant.
Study sample	788 participants
Inclusion criteria	Patients aged 65 years or older who were assessed for their risk of falling within 48 hours of admission.

Exclusion criteria	Not specified
Population subgroups	NA
Risk tool(s)	STRATIFY
Predictors	Not specified
Model development and validation	Not specified
Outcome	Sensitivity, specificity, NPV, and PPV
Duration of follow-up	Noted, but not specified
Indirectness	Some indirectness noted- compared against Nurses' clinical judgment.
Additional comments	

Study arms

STRATIFY (N = 788)

Characteristics

Study-level characteristics

Characteristic	Study (N = 788)
Mean age (SD) Mean (SD)	77.7 (7.89)
Comorbidities Sample size	n = NA; % = NA
Visually impaired Sample size	n = 235; % = 29.3

Outcomes

Sensitivity

Outcome	STRATIFY, N = 783
Sensitivity Custom value	NA
Using 1 as the cut point Custom value	0.93
Using 2 as the cut point	0.82

Custom value	
Using 3 as the cut point Custom value	0.45
Using 4 as the cut point Custom value	0.25

Specificity

Outcome	**STRATIFY, N = 783**
Specificity Custom value	NA
Using 1 as the cut point Custom value	0.29
Using 2 as the cut point Custom value	0.61
Using 3 as the cut point Custom value	0.83
Using 4 as the cut point Custom value	0.95

NPV

Outcome	STRATIFY, N = 783
NPV Custom value	NA
Using 1 as the cut point Custom value	0.98
Using 2 as the cut point Custom value	0.97
Using 3 as the cut point Custom value	0.94
Using 4 as the cut point Custom value	0.93

PPV

Outcome	STRATIFY, N = 783
PPV Custom value	NA
Using 1 as the cut point Custom value	0.12
Using 2 as the cut point Custom value	0.18
Using 3 as the cut point Custom value	0.22
Using 4 as the cut point Custom value	0.35

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to no information regarding exclusion criteria and predictors)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concern)*

Yang, 2021

Bibliographic Reference	**Yang, Christine; Ghaedi, Bahareh; Campbell, T Mark; Rutkowski, Nicole; Finestone, Hillel; Predicting Falls Using the Stroke Assessment of Fall Risk Tool.; PM & R: the journal of injury, function, and rehabilitation; 2021; vol. 13 (no. 3); 274-281**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	Canada
Study setting	Inpatient stroke rehabilitation unit
Study dates	January 2017 to September 2018
Sources of funding	The study was funded by Bruyère Academic Medical Organization (Bruyère # M16-16-022).
Study sample	220 patients with acute stroke
Inclusion criteria	Patients admitted to the unit who had either imaging-confirmed and/or strong clinical evidence of acute ischemic or haemorrhagic stroke were recruited.

Exclusion criteria	Comorbid brain tumour, traumatic brain injuries, neurodegenerative disorders (i.e. Parkinson disease and multiple sclerosis) and language barrier, that is, unable to communicate in English and/or French with no available translator for the patient or substitute decision-marker (SDM).
Population subgroups	Fallers= 48 Non-Fallers= 172
Risk tool(s)	Morse Fall Scale
Predictors	History of falling, secondary diagnosis, ambulatory aids, intravenous therapy, type of gait, and mental status.
Model development and validation	NA
Outcome	AUC, sensitivity, specificity, PPV, and NPV
Duration of follow-up	Not specified
Indirectness	None

Study arms

Morse Fall Scale (N = 220)

Characteristics

Study-level characteristics

Characteristic	Study (N = 220)
% Female Sample size	n = NR; % = NR
Male- Fallers Sample size	n = 33; % = 68.75
Male- non-Fallers Sample size	n = 106; % = 61.63
Mean age (SD) Mean (SD)	NA (NA)
Fallers Mean (SD)	72.3 (13.12)
Non-fallers Mean (SD)	69.57 (13.01)

Outcomes

AUC

Outcome	Morse Fall Scale, N = 220
AUC (95%CI) Custom value	0.56 (0.46 to 0.65)

Sensitivity

Outcome	Morse Fall Scale, N = 220
Sensitivity (95%CI) Custom value	45.83 (31.64 to 60.69)

Specificity

Outcome	Morse Fall Scale, N = 220
Specificity (95%CI) Custom value	68.02 (60.42 to 74.80)

PPV

Outcome	Morse Fall Scale, N = 220
PPV (95%CI) Custom value	28.57 (19.14 to 40.17)

NPV

Outcome	Morse Fall Scale, N = 220
NPV (95%CI) Custom value	81.82 (74.31 to 87.57)

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	Low *(Low risk of bias)*
Overall Risk of bias and Applicability	Concerns for applicability	Low *(Low concern)*

Yoo, 2015

Bibliographic Reference	**Yoo, Sung-Hee; Kim, Sung Reul; Shin, Yong Soon; A prediction model of falls for patients with neurological disorder in acute care hospital.; Journal of the neurological sciences; 2015; vol. 356 (no. 12); 113-7**

Study details

Secondary publication of another included study- see primary study for details	NA
Other publications associated with this study included in review	NA
Trial name / registration number	NA
Study location	Korea
Study setting	Asan Medical Centre- acute care setting
Study dates	1 July to 31 October 2011
Sources of funding	None
Study sample	1026 participants
Inclusion criteria	Adult patients aged 20 years or older, have a primary diagnosis of a neurological disorder, admitted to the neurology, neurosurgery, or rehabilitation department for the first time during the study period due to acute problems such as development of CVD or severe aggregation of Parkinson's disease, and consent by the patient or their family.

Exclusion criteria	Not specified
Population subgroups	NA
Risk tool(s)	Morse Fall Scale, STRATIFY, and Hendrich II Falls Risk Model
Predictors	History of falls, diagnosis (CVD), gait (normal/ bed rest, mild impaired, or severe impaired), overestimate of one's own gait ability, and constant
Model development and validation	NA
Outcome	Sensitivity, specificity, positive predictive value, negative predictive value, AUC, Youden Index
Duration of follow-up	Not specified
Indirectness	None
Additional comments	1018 patients with adequate data were included.

Study arms

Neurological patients (N = 1026)

Patients hospitalised in an acute care setting. 986 patients identified as non-falling and 32 patients identified as falling.

Characteristics

Study-level characteristics

Characteristic	Study (N = 1018)
% Female Sample size	n = NA; % = NA
Falling patients Sample size	n = 16; % = 50
Non-falling patients Sample size	n = 520; % = 52.7
Mean age (SD) Mean (SD)	NA (NA)
Falling patients Mean (SD)	63.1 (14.3)
Non-falling patients Mean (SD)	56.1 (14.8)
Comorbidities	n = NA; % = NA

Sample size	
Falling patients - cerebrovascular disease Sample size	n = 17; % = 53.1
Non-falling patients- cerebrovascular disease Sample size	n = 452; % = 45.8
Falling patients- neurodegenerative disease Sample size	n = 6; % = 18.8
Non-falling patients- neurodegenerative disease Sample size	n = 94; % = 9.5
Falling patients- neuromuscular disease Sample size	n = 0; % = 0
Non-falling patients- neuromuscular disease Sample size	n = 21; % = 2.1
Falling patients- Epilepsy Sample size	n = 2; % = 6.3
Non-falling patients- Epilepsy Sample size	n = 99; % = 10
Falling patients- Tumour	n = 5; % = 15.6

Sample size	
Non-falling patients- Tumour Sample size	n = 177; % = 18
Falling patients- Spine Sample size	n = 2; % = 6.3
Non-falling patients- Spine Sample size	n = 99; % = 10
Falling patients- Infection and others Sample size	n = 0; % = 0
Non-falling patients- Infection and others Sample size	n = 128; % = 13
Falling patients- Confusion or disorientation Sample size	n = 8; % = 25
Non-falling patients- Confusion or disorientation Sample size	n = 108; % = 11
Falling patients- Depression Sample size	n = 4; % = 12.5
Non-falling patients- Depression	n = 139; % = 14.1

Sample size	
Falling patients- Dizziness Sample size	n = 8; % = 25
Non-falling patients- Dizziness Sample size	n = 215; % = 21.8
Falling patients- Visual problems Sample size	n = 10; % = 31.2
Non-falling patients- Visual problems Sample size	n = 246; % = 24.9
Falling patients- Hypertension Sample size	n = 14; % = 43.8
Non-falling patients- Hypertension Sample size	n = 381; % = 38.6
Falling patients- Diabetes Sample size	n = 9; % = 28.1
Non-falling patients- Diabetes Sample size	n = 158; % = 16
Falling patients- Cardiac disease	n = 4; % = 12.5

Sample size	
Non-falling patients- Cardiac disease Sample size	n = 91; % = 9.2
Falling patients- respiratory disease Sample size	n = 1; % = 3.1
Non-falling patients- respiratory disease Sample size	n = 44; % = 4.5
Falling patients- Renal failure Sample size	n = 0; % = 0
Non-falling patients- Renal failure Sample size	n = 13; % = 1.3
Falling patients- Cancer Sample size	n = 1; % = 3.1
Non-falling patients- Cancer Sample size	n = 63; % = 6.4

Outcomes

Sensitivity

Outcome	Neurological patients, N = 1018
Morse Falls Scale Cutoff value 51 Custom value	50.0%
Morse Falls Scale Cutoff value 40 Custom value	78.1%
STRATIFY Cutoff value 3 Custom value	40.6%
STRATIFY Cutoff value 2 Custom value	84.4%
Hendrich II Falls Risk Model Cutoff value 5 Custom value	59.4%
Hendrich II Falls Risk Model Cutoff value 3 Custom value	81.3%

Specificity

Outcome	Neurological patients, N = 1018
Morse Falls Scale Cutoff value 51 Custom value	90.1%
Morse Fall Scale Cutoff value 40 Custom value	82.2%
STRATIFY Cutoff value 3 Custom value	90.0%
STRATIFY Cutoff value 2 Custom value	73.5%
Hendrich II Falls Risk Model Cutoff value 5 Custom value	78.5%
Hendrich II Falls Risk Model Cutoff value 3 Custom value	61.5%

Positive predictive value

Outcome	Neurological patients, N = 1018
Morse Fall Scale Cutoff value 51 Custom value	14.0%
Morse Fall Scale Cutoff value 40 Custom value	12.4%
STRATIFY Cutoff value 3 Custom value	11.6%
STRATIFY Cutoff value 2 Custom value	9.3%
Hendrich II Falls Risk Model Cutoff value 5 Custom value	8.2%
Hendrich II Falls Risk Model Cutoff value 3 Custom value	6.4%

Negative predictive value

Outcome	Neurological patients, N = 1018
Morse Fall Scale Cutoff value 51 Custom value	98.2%
Morse Fall Scale Cutoff value 40 Custom value	99.1%
STRATIFY Cutoff value 3 Custom value	97.9%
STRATIFY Cutoff value 2 Custom value	99.3%
Hendrich II Falls Risk Model Cutoff value 5 Custom value	98.4%
Hendrich II Falls Risk Model Cutoff value 3 Custom value	99.0%

AUC (95%CI)

Outcome	Neurological patients, N = 1018
Morse Falls Scale Cutoff value 51 Mean (95% CI)	0.7 (0.59 to 0.81)
Morse Falls Scale Cutoff value 40 Mean (95% CI)	0.8 (0.72 to 0.89)
STRATIFY Cutoff value 3 Mean (95% CI)	0.65 (0.54 to 0.76)
STRATIFY Cutoff value 2 Mean (95% CI)	0.79 (0.72 to 0.87)
Hendrich II Falls Risk Model Cutoff value 5 Mean (95% CI)	0.69 (0.59 to 0.79)
Hendrich II Falls Risk Model Cutoff value 3 Mean (95% CI)	0.71 (0.63 to 0.8)

Youden Index

Outcome	Neurological patients, N = 1018
Morse Falls Risk Cutoff Value 51 Custom value	0.401
Morse Falls Risk Cutoff Value 40 Custom value	0.603
STRATIFY Cutoff value 3 Custom value	0.306
STRATIFY Cutoff value 2 Custom value	0.579
Hendrich II Falls Risk Model Cutoff value 5 Custom value	0.379
Hendrich II Falls Risk Model Cutoff value 3 Custom value	0.428

Critical appraisal - PROBAST tool 2.2

Section	Question	Answer
Overall Risk of bias and Applicability	Risk of bias	High *(High risk of bias due to limited information provided regarding outcome definitions and exclusion criteria information not being provided)*
Overall Risk of bias and Applicability	Concerns for applicability	Unclear *(Unclear concerns for applicability)*

Appendix E AUC plots

AUC- Community setting – aged 65 years or older

Figure 2: AUC – Timed up and go test – community setting – aged 65 years or older

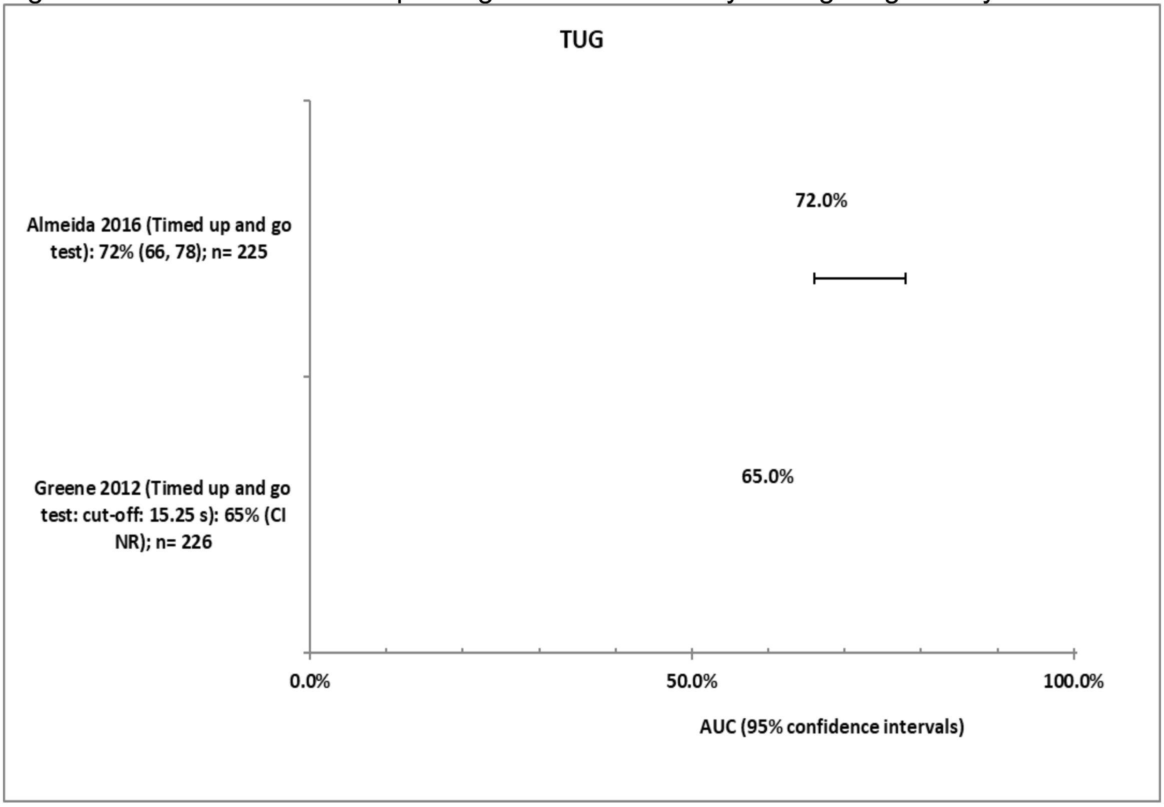


Figure 3: **AUC – Average walking speed – community setting – aged 65 years or older**

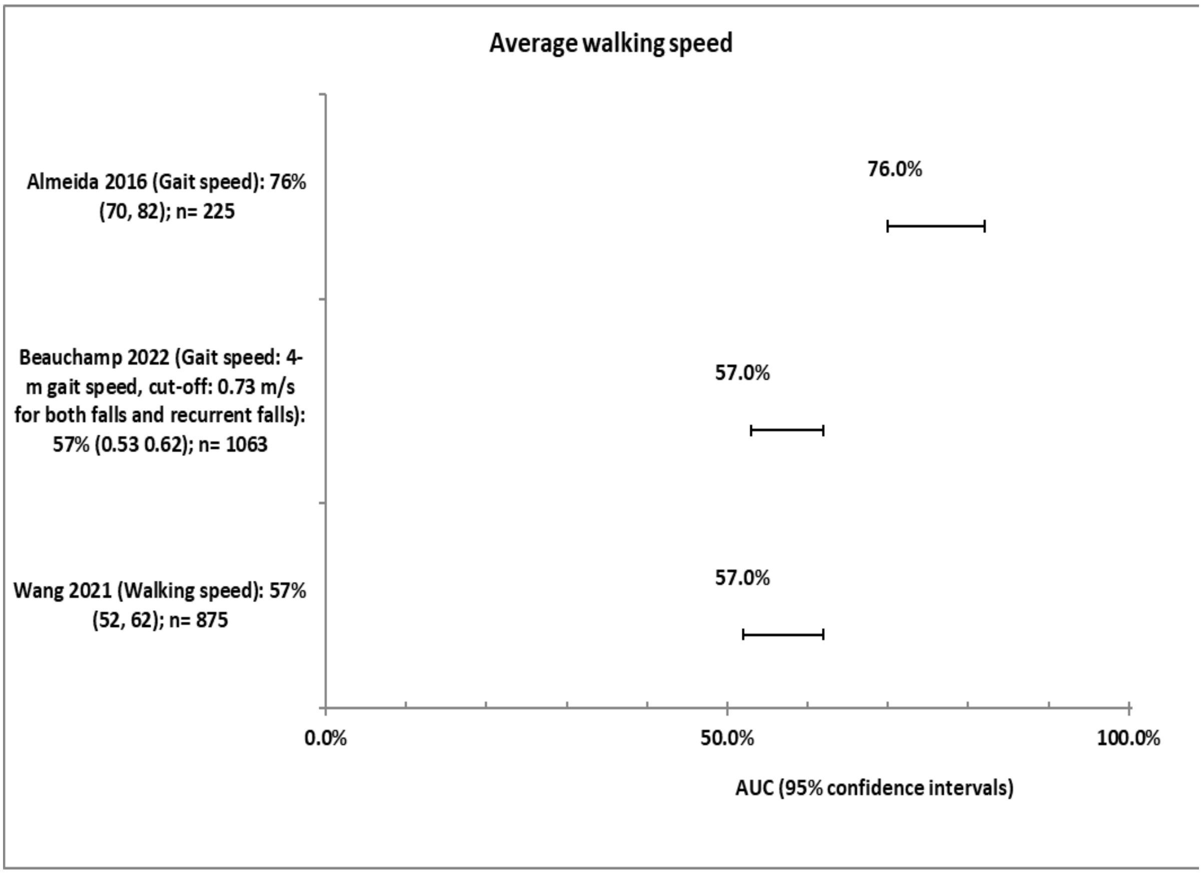

Average walking speed
Almeida 2016 (Gait speed): 76% (70, 82); n= 225
76.0%
Beauchamp 2022 (Gait speed: 4-m gait speed, cut-off: 0.73 m/s for both falls and recurrent falls): 57% (0.53 0.62); n= 1063
57.0%
Wang 2021 (Walking speed): 57% (52, 62); n= 875
57.0%
0.0%
50.0%
100.0%
AUC (95% confidence intervals)

Figure 4: AUC –Chair test– community setting – aged 65 years or older

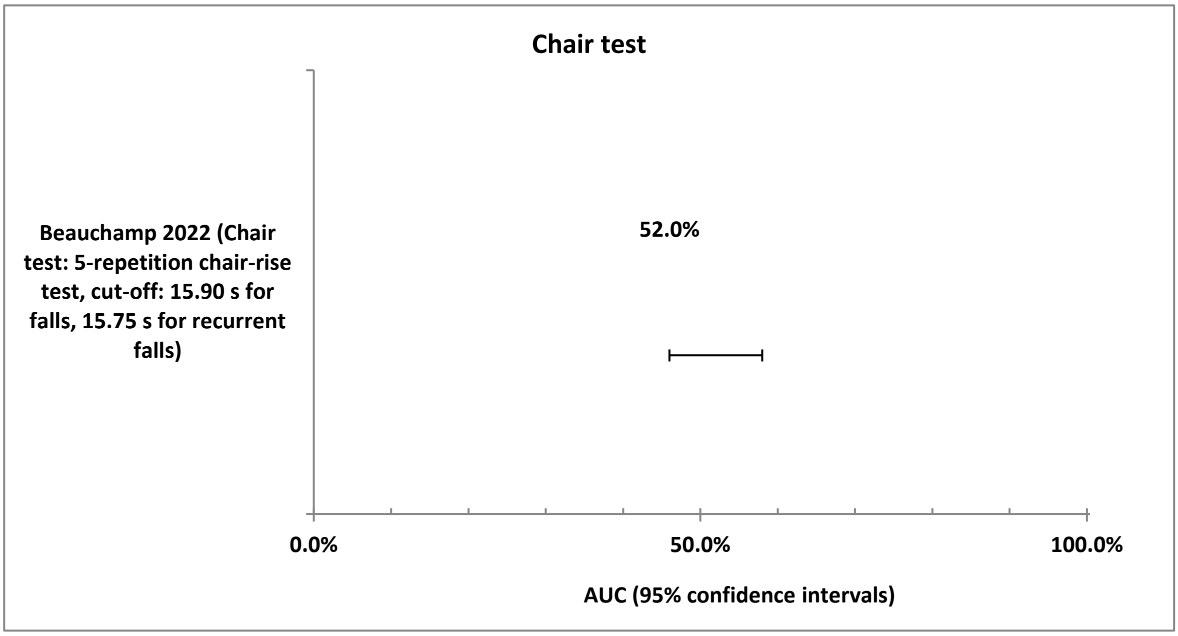


Figure 5: AUC – The Falls Risk Assessment Tool – community setting – aged 65 years or older

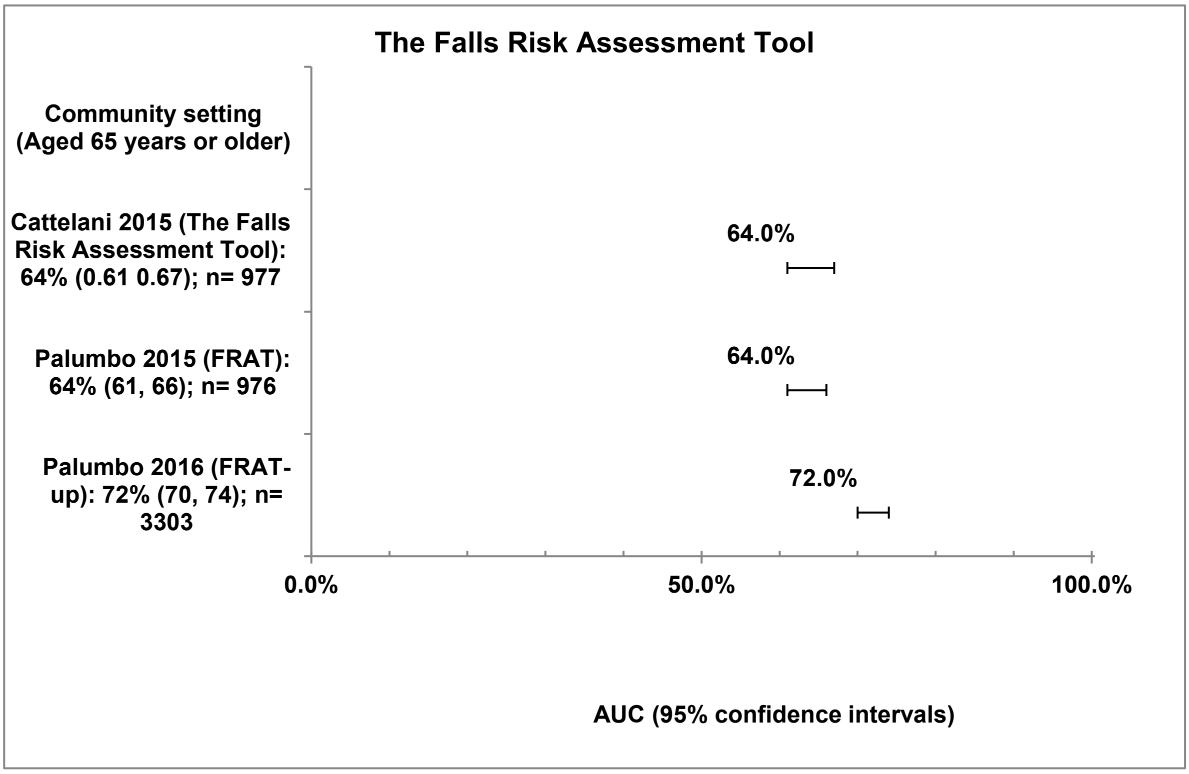


Figure 6: **AUC –Downtown falls risk index– community setting – aged 65 years or older**

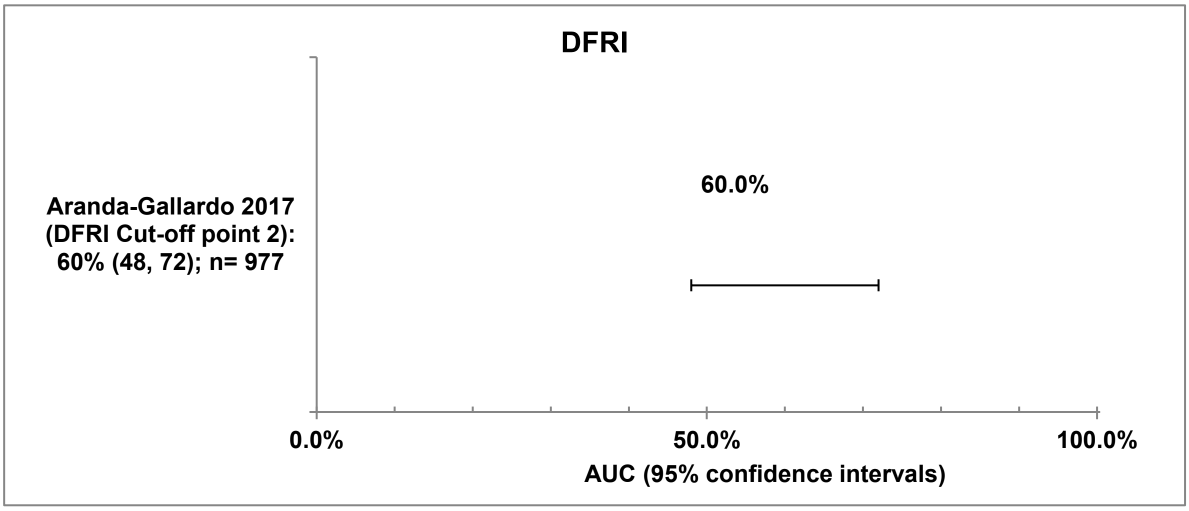


Figure 7: **AUC Functional reach test– community setting – aged 65 years or older**

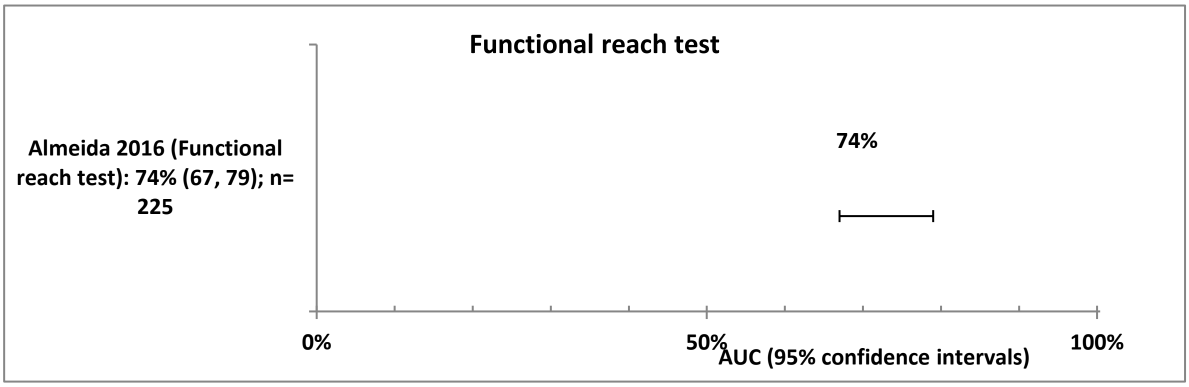
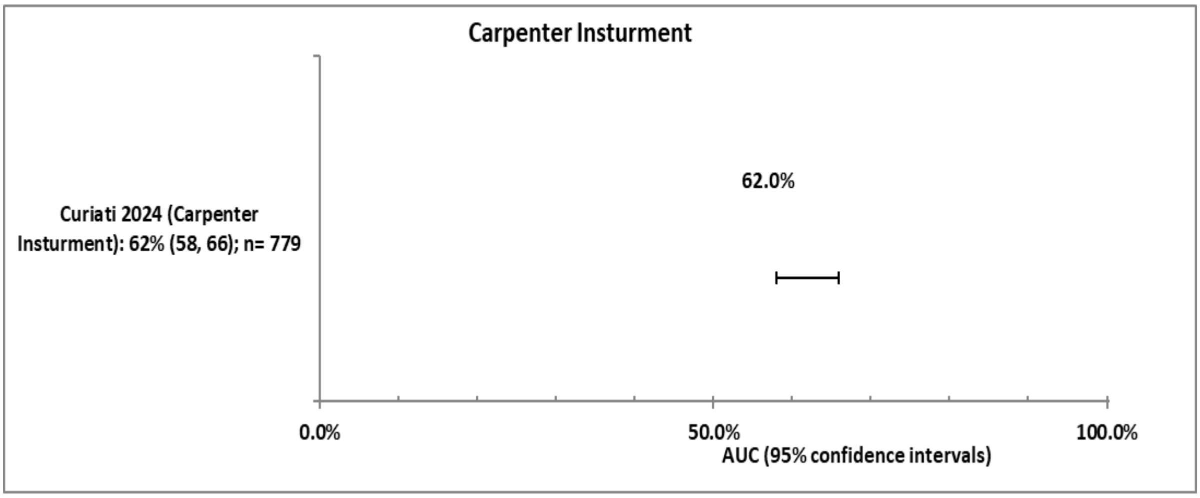


Figure 8: **AUC – Carpenter Instrument –community setting – aged 65 years or older**



AUC- Hospital setting – aged 65 years or older

Figure 9: AUC-Timed up and go– hospital setting- aged 65 years or older

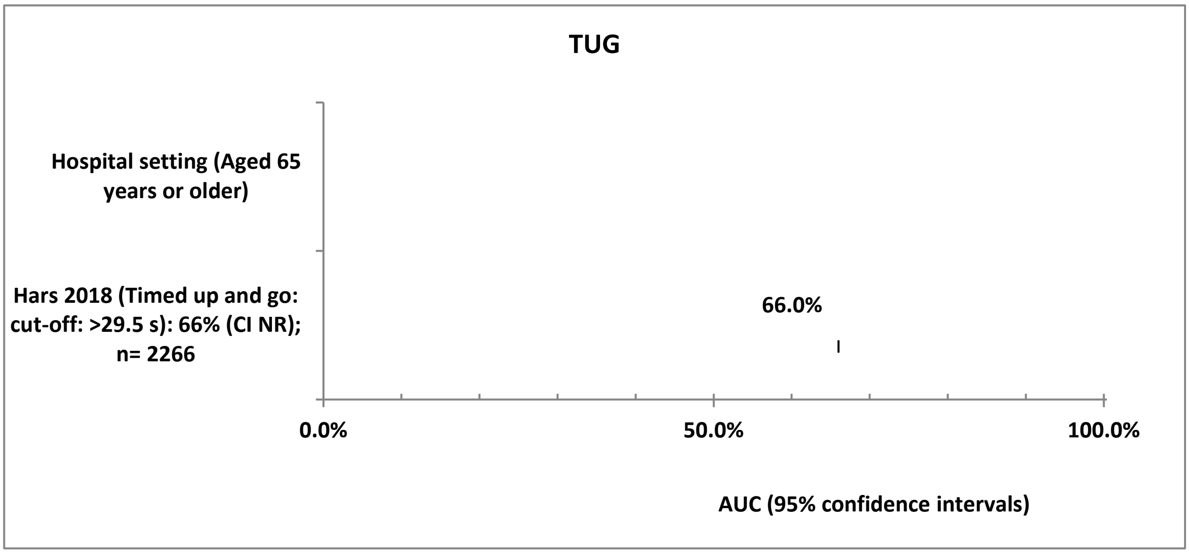


Figure 10: **AUC – STRATIFY – hospital setting – aged 65 years or older**

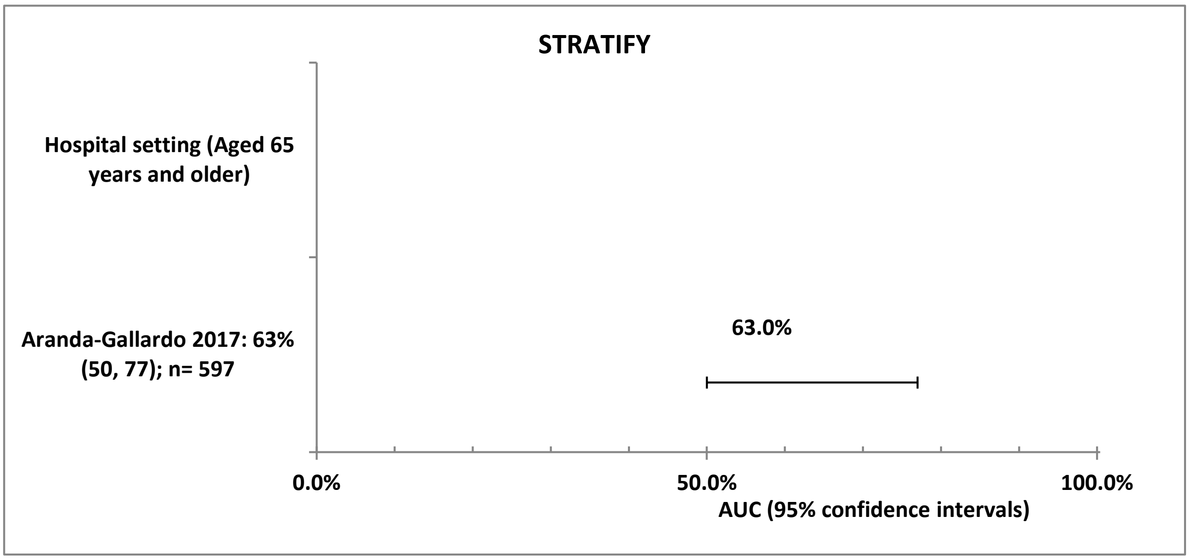


Figure 11: **AUC – DFRI – hospital setting – aged 65 years or older**

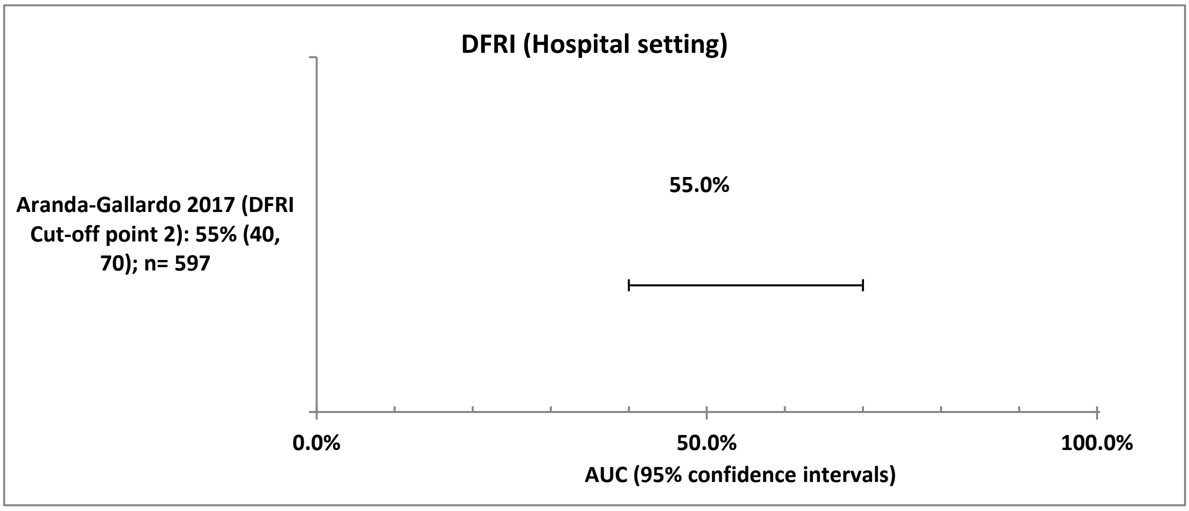


Figure 12:**AUC – Hendrich II Falls Risk Tool – hospital setting – aged 65 years or older**

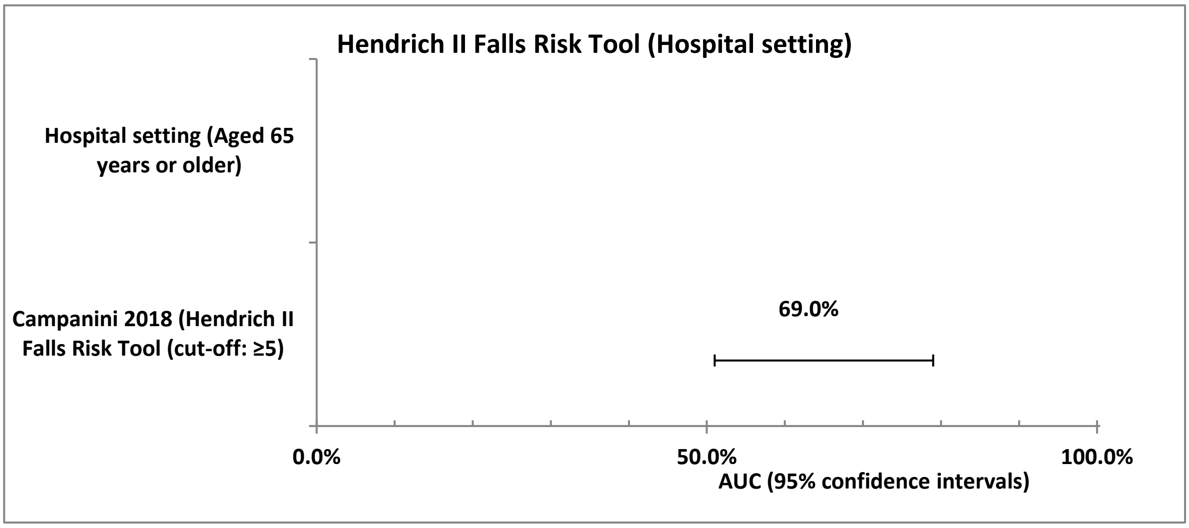
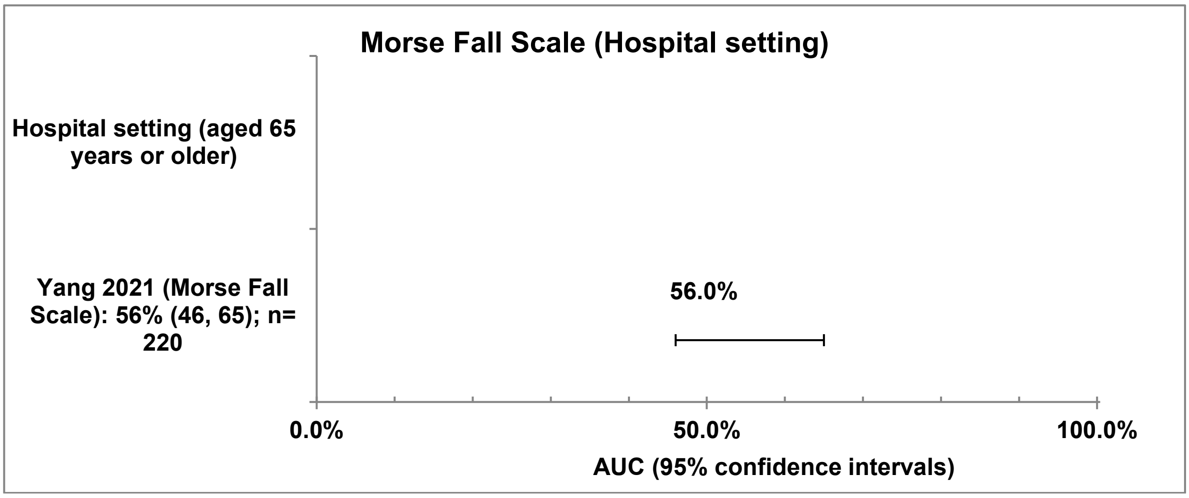


Figure 13: **AUC – Morse Fall Scale – hospital setting – aged 65 years or older**



Summary of results: AUC- Hospital setting aged 50-65 years old

Figure 14: **AUC – STRATIFY – hospital setting – aged 50-65 years old**

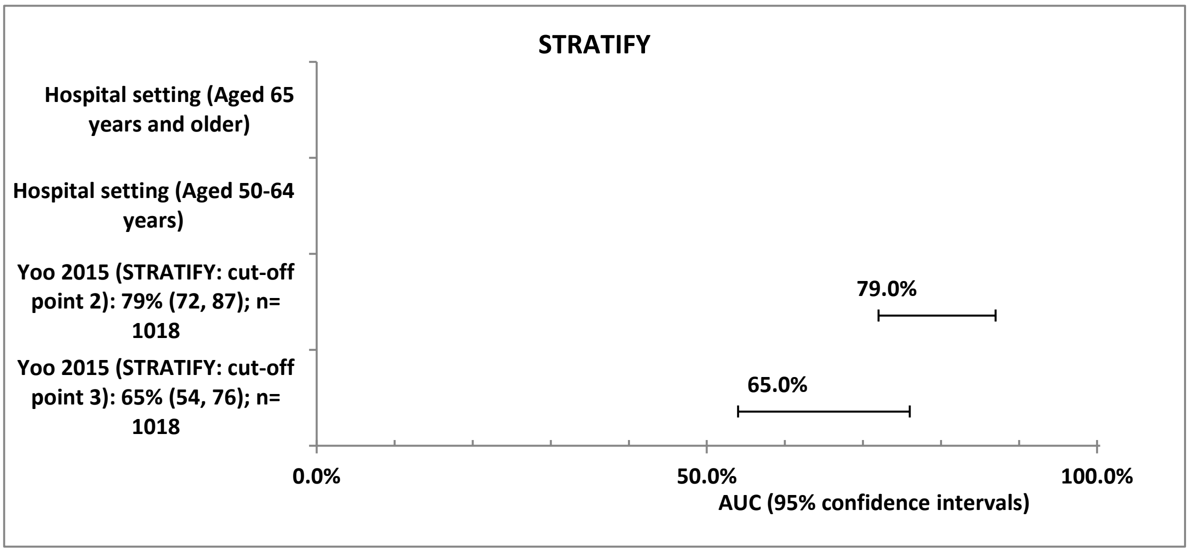


Figure 15: AUC – Hendrich II Falls Risk Tool – hospital setting – aged 50-65 years old

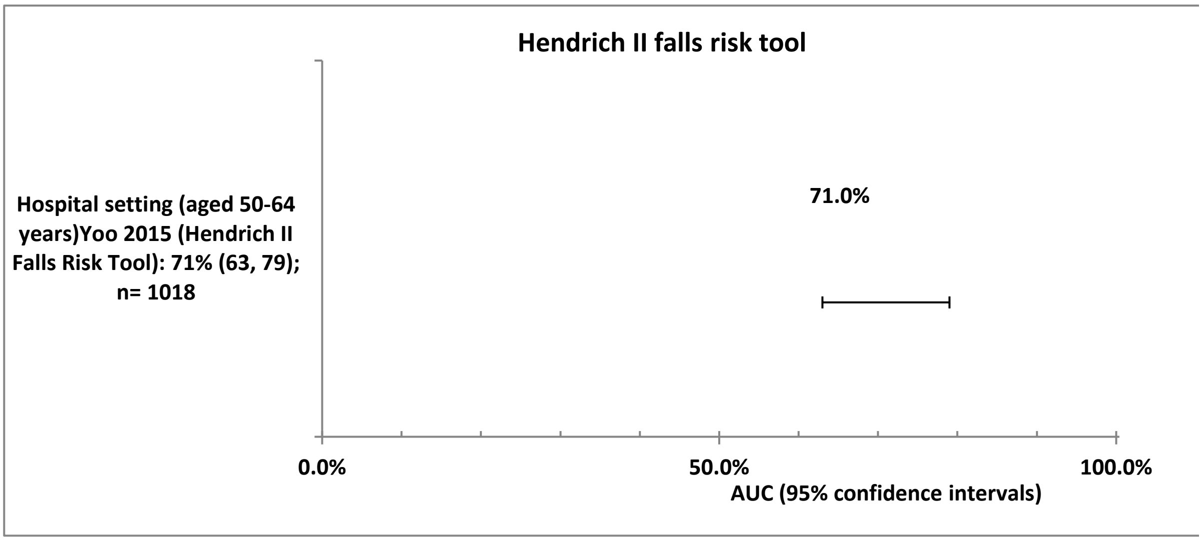
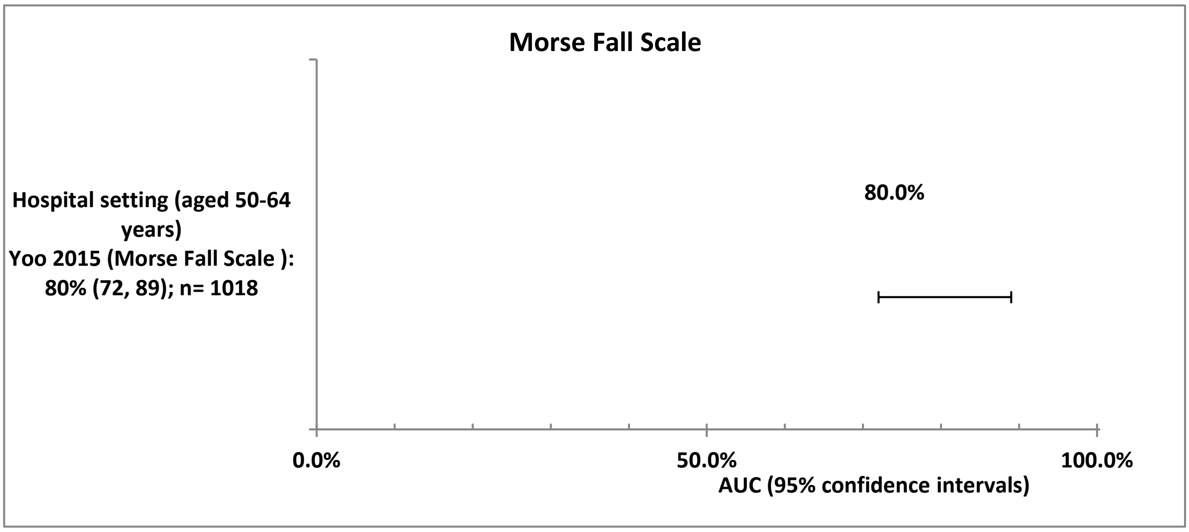


Figure 16: **AUC – Morse Fall Scale – hospital setting – aged 50-65 years old**



Summary of results: AUC- Residential care setting

Figure 17: **AUC – Timed up and go – residential care setting – aged 65 years or older**

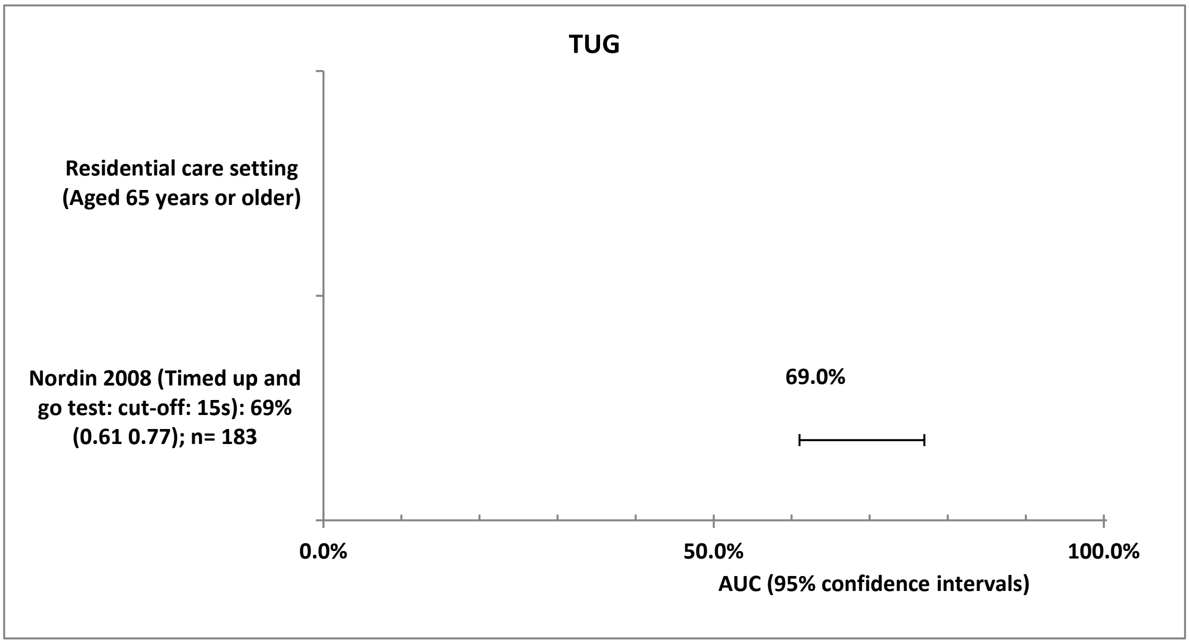
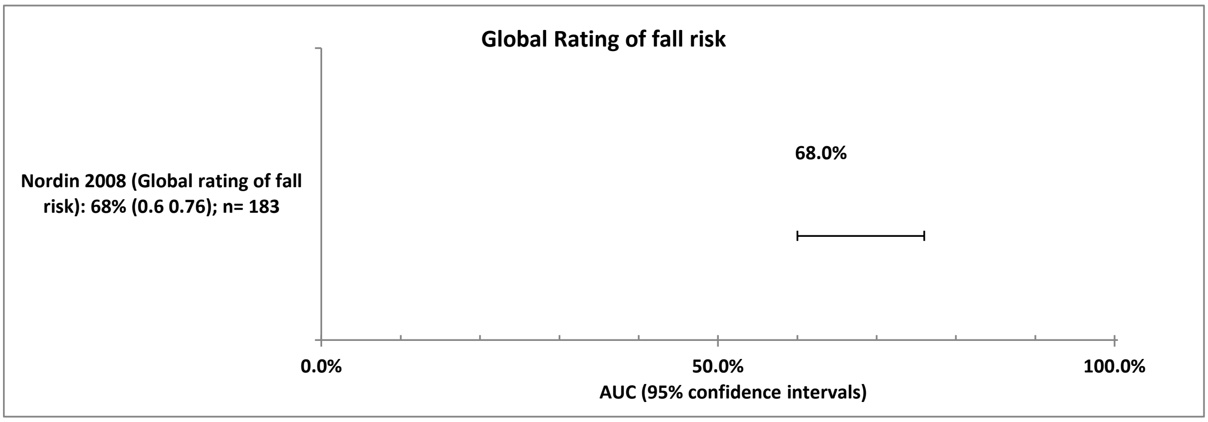


Figure 18: **AUC – Global rating of fall risk – residential care setting – aged 65 years or older**



Appendix F Summary of results: Sensitivity and specificity

F.1.1.1 Community setting

Figure 19: **Chair test (>13 cut off)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Shimada 2009	60	167	39	189	0.61 [0.50, 0.70]	0.53 [0.48, 0.58]

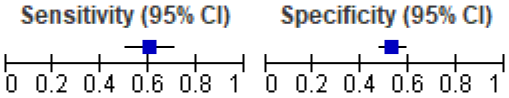


Figure 20: **Chair test (>15.9 cut off)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Beauchamp 2022	102	437	116	629	0.47 [0.40, 0.54]	0.59 [0.56, 0.62]

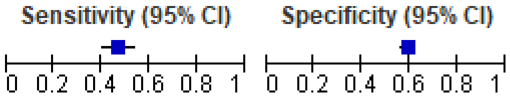


Figure 21: **Chair test (>30 cut off)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Chow 2019	40	109	11	32	0.78 [0.65, 0.89]	0.23 [0.16, 0.31]

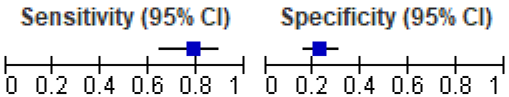


Figure 22: **Downton Falls Risk Index (3 or over cut off)- Community setting - Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Del Brutto 2022	47	7	111	89	0.30 [0.23, 0.38]	0.93 [0.86, 0.97]
Olsson Moller 2012	14	67	4	21	0.78 [0.52, 0.94]	0.24 [0.15, 0.34]

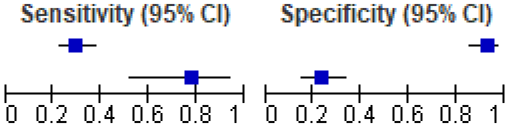


Figure 23: **Downton Falls Risk Index (≥4 cut-off)- Community setting - Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Olsson Moller 2012	7	47	11	41	0.39 [0.17, 0.64]	0.47 [0.36, 0.58]

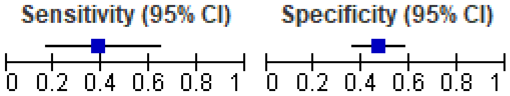


Figure 23: Downton Falls Risk Index (≥5 cut-off)- Community setting - Aged 65 years or older

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Olsson Moller 2012	2	26	16	62	0.11 [0.01, 0.35]	0.70 [0.60, 0.80]

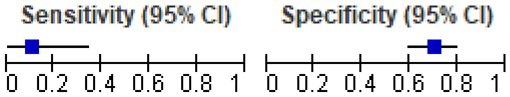


Figure 24: **Functional reach test (cut off <17 cm) – Community setting - Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Almeida 2016	47	25	37	116	0.56 [0.45, 0.67]	0.82 [0.75, 0.88]

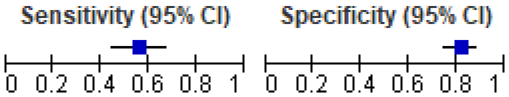


Figure 25: **Functional reach test (18cm or less)- community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Shimada 2009	47	146	52	210	0.47 [0.37, 0.58]	0.59 [0.54, 0.64]

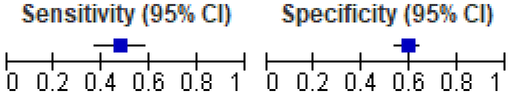


Figure 26: **Functional reach test (≤21.5 cm cut off) – community setting – aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Ashburn 2008	43	42	20	49	0.68 [0.55, 0.79]	0.54 [0.43, 0.64]

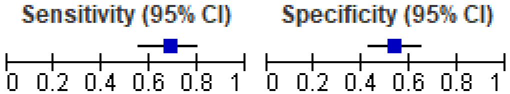


Figure 27: **Self-selected walking speed- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Shimada 2009	55	146	44	210	0.56 [0.45, 0.66]	0.59 [0.54, 0.64]
Wang 2021	18	322	23	512	0.44 [0.28, 0.60]	0.61 [0.58, 0.65]

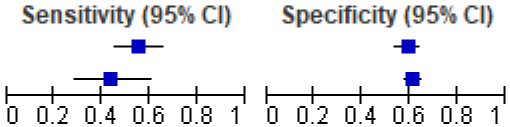


Figure 28: **Maximal walking speed- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Shimada 2009	57	150	42	206	0.58 [0.47, 0.67]	0.58 [0.53, 0.63]

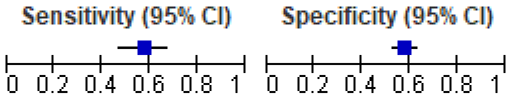


Figure 29: **4 metre gait speed (cut off 0.73)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Beauchamp 2022	102	287	116	558	0.47 [0.40, 0.54]	0.66 [0.63, 0.69]

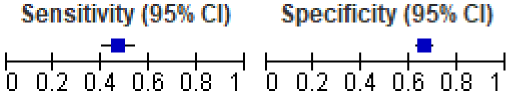


Figure 30: **Hendrich II Fall Risk Model (≥4.5 cut-off)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Arslan 2022	9	57	2	57	0.82 [0.48, 0.98]	0.50 [0.40, 0.60]

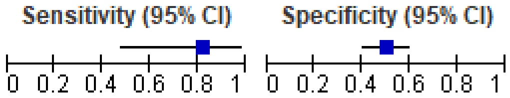


Figure 31: **Morse Fall scale (≥66.2 cut-off)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Arslan 2022	10	29	1	79	0.91 [0.59, 1.00]	0.73 [0.64, 0.81]

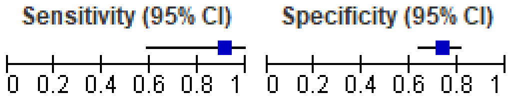
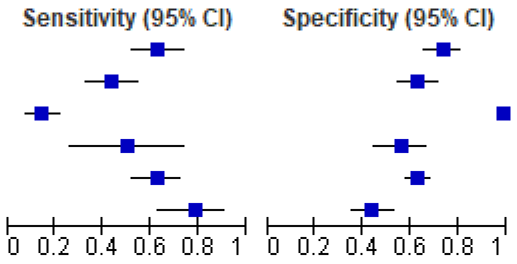


Figure 32: **Timed up and go (≥15 cut-off)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Almeida 2016	53	37	31	104	0.63 [0.52, 0.73]	0.74 [0.66, 0.81]
Greene 2012	36	53	47	90	0.43 [0.33, 0.55]	0.63 [0.54, 0.71]
Kang 2017	16	7	97	421	0.14 [0.08, 0.22]	0.98 [0.97, 0.99]
Olsson Moller 2012	9	39	9	49	0.50 [0.26, 0.74]	0.56 [0.45, 0.66]
Shimada 2009	62	132	37	224	0.63 [0.52, 0.72]	0.63 [0.58, 0.68]
Wald 2020	30	76	8	59	0.79 [0.63, 0.90]	0.44 [0.35, 0.53]



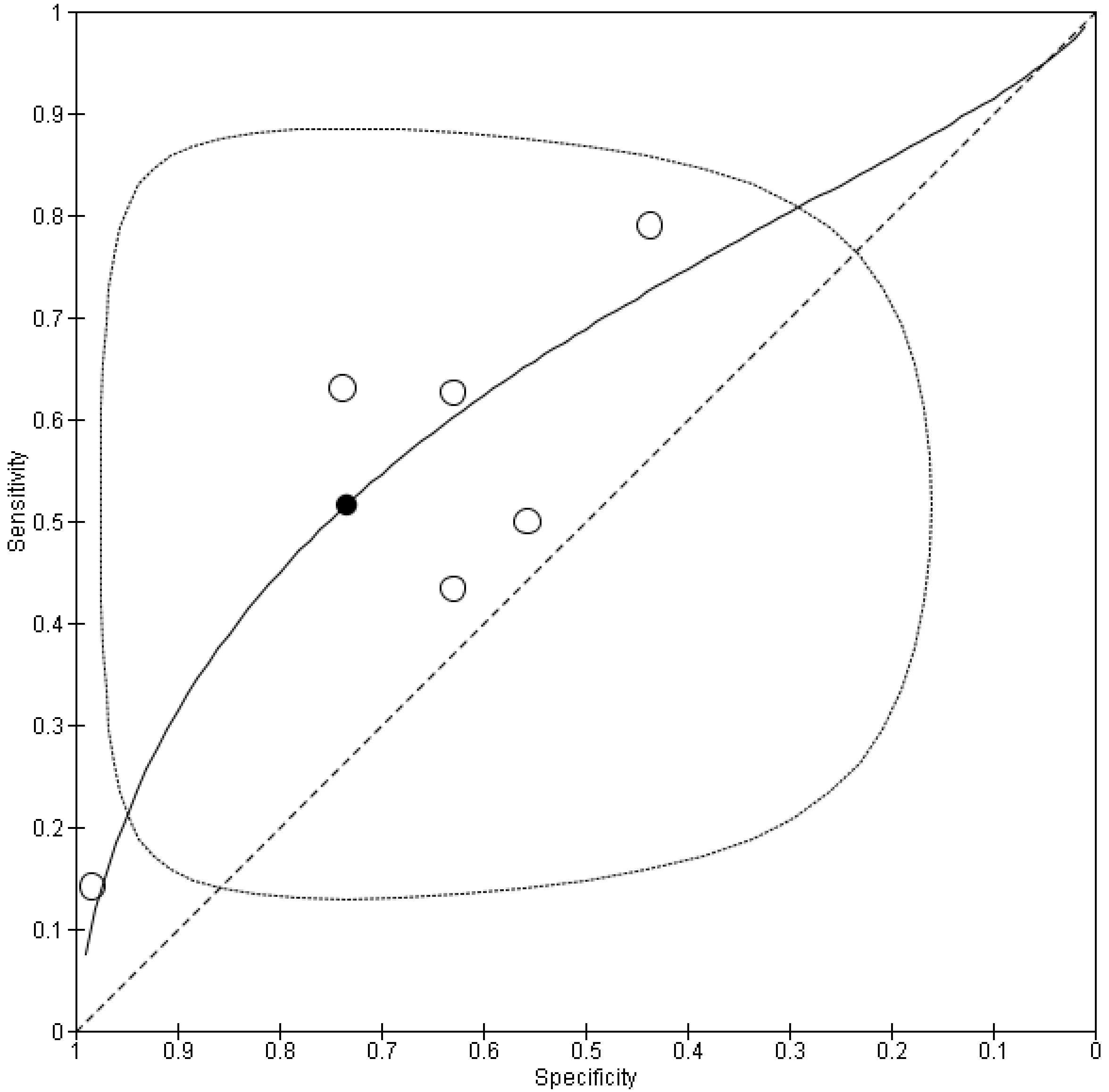

1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Sensitivity
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Specificity

Figure 33: **One Leg Standing Test (≤3 cut-off)- Community setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Shimada 2009	50	139	49	217	0.51 [0.40, 0.61]	0.61 [0.56, 0.66]

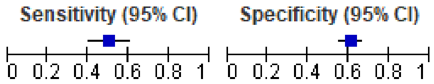


Figure 34: **Carpenter instrument (cut off 0) Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Curiati 2024	68	99	0	0	1.00 [0.95, 1.00]	0.00 [0.00, 0.04]

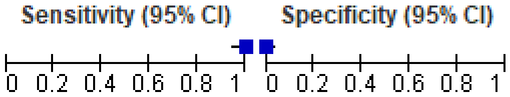


Figure 35: **Carpenter instrument (cut off 1) Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Curiati 2024	637	89	41	12	0.94 [0.92, 0.96]	0.12 [0.06, 0.20]

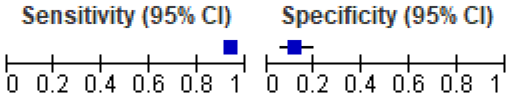


Figure 36: **Carpenter instrument (cut off 2) Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Curiati 2024	447	49	230	53	0.66 [0.62, 0.70]	0.52 [0.42, 0.62]

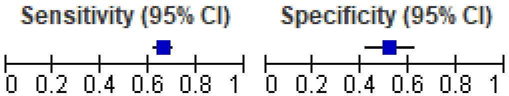


Figure 37: **Carpenter instrument (cut off 3) Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Curiati 2024	197	13	481	88	0.29 [0.26, 0.33]	0.87 [0.79, 0.93]

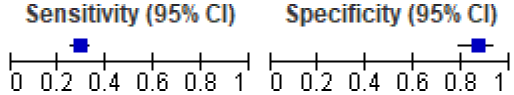
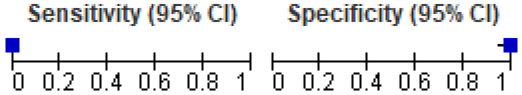


Figure 38: **Carpenter instrument (cut off 4) Hospital setting- Aged 65 years or older**

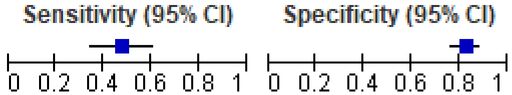
Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Curiati 2024	0	1	678	100	0.00 [0.00, 0.01]	0.99 [0.95, 1.00]



F.1.1.2 Sensitivity and specificity- community setting – aged 50- 65 years

Figure 39: **Downton Falls Risk Index (cut-off value 3)- Aged 50-64 years**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Butler 2019	29	28	32	135	0.48 [0.35, 0.61]	0.83 [0.76, 0.88]



F.1.1.3 Sensitivity and specificity- Hospital setting – aged 65 years or older

Figure 40: **Clinical Frailty Scale (5 cut-off)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Jung 2022	5	242	1	768	0.83 [0.36, 1.00]	0.76 [0.73, 0.79]

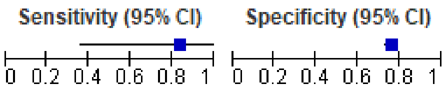


Figure 41: **Downton Falls Risk Index (cut-off value 3)- Hospital setting – aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Vassallo 2005	24	80	5	26	0.83 [0.64, 0.94]	0.25 [0.17, 0.34]
Vassallo 2008	47	96	4	53	0.92 [0.81, 0.98]	0.36 [0.28, 0.44]

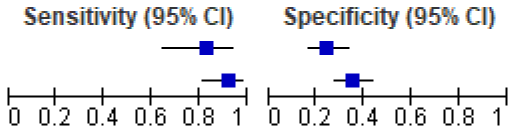


Figure 42: **Falls Risk Assessment Tool (moderate risk)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Silva 2023	1	17	2	39	0.33 [0.01, 0.91]	0.70 [0.56, 0.81]

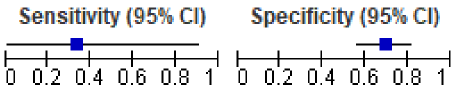


Figure 43: Falls Risk Assessment Tool (high risk)- Hospital setting- Aged 65 years or older

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Silva 2023	1	10	2	22	0.33 [0.01, 0.91]	0.69 [0.50, 0.84]

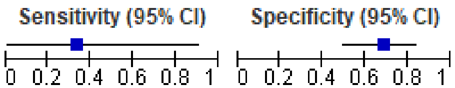


Figure 43: **Functional reach test (≤4 cm)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Haines 2008	126	222	54	168	0.70 [0.63, 0.77]	0.43 [0.38, 0.48]

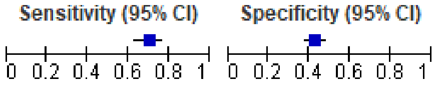


Figure 44: **Hendrich II Fall Risk Model (≥5 cut-off)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Campanini 2018	11	69	0	67	1.00 [0.72, 1.00]	0.49 [0.41, 0.58]

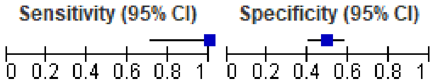


Figure 45: **Hendrich II Fall Risk Model (≥6 cut-off)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Campanini 2018	10	58	1	78	0.91 [0.59, 1.00]	0.57 [0.49, 0.66]

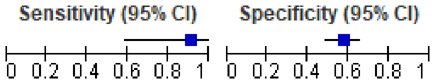


Figure 46: **Hendrich II Fall Risk Model (≥7 cut-off)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Campanini 2018	9	46	2	90	0.82 [0.48, 0.98]	0.66 [0.58, 0.74]

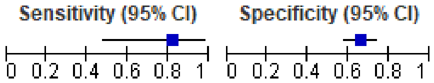


Figure 47: **Hendrich II Fall Risk Model (≥8 cut-off)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Campanini 2018	8	38	3	98	0.73 [0.39, 0.94]	0.72 [0.64, 0.79]

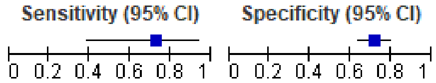


Figure 48: **Hendrich II Fall Risk Model (≥9 cut-off)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Campanini 2018	5	29	6	107	0.45 [0.17, 0.77]	0.79 [0.71, 0.85]

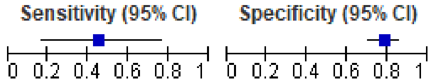


Figure 49: **Morse Fall Scale (≥45 cut-off)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Yang 2021	22	55	26	117	0.46 [0.31, 0.61]	0.68 [0.60, 0.75]

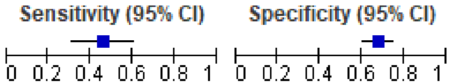


Figure 50: **Royal Melbourne Hospital Falls Risk Assessment Tool- Hospital setting - Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Ma 2014	37	48	7	60	0.84 [0.70, 0.93]	0.56 [0.46, 0.65]

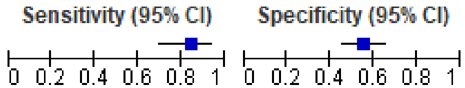
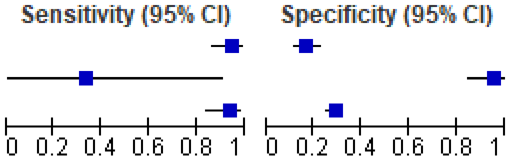


Figure 51: **STRATIFY (cut-off value 1)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Coker 2003	69	175	4	36	0.95 [0.87, 0.98]	0.17 [0.12, 0.23]
Silva 2023	1	2	2	43	0.33 [0.01, 0.91]	0.96 [0.85, 0.99]
Webster 2010	55	514	4	210	0.93 [0.84, 0.98]	0.29 [0.26, 0.32]



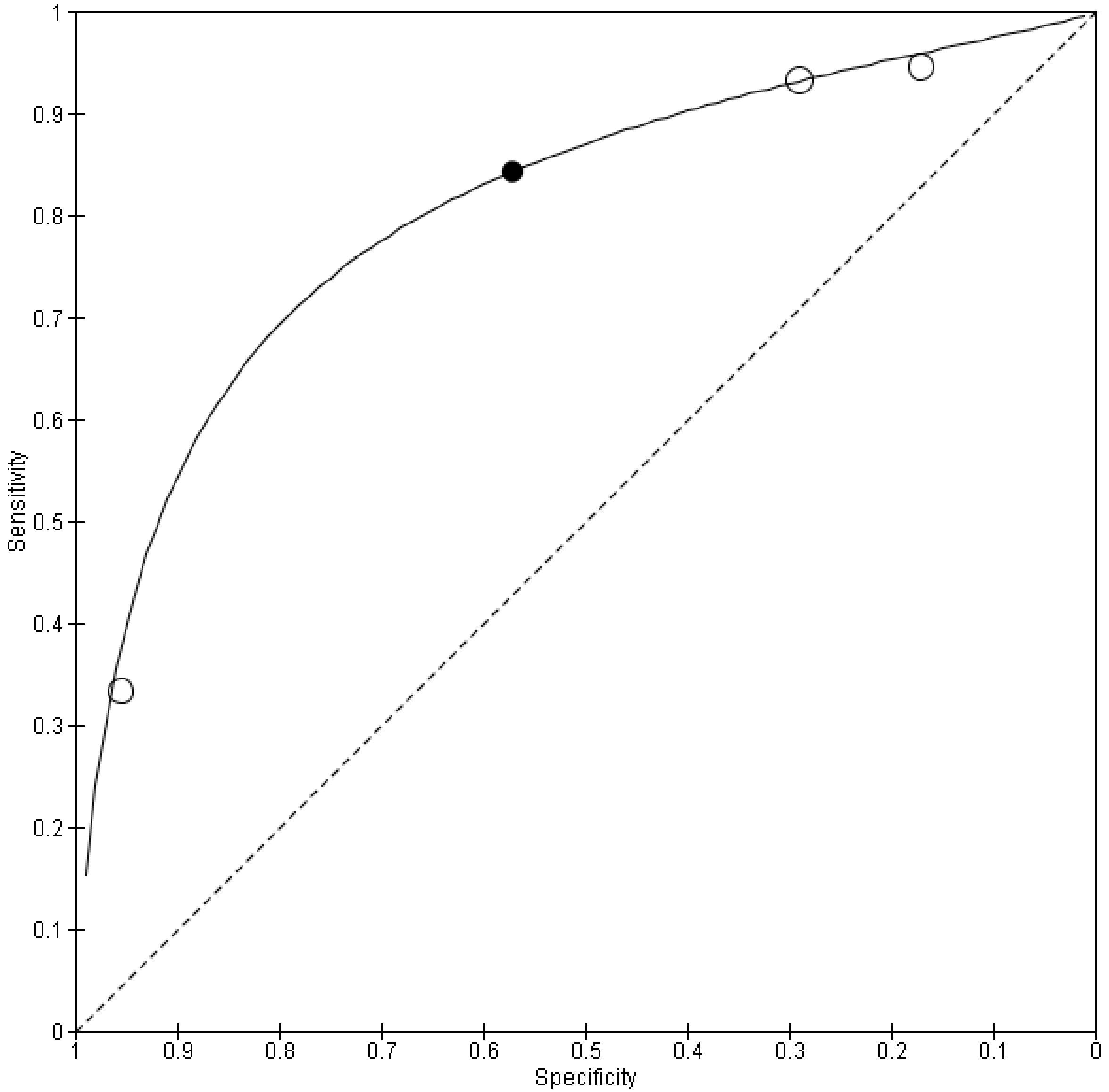
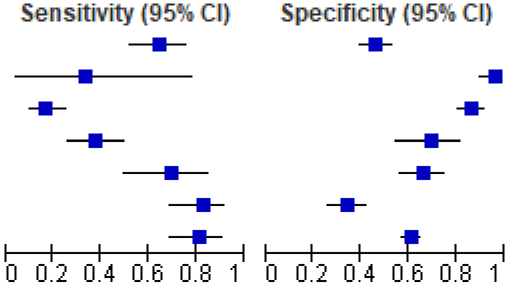

Sensitivity
Specificity
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0

Figure 52: **STRATIFY (cut-off value 2)- Hospital setting – aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Coker 2003	47	116	26	99	0.64 [0.52, 0.75]	0.46 [0.39, 0.53]
Silva 2023	2	4	4	92	0.33 [0.04, 0.78]	0.96 [0.90, 0.99]
Smith 2006	18	24	90	152	0.17 [0.10, 0.25]	0.86 [0.80, 0.91]
Strupeit 2016	27	16	45	36	0.38 [0.26, 0.50]	0.69 [0.55, 0.81]
Vassallo 2005	20	36	9	70	0.69 [0.49, 0.85]	0.66 [0.56, 0.75]
Vassallo 2008	42	98	9	51	0.82 [0.69, 0.92]	0.34 [0.27, 0.42]
Webster 2010	48	284	11	445	0.81 [0.69, 0.90]	0.61 [0.57, 0.65]



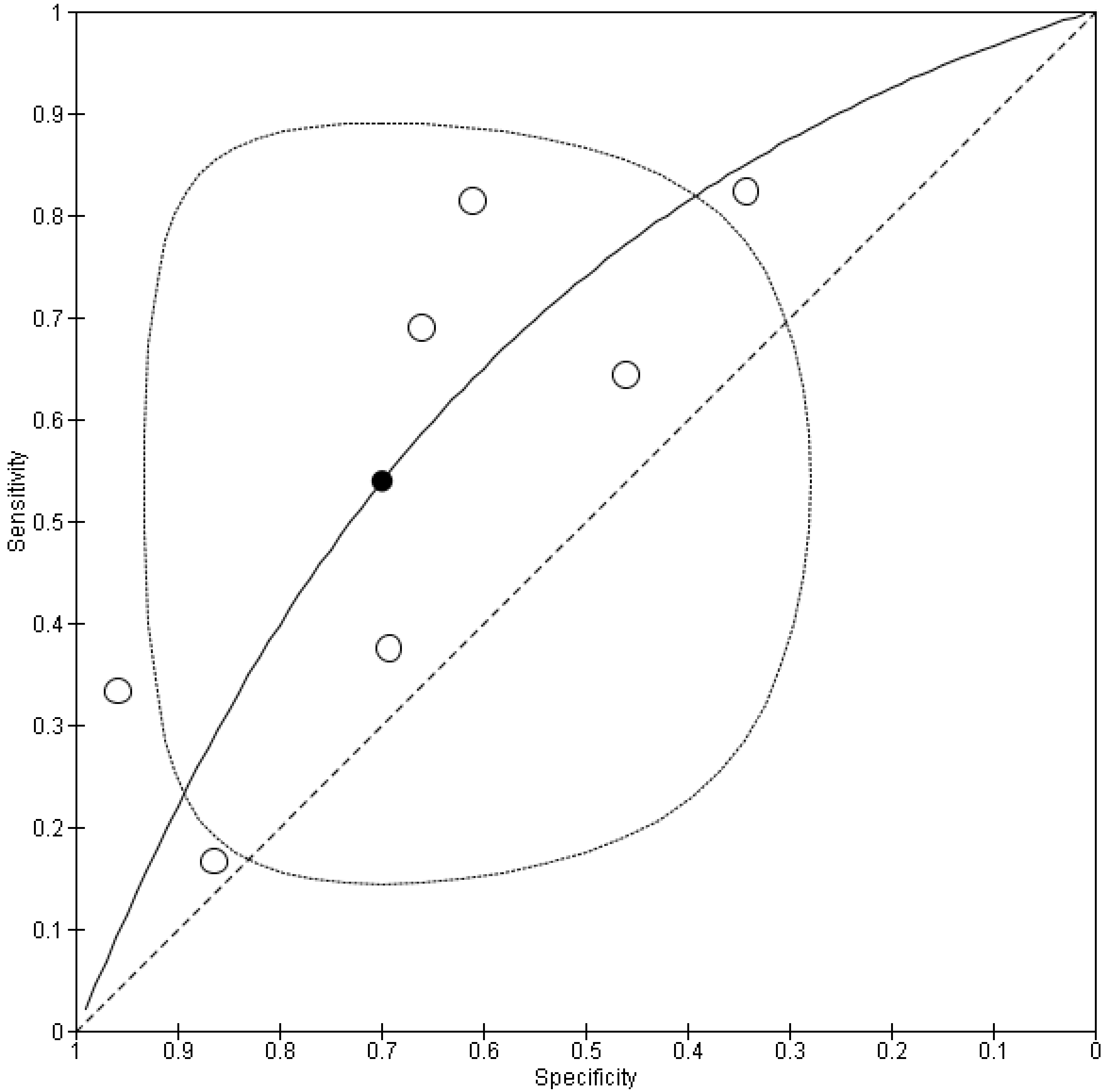

Sensitivity
Specificity
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0

Figure 53: **STRATIFY (cut-off value 3)- Hospital setting – aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Coker 2003	26	33	47	176	0.36 [0.25, 0.48]	0.84 [0.79, 0.89]
Webster 2010	27	123	32	601	0.46 [0.33, 0.59]	0.83 [0.80, 0.86]

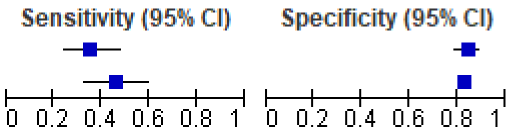


Figure 54: **STRATIFY (cut-off value 4)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Coker 2003	8	8	65	189	0.11 [0.05, 0.20]	0.96 [0.92, 0.98]
Webster 2010	15	36	44	688	0.25 [0.15, 0.38]	0.95 [0.93, 0.96]

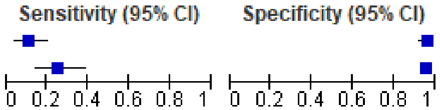


Figure 55:**STRATIFY (cut-off value 5)- Hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Coker 2003	7	7	66	650	0.10 [0.04, 0.19]	0.99 [0.98, 1.00]

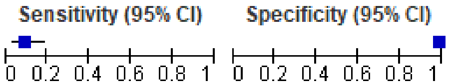
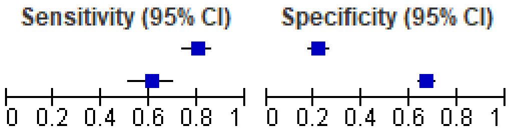


Figure 56: **Timed up and go (≥15 cut-off)- hospital setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Haines 2008	144	304	36	86	0.80 [0.73, 0.86]	0.22 [0.18, 0.26]
Hars 2018	72	227	46	462	0.61 [0.52, 0.70]	0.67 [0.63, 0.71]



F.1.1.4 Sensitivity and specificity - Hospital setting (aged 50-65 years)

Figure 57: **Hendrich II Fall Risk Model (3 cut-off)- Hospital setting- Aged 50 to 64 years**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Yoo 2015	26	380	6	606	0.81 [0.64, 0.93]	0.61 [0.58, 0.65]

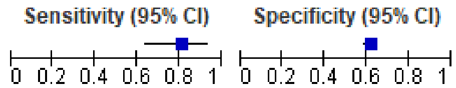


Figure 58: **Hendrich II Fall Risk Model (≥5 cut-off)- Aged 50 to 64 years**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Yoo 2015	19	212	13	774	0.59 [0.41, 0.76]	0.78 [0.76, 0.81]

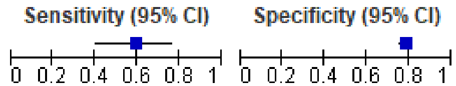


Figure 59: **Morse Fall Scale (40 cut-off)- Hospital setting- Aged 50 to 64 years**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Yoo 2015	25	177	7	809	0.78 [0.60, 0.91]	0.82 [0.80, 0.84]

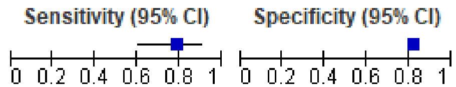


Figure 60: **Morse Fall Scale (≥51 cut-off)- Hospital setting- Aged 50 to 64 years**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Yoo 2015	16	89	16	895	0.50 [0.32, 0.68]	0.91 [0.89, 0.93]

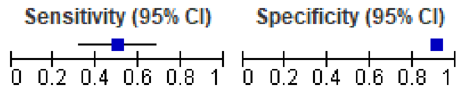


Figure 61: **STRATIFY (cut-off value 2)- Aged 50 to 64 years**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Yoo 2015	27	261	5	725	0.84 [0.67, 0.95]	0.74 [0.71, 0.76]

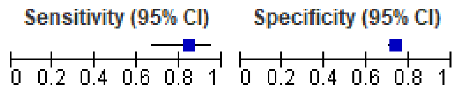
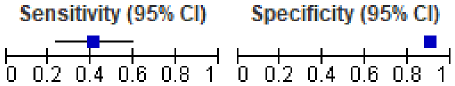


Figure 62: **STRATIFY (cut-off value 3)- Aged 50 to 64 years**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Yoo 2015	13	99	19	887	0.41 [0.24, 0.59]	0.90 [0.88, 0.92]



F.1.1.5 Sensitivity and specificity- residential care setting – aged 65 years or older

Figure 63: **Clinical Frailty Scale (3 cut-off)- Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Grosshauser 2022	158	1327	0	164	1.00 [0.98, 1.00]	0.11 [0.09, 0.13]

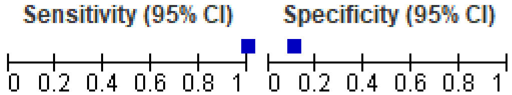


Figure 64: **Clinical Frailty Scale (4 cut-off)- Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Grosshauser 2022	158	284	0	71	1.00 [0.98, 1.00]	0.20 [0.16, 0.25]

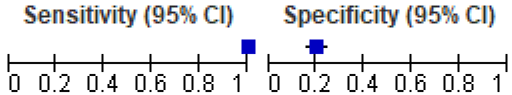


Figure 65: **Clinical Frailty Scale (5 cut-off)- Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Grosshauser 2022	80	127	1	38	0.99 [0.93, 1.00]	0.23 [0.17, 0.30]

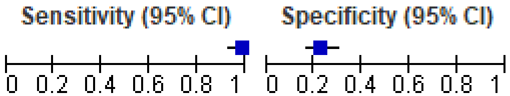


Figure 66: **Clinical Frailty Scale (6 cut-off)- Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Grosshauser 2022	97	676	3	202	0.97 [0.91, 0.99]	0.23 [0.20, 0.26]

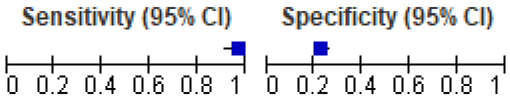


Figure 67: **Clinical Frailty Scale (7 cut-off)- Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Grosshauser 2022	72	15	9	150	0.89 [0.80, 0.95]	0.91 [0.85, 0.95]

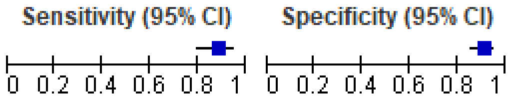


Figure 68: **Clinical Frailty Scale (8 cut-off)- Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Grosshauser 2022	24	0	58	165	0.29 [0.20, 0.40]	1.00 [0.98, 1.00]

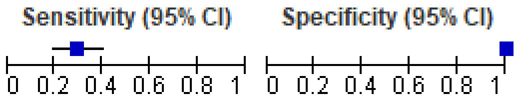


Figure 69: **Clinical Frailty Scale (9 cut-off)- Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Grosshauser 2022	15	0	67	165	0.18 [0.11, 0.28]	1.00 [0.98, 1.00]

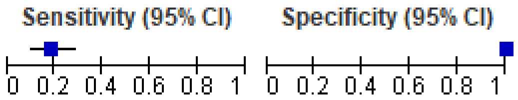


Figure 70: **STRATIFY (cut off 2) - Residential care setting - Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Bentzen 2011	319	139	251	439	0.56 [0.52, 0.60]	0.76 [0.72, 0.79]

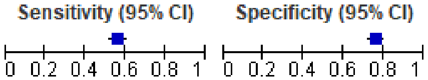
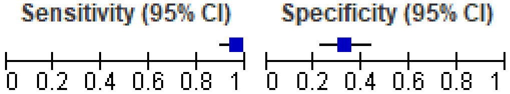
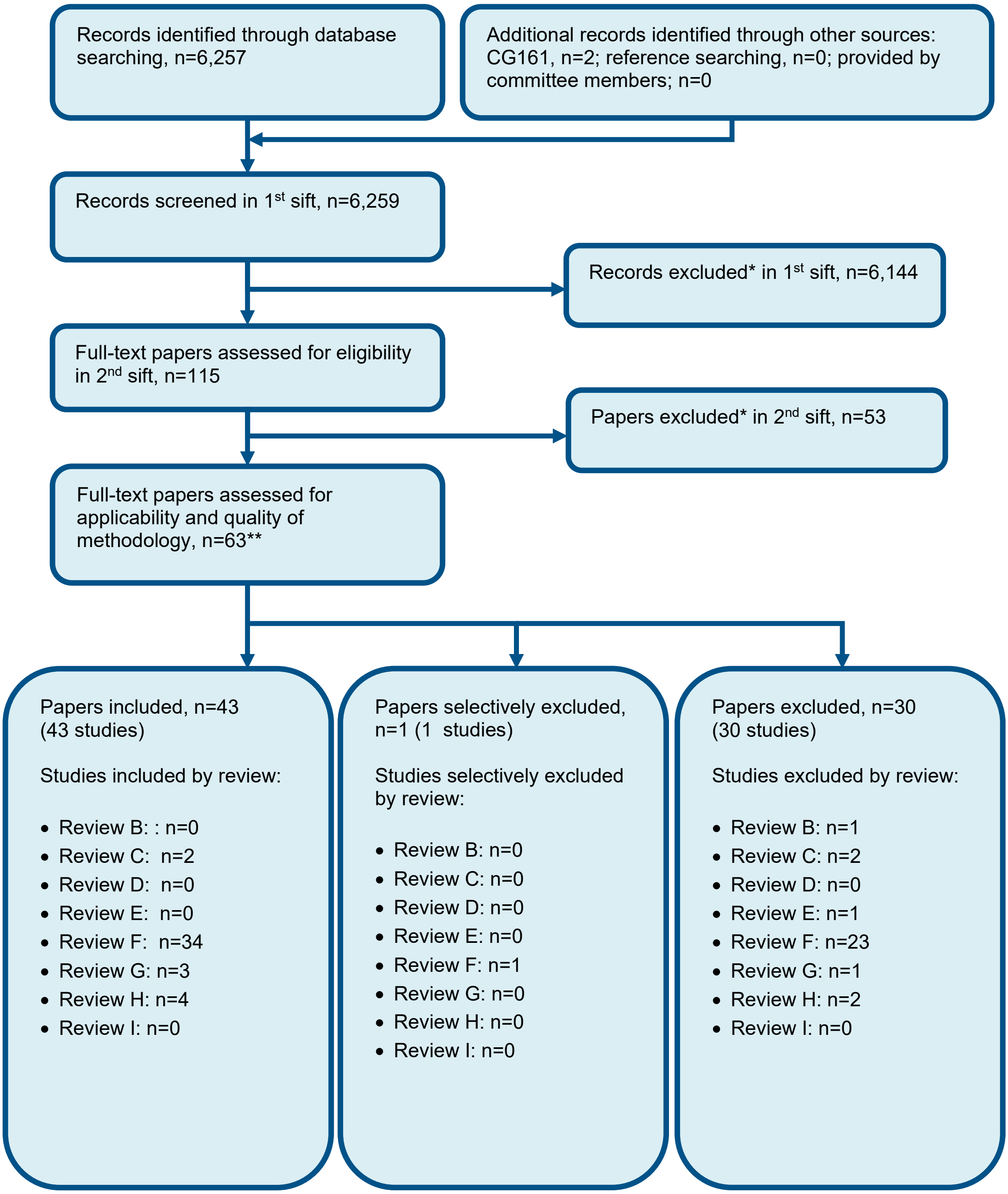


Figure 71: **Timed Up and Go test (cut off >15) - Residential care setting- Aged 65 years or older**

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Nordin 2008	93	58	4	28	0.96 [0.90, 0.99]	0.33 [0.23, 0.44]



Appendix G Economic evidence study selection



* Non-relevant population, intervention, comparison, design or setting; non-English language
**One paper included in two reviews

Appendix H Economic evidence tables

Study	Franklin 2019[14]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost effectiveness**
Economic analysis: CUA (health outcome: QALYs) **Study design:** Decision analytic model **Approach to analysis:** Adaptation of the Poole (2015) falls model. An initial decision tree models the accuracy of the fall-risk assessment (QTUG vs TUG) to inform fall-prevention intervention referral and longer-term fall-related events are captured using a state transition, cohort-based Markov model with five event states. (1) 'well, /insignificant fall' (2) 'minor fall: requiring ED visit (3) 'major fall: hospitalisation' (4) 'long-term care'—care home admission; (5) 'dead'—due to a fall, 1-year care-home-related or	**Population:** The model includes 5 stratified age groups ranging from 65 to 89 years old, community dwelling adults. **Cohort settings:** Start age: 65 years. Male: NR **Intervention 1:** No assessment followed by no care pathway **Intervention 2:** QTUG followed by Otago home-based exercise pathway. **Intervention 3:**	Both 'Healthcare' and 'Health and Social care' perspectives are both presented. Former excludes care home costs. Latter includes some self, local authority, and NHS funded care home costs. **Total costs (mean per patient):** Only available at cohort level, not reported at per patient level. Cohort level presented in cost-	**QALYs (mean per patient):** Only available at cohort level, not reported at per patient level. Cohort level presented in cost-effectiveness column.	TUG-based pathways were included interventions but as these were dominated (more costly and less effective) by QTUG-based pathways in all cohorts these were not reported in the paper. **Analysis of uncertainty:** Probabilistic sensitivity analysis. - QTUG sensitivity and specificity were independently or jointly varied from 0.05 to 0.95 in 0.05 increments. If QTUG and TUG sensitivity are equivalent (i.e. both 0.31), QTUG compared to TUG produces lower costs (equivalent QALYs) due to its higher specificity (0.81 versus 0.74), thus better ability to avoid additional cost of providing fall-preventions intervention to non-fallers albeit with no QALY gain, if QTUG and TUG specificity are equivalent (i.e. both 0.74), QTUG still dominates TUG at a sensitivity rate ~0.35 (QTUG base-case sensitivity = 0.67). At a sensitivity rate ~0.45, QTUG dominates no care pathway irrespective of specificity rate.

age-related mortality. 1 year cycle duration **Perspective:** UK NHS **Time horizon:** 2 years **Treatment effect duration:**[(a)]n/a **Discounting:** Costs: None; Outcomes: None	QTUG followed by Falls Management group Exercise programme (FaME) pathway. **Intervention 4:** QTUG followed by Tai Chi pathway. **Intervention 5:** QTUG followed by home safety assessment and modification (HAM) pathway. TUG-based pathways were included interventions but as these were dominated (more costly and less effective) by QTUG-based pathways in all cohorts these were not reported in the paper. Appendices were unavailable and so results cannot be extracted here.	effectiveness column. **Currency & cost year:** 2017 UK pounds **Cost components incorporated:** Intervention costs and falls related visits to primary care, community care and hospitalisations		
Data sources				

Health outcomes: Baseline and effectiveness data (falls, EQ-5D and mortality) for Tai Chi intervention based on 2019 Cochrane review by Sherrington et al. Otago, HAM and FaME effectiveness sourced from 2011 Cochrane review by Gillespie et al. Meta-analysis by Barry et al (2019) used for TUG effectiveness. **Quality-of-life weights:** EQ-5D UK tariff **Cost sources:** Sourced from PSSRU and NHS reference costs and for the falls prevention care pathway costs were based on the PPP study implementation costs or sourced from Public Health England.
Comments
Source of funding: Kinesis Health Technologies Ltd. **Limitations:** 2-year time horizon may not sufficiently long assess the full costs and benefits. One potential conflict of interest, Kinesis Health Technologies Ltd who developed the QTUG technology was a part of the Perfect Patient Pathway Test Bed, for which the model was developed, and representatives of Kinesis provided their thoughts on the initial design of the model however, they did not inform the overall development and analysis of the model and subsequent results in this manuscript **Other:**
Overall applicability:[(b)] Directly Applicable **Overall quality:**[(c)] Minor Limitations

Abbreviations: CCA= cost–consequences analysis; CEA= cost-effectiveness analysis; 95% CI= 95% confidence interval; CUA= cost–utility analysis; da= deterministic analysis; EQ-5D= Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); ICER= incremental cost-effectiveness ratio; NR= not reported; pa= probabilistic analysis; QALYs= quality-adjusted life years. FaME = Falls Management group Exercise programme; HAM = Home safety assessment and modification; Otago = Otago home-based exercise; QTUG = Quantitative Timed Up and Go device; TUG = Timed Up and Go test

(a) For studies where the time horizon is longer than the treatment duration, an assumption needs to be made about the continuation of the study effect. For example, does a difference in utility between groups during treatment continue beyond the end of treatment and if so for how long.

(b) Directly applicable / Partially applicable / Not applicable

(c) Minor limitations / Potentially serious limitations / Very serious limitations

Study	**Zanghelini 2024**[41]			
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost effectiveness**
Economic analysis: CUA (health outcome: fear of falling, risk of falling) **Study design:** Decision analytic model **Approach to analysis:** Decision tree using a single RCT	**Population:** Older people that had suffered a fall or had moderate to severe fear of falling **Cohort settings:** Mean age: 79 ±9.4 years Male:45.8% **Intervention 1:**	**Total costs (mean per patient, fear of falling):** Intervention 1: £15,363.65 Intervention 2: £10,884.08 Incremental (2−1): -£4,479.57 (95% CI: NR; p=NR) **Total costs (mean per patient, risk of falling):**	**QALYs (mean per patient, fear of falling):** Intervention 1: 685.08 Intervention 2: 685.85 Incremental (2−1):0.77 (95% CI: NR; p=NR) **QALYs (mean per patient, fear of falling):** Intervention 1: 667.45 Intervention 2: 668.52	**ICER (Intervention 2 versus Intervention 1):** For both fear of falling and risk of falling GaitSmart dominated standard care Probability GaitSmart cost effective (£20/£30K threshold, fear of falling): 79%/NR Probability GaitSmart cost effective (£20/£30K threshold, risk of falling): 100%/NR

Perspective: UK NHS **Time horizon:** 12 months **Discounting:** Costs: N/A ; Outcomes: N/A	Standard care **Intervention 2:** GaitSmart which is a sensor based digital device. Six sensors are attached to the body which provide data that can be used to create an individualised exercise program	Intervention 1: £119,152.27 Intervention 2: £116,250.48 Incremental (2−1): -£2,901.79 (95% CI: NR; p=NR) **Currency & cost year:** 2018 GBP **Cost components incorporated:** GP appointments, accidents and emergencies admission, inpatient treatment, ambulance call, and length of stay	Incremental (2−1): 1.07 (95% CI: NR; p=NR)	**Analysis of uncertainty:** Probabilistic sensitivity analysis was competed (results above)
Data sources				
Health outcomes: number of falls and injuries resulting from those falls. Published data was used to correlated the fear of falling to number of falls and their injuries **Quality-of-life weights:** EQ-5D-3L UK tariff. **Cost sources:** the Personal Social Services Research Unit, and the Unit Costs of Health and Social Care 2018				
Comments				
Source of funding: No funding was received **Limitations:** 2018 costs were used when there are more recent available data. Based on a single RCT however it was not possible to find the details of that RCT **Other:**				
Overall applicability: Directly[(a)]	**Overall quality: Potentially serious**[(b)]			

Abbreviations: CCA= cost–consequences analysis; CEA= cost-effectiveness analysis; 95% CI= 95% confidence interval; CUA= cost–utility analysis; da= deterministic analysis; EQ-5D= Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); ICER= incremental cost-effectiveness ratio; N/A=Not applicable NR= not reported; pa= probabilistic analysis; QALYs= quality-adjusted life years
(a) =Directly applicable / Partially applicable / Not applicable
(b) Minor limitations / Potentially serious limitations / Very serious limitations

Appendix I Health economic model

This question was not prioritised for de novo modelling.

Appendix J Excluded studies

J.1 Clinical studies

Table 22: Studies excluded from the clinical review

Study	Code [Reason]
Abou, Libak, Ilha, Jocemar, Romanini, Francielle et al. (2019) Do clinical balance measures have the ability to predict falls among ambulatory individuals with spinal cord injury? A systematic review and meta-analysis. Spinal cord 57(12): 1001-1013	- Systematic review used as source of primary studies
Abou, Libak, Peters, Joseph, Fritz, Nora E et al. (2022) Motor Cognitive Dual-Task Testing to Predict Future Falls in Multiple Sclerosis: A Systematic Review. Neurorehabilitation and neural repair 36(12): 757-769	- Population not relevant to this review protocol
Abou, Libak, Peters, Joseph, Wong, Ellyce et al. (2021) Gait and Balance Assessments using Smartphone Applications in Parkinson's Disease: A Systematic Review. Journal of medical systems 45(9): 87	- Study does not contain an intervention relevant to this review protocol
Abu Samah, Z., Mohd Nordin, N.A., Shahar, S. et al. (2016) Can gait speed test be used as a falls risk screening tool in community dwelling older adults? A review. Polish Annals of Medicine 23(1): 61-67	- Study does not contain an intervention relevant to this review protocol
Agarwal, G, Angeles, R, Pirrie, M et al. (2017) Effectiveness of a community paramedic-led health assessment and education initiative in a seniors' residence building: the Community Health Assessment Program through Emergency Medical Services (CHAP-EMS). BMC emergency medicine 17(1): 8	- Study design not relevant to this review protocol
Alkan, H., Yildiz, N., Sarsan, A. et al. (2014) The relationship between posturographic fall risk and clinical balance tests among community-dwelling older adults. Turk Geriatri Dergisi 17(3): 242-248	- Study does not contain an intervention relevant to this review protocol
Alharbi, Ahmad A, Al Amer, Hamad S, Albalwi, Abdulaziz A et al. (2023) Cross-Cultural Adaptation and Psychometric Properties of the Arabic Version of the Fall Risk Questionnaire. International journal of environmental research and public health 20(8)	- No useable outcome data
Allum, John Hj and Carpenter, Mark G (2005) A speedy solution for balance and gait analysis: angular velocity measured at the centre of body mass. Current opinion in neurology 18(1): 15-21	- Study does not contain an intervention relevant to this review protocol
Almeida, Lorena R S, Valenca, Guilherme T, Negreiros, Nadja N et al. (2017) Predictors of Recurrent Falls in People with Parkinson's Disease and Proposal for a Predictive Tool. Journal of Parkinson's disease 7(2): 313-324	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Alsubheen, Sanaa A, Beauchamp, Marla K, Ellerton, Cindy et al. (2022) Validity of the Activities-specific Balance Confidence Scale in individuals with chronic obstructive pulmonary disease. Expert review of respiratory medicine 16(6): 689-696	- Study design not relevant to this review protocol
Amundsen, T., Rossman, M., Ahmad, I. et al. (2022) Fall risk assessment and visualization through gait analysis. Smart Health 25: 100284	- Study does not contain an intervention relevant to this review protocol
An, SeungHeon; Lee, YunBok; Lee, GyuChang (2014) Validity of the performance-oriented mobility assessment in predicting fall of stroke survivors: a retrospective cohort study. The Tohoku journal of experimental medicine 233(2): 79-87	- Study does not contain an intervention relevant to this review protocol
Andersson, Asa G, Kamwendo, Kitty, Seiger, Ake et al. (2006) How to identify potential fallers in a stroke unit: validity indexes of 4 test methods. Journal of rehabilitation medicine 38(3): 186-91	- Study does not contain an intervention relevant to this review protocol (cut off under 15 seconds for TUG)
Aprahamian, Ivan, Suemoto, Claudia Kimie, Aliberti, Marlon Juliano Romero et al. (2018) Frailty and cognitive status evaluation can better predict mortality in older adults?. Archives of gerontology and geriatrics 77: 51-56	- Data not reported in an extractable format or a format that can be analysed
Arai, Tomoyuki, Fujita, Hiroaki, Maruya, Kohei et al. (2020) The one-leg portion of the Stand-Up Test predicts fall risk in aged individuals: A prospective cohort study. Journal of orthopaedic science : official journal of the Japanese Orthopaedic Association 25(4): 688-692	- Data not reported in an extractable format or a format that can be analysed
Aranda-Gallardo, Marta, Morales-Asencio, Jose M, Canca-Sanchez, Jose C et al. (2013) Instruments for assessing the risk of falls in acute hospitalized patients: a systematic review and meta-analysis. BMC health services research 13: 122	- Study not reported in English
Arihisa, Katsuhiko, Yamamoto, Akihiko, Hayashi, Tatsuhiro et al. (2019) Development and Testing of a Visual Tool for Assessing Risk of Falls. Quality management in health care 28(3): 139-146	- Study not reported in English
Arndt, Holger, Burkard, Stefan, Talavera, Guillermo et al. (2017) Real-Time Constant Monitoring of Fall Risk Index by Means of Fully-Wireless Insoles. Studies in health technology and informatics 237: 193-197	- Study does not contain an intervention relevant to this review protocol
Atrsaei, Arash, Paraschiv-Ionescu, Anisoara, Krief, Helene et al. (2022) Instrumented 5-Time Sit-To-Stand Test: Parameters Predicting Serious Falls beyond the Duration of the Test. Gerontology 68(5): 587-600	- Study does not contain an intervention relevant to this review protocol
Ayers, Emmeline I, Tow, Amanda C, Holtzer, Roee et al. (2014) Walking while talking and falls in aging. Gerontology 60(2): 108-13	- Study does not contain an intervention relevant to this review protocol
Azad, Akram, Sabet, Azar, Taghizadeh, Ghorban et al. (2020) Clinical assessment of Persian translation of Fullerton Advanced Balance Scale	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
in community-dwelling older adults. Disability and rehabilitation 42(4): 567-573	
Bailey, Patricia Hill, Rietze, Lori Lynn, Moroso, Sandra et al. (2011) A description of a process to calibrate the Morse fall scale in a long-term care home. Applied nursing research : ANR 24(4): 263-8	- Data not reported in an extractable format or a format that can be analysed
Baker, Nicky; Gough, Claire; Gordon, Susan J (2021) Inertial Sensor Reliability and Validity for Static and Dynamic Balance in Healthy Adults: A Systematic Review. Sensors (Basel, Switzerland) 21(15)	- Study does not contain an intervention relevant to this review protocol
Bargiotas, Ioannis, Audiffren, Julien, Vayatis, Nicolas et al. (2018) On the importance of local dynamics in statokinesigram: A multivariate approach for postural control evaluation in elderly. PloS one 13(2): e0192868	- Study does not contain an intervention relevant to this review protocol
Barker, Anna, Kamar, Jeannette, Graco, Marnie et al. (2011) Adding value to the STRATIFY falls risk assessment in acute hospitals. Journal of advanced nursing 67(2): 450-7	- Study design not relevant to this review protocol
Barry, Emma, Galvin, Rose, Keogh, Claire et al. (2014) Is the Timed Up and Go test a useful predictor of risk of falls in community dwelling older adults: a systematic review and meta-analysis. BMC geriatrics 14: 14	- Study does not contain an intervention relevant to this review protocol
Bassett, Alaina M; Siu, Ka-Chun; Honaker, Julie A (2018) Functional Measures for Fall Risk in the Acute Care Setting: A Review. Western journal of nursing research 40(10): 1469-1488	- Systematic review used as source of primary studies
Beauchamp, Marla K (2019) Balance assessment in people with COPD: An evidence-based guide. Chronic respiratory disease 16: 1479973118820311	- Data not reported in an extractable format or a format that can be analysed
Batko-Szwaczka, Agnieszka, Wilczynski, Krzysztof, Hornik, Beata et al. (2020) Predicting Adverse Outcomes in Healthy Aging Community-Dwelling Early-Old Adults with the Timed Up and Go Test. Clinical interventions in aging 15: 1263-1270	- Study does not contain an intervention relevant to this review protocol (TUG test <15 seconds)
Beauchet, O, Annweiler, C, Dubost, V et al. (2009) Stops walking when talking: a predictor of falls in older adults?. European journal of neurology 16(7): 786-95	- More recent systematic review included that covers the same topic
Beauchet, O, Fantino, B, Allali, G et al. (2011) Timed Up and Go test and risk of falls in older adults: a systematic review. The journal of nutrition, health & aging 15(10): 933-8	- Systematic review used as source of primary studies
Beauchet, O, Noublanche, F, Simon, R et al. (2018) Falls Risk Prediction for Older Inpatients in Acute Care Medical Wards: Is There an Interest to Combine an Early Nurse Assessment and the Artificial	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Neural Network Analysis?. The journal of nutrition, health & aging 22(1): 131-137	
Beauchet, Olivier, Allali, Gilles, Annweiler, Cedric et al. (2008) Does change in gait while counting backward predict the occurrence of a first fall in older adults?. Gerontology 54(4): 217-23	- Study does not contain an intervention relevant to this review protocol
Beauchet, Olivier, Matskiv, Jacqueline, Launay, Cyrille P et al. (2022) CARE frailty e-health scale: Association with incident adverse health outcomes and comparison with the Cardiovascular Health Study frailty scale in the NuAge cohort. Maturitas 162: 37-43	- Data not reported in an extractable format or a format that can be analysed
Beck Jepsen, D, Robinson, K, Ogliari, G et al. (2022) Predicting falls in older adults: an umbrella review of instruments assessing gait, balance, and functional mobility. BMC geriatrics 22(1): 615	- Study does not contain an intervention relevant to this review protocol
Beretta, Mileni V, Milan, Victoria B, Hoffmeister, Mariana C et al. (2023) Orthostatic hypotension, falls and in-hospital mortality among elderly patients with and without type 2 diabetes. Journal of hypertension 41(3): 388-392	- No useable outcome data
Berg, K O, Wood-Dauphinee, S L, Williams, J I et al. (1992) Measuring balance in the elderly: validation of an instrument. Canadian journal of public health = Revue canadienne de sante publique 83suppl2: 7-11	- Study does not contain an intervention relevant to this review protocol
Bet, Patricia; Castro, Paula C; Ponti, Moacir A (2019) Fall detection and fall risk assessment in older person using wearable sensors: A systematic review. International journal of medical informatics 130: 103946	- Study does not contain an intervention relevant to this review protocol
Betteridge, Callum M W, Natarajan, Pragadesh, Fonseka, R Dineth et al. (2021) Objective falls-risk prediction using wearable technologies amongst patients with and without neurogenic gait alterations: a narrative review of clinical feasibility. mHealth 7: 61	- Study does not contain an intervention relevant to this review protocol
Bezold, Jelena, Krell-Roesch, Janina, Eckert, Tobias et al. (2021) Sensor-based fall risk assessment in older adults with or without cognitive impairment: a systematic review. European review of aging and physical activity : official journal of the European Group for Research into Elderly and Physical Activity 18(1): 15	- Study does not contain an intervention relevant to this review protocol
Bhatt, Tanvi, Espy, Debbie, Yang, Feng et al. (2011) Dynamic gait stability, clinical correlates, and prognosis of falls among community-dwelling older adults. Archives of physical medicine and rehabilitation 92(5): 799-805	- Study does not contain an intervention relevant to this review protocol
Bibi, Rashida, Yan, Zhang, Ilyas, Muhammad et al. (2023) Assessment of fall-associated risk factors in the Muslim community-dwelling older adults of Peshawar, Khyber Pakhtunkhwa, Pakistan. BMC geriatrics 23(1): 623	- Study design not relevant to this review protocol
Bilgin, Yaprak Ozum Unsal; Koskderelioglu, Asli; Gedizlioglu, Muhtesem (2023) Fall risk is related to cognitive functioning in ambulatory multiple sclerosis patients. Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology 44(9): 3233-3242	- No useable outcome data

Study	Code [Reason]
Bigelow, Kimberly Edginton and Berme, Necip (2011) Development of a protocol for improving the clinical utility of posturography as a fall-risk screening tool. The journals of gerontology. Series A, Biological sciences and medical sciences 66(2): 228-33	- Study does not contain an intervention relevant to this review protocol
Bizovska, Lucia, Svoboda, Zdenek, Janura, Miroslav et al. (2018) Local dynamic stability during gait for predicting falls in elderly people: A one-year prospective study. PloS one 13(5): e0197091	- Study does not contain an intervention relevant to this review protocol
Blodgett, Joanna M, Ventre, Jodi P, Mills, Richard et al. (2022) A systematic review of one-legged balance performance and falls risk in community-dwelling adults. Ageing research reviews 73: 101501	- Systematic review used as source of primary studies
Bloem, Bastiaan R, Marinus, Johan, Almeida, Quincy et al. (2016) Measurement instruments to assess posture, gait, and balance in Parkinson's disease: Critique and recommendations. Movement disorders : official journal of the Movement Disorder Society 31(9): 1342-55	- Study does not contain an intervention relevant to this review protocol
Blum, Lisa and Korner-Bitensky, Nicol (2008) Usefulness of the Berg Balance Scale in stroke rehabilitation: a systematic review. Physical therapy 88(5): 559-66	- Study does not contain an intervention relevant to this review protocol
Bongers, Kim T J, Schoon, Yvonne, Graauwmans, Maartje J et al. (2015) The predictive value of gait speed and maximum step length for falling in community-dwelling older persons. Age and ageing 44(2): 294-9	- Study does not contain an intervention relevant to this review protocol
Bongue, Bienvenu, Dupre, Caroline, Beauchet, Olivier et al. (2011) A screening tool with five risk factors was developed for fall-risk prediction in community-dwelling elderly. Journal of clinical epidemiology 64(10): 1152-60	- Study does not contain an intervention relevant to this review protocol
Boyce, Richard D, Kravchenko, Olga V, Perera, Subashan et al. (2022) Falls prediction using the nursing home minimum dataset. Journal of the American Medical Informatics Association : JAMIA 29(9): 1497-1507	- Study does not contain an intervention relevant to this review protocol
Breisinger, Terry P, Skidmore, Elizabeth R, Niyonkuru, Christian et al. (2014) The Stroke Assessment of Fall Risk (SAFR): predictive validity in inpatient stroke rehabilitation. Clinical rehabilitation 28(12): 1218-24	- Study does not contain an intervention relevant to this review protocol
Buckinx, F, Beaudart, C, Slomian, J et al. (2015) Added value of a triaxial accelerometer assessing gait parameters to predict falls and mortality among nursing home residents: A two-year prospective study. Technology and health care : official journal of the European Society for Engineering and Medicine 23(2): 195-203	- Study does not contain an intervention relevant to this review protocol
Campanini, Isabella, Bargellini, Annalisa, Mastrangelo, Stefano et al. (2021) Performance of the Hendrich Fall Risk Model II in Patients Discharged from Rehabilitation Wards. A Preliminary Study of Predictive Ability. International journal of environmental research and public health 18(4)	- Population not relevant to this review protocol

Study	Code [Reason]
Campbell, Grace and Skubic, Marjorie A (2018) Balance and Gait Impairment: Sensor-Based Assessment for Patients With Peripheral Neuropathy. Clinical journal of oncology nursing 22(3): 316-325	- Study does not contain an intervention relevant to this review protocol
Carazo, Matthew, Sadarangani, Tina, Natarajan, Sundar et al. (2017) Prognostic Utility of the Braden Scale and the Morse Fall Scale in Hospitalized Patients With Heart Failure. Western journal of nursing research 39(4): 507-523	- Data not reported in an extractable format or a format that can be analysed
Carpenter, Christopher R, Avidan, Michael S, Wildes, Tanya et al. (2014) Predicting geriatric falls following an episode of emergency department care: a systematic review. Academic emergency medicine : official journal of the Society for Academic Emergency Medicine 21(10): 1069-82	- Data not reported in an extractable format or a format that can be analysed
Castaldo, Rossana, Melillo, Paolo, Izzo, R et al. (2017) Fall Prediction in Hypertensive Patients via Short-Term HRV Analysis. IEEE journal of biomedical and health informatics 21(2): 399-406	- Study does not contain an intervention relevant to this review protocol
Castellini, Greta, Gianola, Silvia, Stucovitz, Elena et al. (2019) Diagnostic test accuracy of an automated device as a screening tool for fall risk assessment in community-residing elderly: A STARD compliant study. Medicine 98(39): e17105	- Study does not contain an intervention relevant to this review protocol
Cella, Alberto, De Luca, Alice, Squeri, Valentina et al. (2020) Development and validation of a robotic multifactorial fall-risk predictive model: A one-year prospective study in community-dwelling older adults. PloS one 15(6): e0234904	- Study does not contain an intervention relevant to this review protocol
Chantanachai, Thanwarat; Pichaiyongwongdee, Sopa; Jalayondeja, Chutima (2014) Fall prediction in thai elderly with timed up and go and tandem walk test: a cross-sectional study. Journal of the Medical Association of Thailand = Chotmaihet thangphaet 97suppl7: 21-5	- Study does not contain an intervention relevant to this review protocol
Chen, J S, March, L M, Schwarz, J et al. (2005) A multivariate regression model predicted falls in residents living in intermediate hostel care. Journal of clinical epidemiology 58(5): 503-8	- Study does not contain an intervention relevant to this review protocol
Chen, Manting, Wang, Hailiang, Yu, Lisha et al. (2022) A Systematic Review of Wearable Sensor-Based Technologies for Fall Risk Assessment in Older Adults. Sensors (Basel, Switzerland) 22(18)	- Study does not contain an intervention relevant to this review protocol
Chen, Shih-Hai, Lee, Chia-Hsuan, Jiang, Bernard C et al. (2021) Using a Stacked Autoencoder for Mobility and Fall Risk Assessment via Time-Frequency Representations of the Timed Up and Go Test. Frontiers in physiology 12: 668350	- Study does not contain an intervention relevant to this review protocol
Chiang, Tsai-Lien, Hsu, Chan-Peng, Yuan, Yu-Jie et al. (2022) Can EMS providers and emergency department nurses work together to identify home risk factors for falls in older people?. Medicine 101(38): e30752	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Chinnadurai, Somasundaram Aadhimoolam, Gandhirajan, Divya, Srinivasan, Avathvadi Venkatesan et al. (2018) Predicting falls in multiple sclerosis: Do electrophysiological measures have a better predictive accuracy compared to clinical measures?. Multiple sclerosis and related disorders 20: 199-203	- Study does not contain an intervention relevant to this review protocol
Colagiorgio, P, Romano, F, Sardi, F et al. (2014) Affordable, automatic quantitative fall risk assessment based on clinical balance scales and Kinect data. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2014: 3500-3	- Study does not contain an intervention relevant to this review protocol
Coll-Planas, Laura, Kron, Martina, Sander, Silvia et al. (2006) Accidental falls among community-dwelling older adults: improving the identification process of persons at risk by nursing staff. Zeitschrift fur Gerontologie und Geriatrie 39(4): 277-82	- Study does not contain an intervention relevant to this review protocol
Colon-Emeric, Cathleen S, McDermott, Cara L, Lee, Deborah S et al. (2024) Risk Assessment and Prevention of Falls in Older Community-Dwelling Adults: A Review. JAMA 331(16): 1397-1406	- Systematic review used as a source of primary studies
Criter, Robin E and Honaker, Julie A (2016) Identifying Balance Measures Most Likely to Identify Recent Falls. Journal of geriatric physical therapy (2001) 39(1): 30-7	- Population not relevant to this review protocol
Cuaya, German, Munoz-Melendez, Angelica, Nunez Carrera, Lidia et al. (2013) A dynamic Bayesian network for estimating the risk of falls from real gait data. Medical & biological engineering & computing 51(12): 29-37	- Study does not contain an intervention relevant to this review protocol
Cui, Yao, Liu, Bo, Qin, Ming-Zhao et al. (2023) Effects of early mental state changes on physical functions in elderly patients with a history of falls. BMC geriatrics 23(1): 564	- No useable outcome data
Cwikel, J G, Fried, A V, Biderman, A et al. (1998) Validation of a fall-risk screening test, the Elderly Fall Screening Test (EFST), for community-dwelling elderly. Disability and rehabilitation 20(5): 161-7	- Study does not contain an intervention relevant to this review protocol
Dabkowski, E, Missen, K, Duncan, J et al. (2023) Falls risk perception measures in hospital: a COSMIN systematic review. Journal of patient-reported outcomes 7(1): 58	- Systematic review used as a source of primary studies
da Costa, Bruno Roza, Rutjes, Anne Wilhelmina Saskia, Mendy, Angelico et al. (2012) Can falls risk prediction tools correctly identify fall-prone elderly rehabilitation inpatients? A systematic review and meta-analysis. PloS one 7(7): e41061	- Systematic review used as source of primary studies
Dasgupta, Pritika, Frisch, Adam, Huber, James et al. (2022) Predicting falls within 3 months of emergency department discharge among community-dwelling older adults using self-report tools versus a brief functional assessment. The American journal of emergency medicine 53: 245-249	- Study does not contain an intervention relevant to this review protocol
Davis, Alexander, Luciano, Mark, Moghekar, Abhay et al. (2021) Assessing the predictive value of common gait measure for predicting falls in patients presenting with suspected normal pressure hydrocephalus. BMC neurology 21(1): 60	- Study does not contain an intervention relevant to this review protocol
De Brauwer, Isabelle, Cornette, Pascale, Boland, Benoit et al. (2017) Can we predict functional decline in hospitalized older people admitted	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
through the emergency department? Reanalysis of a predictive tool ten years after its conception. BMC geriatrics 17(1): 105	
De Brauwer, Isabelle, Lepage, Sylvain, Yombi, Jean-Cyr et al. (2012) Prediction of risk of in-hospital geriatric complications in older patients with hip fracture. Aging clinical and experimental research 24(1): 62-7	- Study does not contain an intervention relevant to this review protocol
de Souza Moreira, Bruno, Mourao Barroso, Cristiano, Cavalcanti Furtado, Sheyla Rossana et al. (2015) Clinical functional tests help identify elderly women highly concerned about falls. Experimental aging research 41(1): 89-103	- Data not reported in an extractable format or a format that can be analysed
Delbaere K, Van den Noortgate N, Bourgois J et al. (2006) The Physical Performance Test as a predictor of frequent fallers: a prospective community-based cohort study. Clinical rehabilitation 20(1): 83-90	- Data not reported in an extractable format or a format that can be analysed
Demons, Jamehl L, Chenna, Swapna, Callahan, Kathryn E et al. (2014) Utilizing a Meals on Wheels program to teach falls risk assessment to medical students. Gerontology & geriatrics education 35(4): 409-20	- Data not reported in an extractable format or a format that can be analysed
Deng, You, Lin, Lin, Hou, Lijun et al. (2020) A self-reported Frailty Index predicts long-term mortality in hospitalized patients with cirrhosis. Annals of translational medicine 8(19): 1217	- Study does not contain an intervention relevant to this review protocol
Deng, Yi and Sato, Naomi (2024) Global frailty screening tools: Review and application of frailty screening tools from 2001 to 2023. Intractable & rare diseases research 13(1): 1-11	- Systematic review used as a source of primary studies
Dent, Elsa, Dalla Via, Jack, Bozanich, Trent et al. (2024) Frailty increases the long-term risk for fall and fracture-related hospitalizations and all-cause mortality in community-dwelling older women. Journal of bone and mineral research : the official journal of the American Society for Bone and Mineral Research 39(3): 222-230	- No useable outcome data
Di Rosa, Mirko, Hausdorff, Jeff M, Stara, Vera et al. (2017) Concurrent validation of an index to estimate fall risk in community dwelling seniors through a wireless sensor insole system: A pilot study. Gait & posture 55: 6-11	- Study does not contain an intervention relevant to this review protocol
Doheny, Emer P, Fan, Chie Wei, Foran, Timothy et al. (2011) An instrumented sit-to-stand test used to examine differences between older fallers and non-fallers. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2011: 3063-6	- Study does not contain an intervention relevant to this review protocol
Doheny, Emer P, McGrath, Denise, Greene, Barry R et al. (2012) Displacement of centre of mass during quiet standing assessed using accelerometry in older fallers and non-fallers. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2012: 3300-3	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Dolatabadi, Elham, Van Ooteghem, Karen, Taati, Babak et al. (2018) Quantitative Mobility Assessment for Fall Risk Prediction in Dementia: A Systematic Review. Dementia and geriatric cognitive disorders 45(56): 353-367	- Study does not contain an intervention relevant to this review protocol
Donate-Martinez, Ascension; Alhambra-Borras, Tamara; Dura-Ferrandis, Estrella (2022) Frailty as a Predictor of Adverse Outcomes among Spanish Community-Dwelling Older Adults. International journal of environmental research and public health 19(19)	- Study design not relevant to this review protocol
Downey, Patricia A; Perry, Susan B; Anderson, Janice M (2013) Screening postmenopausal women for fall and fracture prevention. Journal of geriatric physical therapy (2001) 36(3): 138-45	- Data not reported in an extractable format or a format that can be analysed
Dubois, Amandine; Bihl, Titus; Bresciani, Jean-Pierre (2017) Automating the Timed Up and Go Test Using a Depth Camera. Sensors (Basel, Switzerland) 18(1)	- Study does not contain an intervention relevant to this review protocol
Duncan, Ryan P, Leddy, Abigail L, Cavanaugh, James T et al. (2012) Accuracy of fall prediction in Parkinson disease: six-month and 12-month prospective analyses. Parkinson's disease 2012: 237673	- Study does not contain an intervention relevant to this review protocol
Eagle DJ, Salama S, Whitman D et al. (1999) Comparison of three instruments in predicting accidental falls in selected inpatients in a general teaching hospital. Journal of gerontological nursing 25(7): 40-45	- Population not relevant to this review protocol (less than 100 participants)
Eagles, Debra, Yadav, Krishan, Perry, Jeffrey J et al. (2018) Mobility assessments of geriatric emergency department patients: A systematic review. CJEM 20(3): 353-361	- Data not reported in an extractable format or a format that can be analysed
El Miedany, Yasser, El Gaafary, Maha, Gadallah, Naglaa et al. (2023) Targeted optimum care approach for osteoporotic fragility fractures: tailored strategy based on risk stratification to reduce incidents of falls-an initiative by the Egyptian Academy of bone health based on the FLS national register. Archives of osteoporosis 18(1): 139	- No useable outcome data
Eichler, Nadav, Raz, Shmuel, Toledano-Shubi, Adi et al. (2022) Automatic and Efficient Fall Risk Assessment Based on Machine Learning. Sensors (Basel, Switzerland) 22(4)	- Study does not contain an intervention relevant to this review protocol
Ejupi, Andreas; Lord, Stephen R; Delbaere, Kim (2014) New methods for fall risk prediction. Current opinion in clinical nutrition and metabolic care 17(5): 407-11	- Study does not contain an intervention relevant to this review protocol
Elledge, Julie (2017) Concordance of Motion Sensor and Clinician-Rated Fall Risk Scores in Older Adults. Computers, informatics, nursing : CIN 35(12): 624-629	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Eost-Telling, Charlotte, Yang, Yang, Norman, Gill et al. (2024) Digital technologies to prevent falls in people living with dementia or mild cognitive impairment: a rapid systematic overview of systematic reviews. Age and ageing 53(1)	- Systematic review used as a source of primary studies
Faber, Marjan J; Bosscher, Ruud J; van Wieringen, Piet C W (2006) Clinimetric properties of the performance-oriented mobility assessment. Physical therapy 86(7): 944-54	- Study does not contain an intervention relevant to this review protocol
Fabre, Jennifer M, Ellis, Rebecca, Kosma, Maria et al. (2010) Falls risk factors and a compendium of falls risk screening instruments. Journal of geriatric physical therapy (2001) 33(4): 184-97	- Review article but not a systematic review
Fielding, Susan J; McKay, Michael; Hyrkas, Kristiina (2013) Testing the reliability of the Fall Risk Screening Tool in an elderly ambulatory population. Journal of nursing management 21(8): 1008-15	- Data not reported in an extractable format or a format that can be analysed
Fischer, Barbara L, Hoyt, William T, Maucieri, Lawrence et al. (2014) Performance-based assessment of falls risk in older veterans with executive dysfunction. Journal of rehabilitation research and development 51(2): 263-74	- Study design not relevant to this review protocol
Fischer, M.G.; Josef, K.L.; Russell, J.H. (2020) Functional outcomes graded with normative data can predict postdischarge falls and 30-day readmissions in hospitalized older adults. Journal of Acute Care Physical Therapy 11(4): 201-215	- Study does not contain an intervention relevant to this review protocol
Flaherty, L M and Josephson, N C (2013) Screening for fall risk in patients with haemophilia. Haemophilia : the official journal of the World Federation of Hemophilia 19(3): e103-9	- Review article but not a systematic review
Flannery, Caragh, Dennehy, Rebecca, Riordan, Fiona et al. (2022) Enhancing referral processes within an integrated fall prevention pathway for older people: a mixed-methods study. BMJ open 12(8): e056182	- Study design not relevant to this review protocol
Flemming, Patricia J and Ramsay, Katherine (2012) Falls risk assessment begins with hello: lessons learned from the use of one home health agency's fall risk tool. Home healthcare nurse 30(9): 516-23	- Review article but not a systematic review
Forrester, D A; McCabe-Bender, J; Tiedeken, K (1999) Fall risk assessment of hospitalized adults and follow-up study. Journal for nurses in staff development : JNSD : official journal of the National Nursing Staff Development Organization 15(6): 251-9	- Data not reported in an extractable format or a format that can be analysed
French, Dustin D, Werner, Dennis C, Campbell, Robert R et al. (2007) A multivariate fall risk assessment model for VHA nursing homes using the minimum data set. Journal of the American Medical Directors Association 8(2): 115-22	- Study does not contain an intervention relevant to this review protocol
Frisendahl, Nathalie, Ek, Stina, Rosendahl, Erik et al. (2020) Predictive Performance of the FIF Screening Tool in 2 Cohorts of Community-Living Older Adults. Journal of the American Medical Directors Association 21(12): 1900-1905e1	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Fu, C.-J., Chen, W.-C., Lu, M.-L. et al. (2021) Equipment-free fall-risk assessments for the functionally independent elderly: A systematic review and meta-analysis. International Journal of Gerontology 15(4): 301-308	- Systematic review used as source of primary studies
Gade, Gustav Valentin, Jorgensen, Martin Gronbech, Ryg, Jesper et al. (2021) Predicting falls in community-dwelling older adults: a systematic review of prognostic models. BMJ open 11(5): e044170	- Study does not contain an intervention relevant to this review protocol
Gafner, Simone Chantal, Allet, Lara, Hilfiker, Roger et al. (2021) Reliability and Diagnostic Accuracy of Commonly Used Performance Tests Relative to Fall History in Older Persons: A Systematic Review. Clinical interventions in aging 16: 1591-1616	- Systematic review used as source of primary studies
Gafner, Simone Chantal, Bastiaenen, Caroline Henrice Germaine, Ferrari, Serge et al. (2020) The Role of Hip Abductor Strength in Identifying Older Persons at Risk of Falls: A Diagnostic Accuracy Study. Clinical interventions in aging 15: 645-654	- Population not relevant to this review protocol
Galindo-Ciocon, D J; Ciocon, J O; Galindo, D J (1995) Gait training and falls in the elderly. Journal of gerontological nursing 21(6): 10-7	- Study does not contain an intervention relevant to this review protocol
Gangar, Surekha, Sivakumaran, Shajicaa, Anderson, Ashley N et al. (2022) Optimizing falls risk prediction for inpatient stroke rehabilitation: A secondary data analysis. Physiotherapy theory and practice: 1-12	- Study design not relevant to this review protocol
Ganz, David A, Bao, Yeran, Shekelle, Paul G et al. (2007) Will my patient fall?. JAMA 297(1): 77-86	- Systematic review used as source of primary studies
Gates, Simon, Smith, Lesley A, Fisher, Joanne D et al. (2008) Systematic review of accuracy of screening instruments for predicting fall risk among independently living older adults. Journal of rehabilitation research and development 45(8): 1105-16	- Systematic review used as source of primary studies
Gemmeke, Marle, Koster, Ellen S, Pajouheshnia, Romin et al. (2021) Using pharmacy dispensing data to predict falls in older individuals. British journal of clinical pharmacology 87(3): 1282-1290	- Data not reported in an extractable format or a format that can be analysed
Giansanti, Daniele, Maccioni, Giovanni, Cesinaro, Stefano et al. (2008) Assessment of fall-risk by means of a neural network based on parameters assessed by a wearable device during posturography. Medical engineering & physics 30(3): 367-72	- Study does not contain an intervention relevant to this review protocol
Gietzelt, Matthias, Nemitz, Gerhard, Wolf, Klaus-Hendrik et al. (2009) A clinical study to assess fall risk using a single waist accelerometer. Informatics for health & social care 34(4): 181-8	- Study does not contain an intervention relevant to this review protocol
Gillain, S, Boutaayamou, M, Beaudart, C et al. (2018) Assessing gait parameters with accelerometer-based methods to identify older adults at risk of falls: a systematic review. European geriatric medicine 9(4): 435-448	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Gobbens, Robbert Jj, Boersma, Petra, Uchmanowicz, Izabella et al. (2020) The Tilburg Frailty Indicator (TFI): New Evidence for Its Validity. Clinical interventions in aging 15: 265-274	- Study design not relevant to this review protocol
Godfrey, A (2017) Wearables for independent living in older adults: Gait and falls. Maturitas 100: 16-26	- Study does not contain an intervention relevant to this review protocol
Goldberg, Elizabeth M, Marks, Sarah J, Ilegbusi, Aderonke et al. (2020) GAPcare: The Geriatric Acute and Post-Acute Fall Prevention Intervention in the Emergency Department: Preliminary Data. Journal of the American Geriatrics Society 68(1): 198-206	- Data not reported in an extractable format or a format that can be analysed
Gonzalez-Colaco Harmand, Magali, Meillon, Celine, Bergua, Valerie et al. (2017) Comparing the predictive value of three definitions of frailty: Results from the Three-City study. Archives of gerontology and geriatrics 72: 153-163	- Study does not contain an intervention relevant to this review protocol
Gor-Garcia-Fogeda, Maria Dolores, Cano de la Cuerda, Roberto, Carratala Tejada, Maria et al. (2016) Observational Gait Assessments in People With Neurological Disorders: A Systematic Review. Archives of physical medicine and rehabilitation 97(1): 131-40	- Study does not contain an intervention relevant to this review protocol
Greenberg, Marna, Jacoby, Jeanne, Barraco, Robert D et al. (2021) Analysis of Falls Efficacy Scale and Vulnerable Elders Survey as Predictors of Falls. Cureus 13(4): e14471	- Study does not contain an intervention relevant to this review protocol
Greene, Barry R, Doheny, Emer P, Kenny, Rose A et al. (2014) Classification of frailty and falls history using a combination of sensor-based mobility assessments. Physiological measurement 35(10): 2053-66	- Study does not contain an intervention relevant to this review protocol
Greene, Barry R, McGrath, Denise, Walsh, Lorcan et al. (2012) Quantitative falls risk estimation through multi-sensor assessment of standing balance. Physiological measurement 33(12): 2049-63	- Study does not contain an intervention relevant to this review protocol
Greene, Barry R, Premoli, Isabella, McManus, Killian et al. (2021) Predicting Fall Counts Using Wearable Sensors: A Novel Digital Biomarker for Parkinson's Disease. Sensors (Basel, Switzerland) 22(1)	- Study does not contain an intervention relevant to this review protocol
Greene, Barry R; Redmond, Stephen J; Caulfield, Brian (2017) Fall Risk Assessment Through Automatic Combination of Clinical Fall Risk Factors and Body-Worn Sensor Data. IEEE journal of biomedical and health informatics 21(3): 725-731	- Study does not contain an intervention relevant to this review protocol
Guerard, Emily J, Deal, Allison M, Williams, Grant R et al. (2015) Falls in Older Adults With Cancer: Evaluation by Oncology Providers. Journal of oncology practice 11(6): 470-4	- Data not reported in an extractable format or a format that can be analysed

Study	Code [Reason]
Gulley, Emma; Ayers, Emmeline; Verghese, Joe (2020) A comparison of turn and straight walking phases as predictors of incident falls. Gait & posture 79: 239-243	- Data not reported in an extractable format or a format that can be analysed
Gutierrez-Valencia, M.; Leache, L.; Saiz, L.C. (2022) Review of the validity of fall risk assessment scales in hospitalised patients. Revista Espanola de Geriatria y Gerontologia 57(3): 186-194	- Study not reported in English
Hachiya, Mizuki, Murata, Shin, Otao, Hiroshi et al. (2015) Usefulness of a 50-meter round walking test for fall prediction in the elderly requiring long-term care. Journal of physical therapy science 27(12): 3663-6	- Study does not contain an intervention relevant to this review protocol
Haines T, Kuys SS, Morrison G et al. (2009) Cost-effectiveness analysis of screening for risk of in-hospital falls using physiotherapist clinical judgement. Medical care 47(4): 448-456	- Study does not contain an intervention relevant to this review protocol
Haines, Terry P, Bennell, Kim L, Osborne, Richard H et al. (2006) A new instrument for targeting falls prevention interventions was accurate and clinically applicable in a hospital setting. Journal of clinical epidemiology 59(2): 168-75	- Data not reported in an extractable format or a format that can be analysed
Haines, Terry P, Hill, Keith D, Bennell, Kim L et al. (2006) Recurrent events counted in evaluations of predictive accuracy. Journal of clinical epidemiology 59(11): 1155-61	- Study does not contain an intervention relevant to this review protocol
Halter, Mary, Vernon, Susan, Snooks, Helen et al. (2011) Complexity of the decision-making process of ambulance staff for assessment and referral of older people who have fallen: a qualitative study. Emergency medicine journal : EMJ 28(1): 44-50	- Study does not contain an intervention relevant to this review protocol
Hamacher, D, Singh, N B, Van Dieen, J H et al. (2011) Kinematic measures for assessing gait stability in elderly individuals: a systematic review. Journal of the Royal Society, Interface 8(65): 1682-98	- Study does not contain an intervention relevant to this review protocol
Han, J., Xu, L., Zhou, C. et al. (2017) Stratify, hendrich II fall risk model and morse fall scale used in predicting the risk of falling for elderly in-patients. Biomedical Research (India) 2017(specialissuehealthscienceandbioconvergencetechnologyeditionii): 439-s442	- Data not reported in an extractable format or a format that can be analysed
Harper, Kristie J, Barton, Annette D, Arendts, Glenn et al. (2018) Failure of falls risk screening tools to predict outcome: a prospective cohort study. Emergency medicine journal : EMJ 35(1): 28-32	- Study does not contain an intervention relevant to this review protocol
Harper, Kristie J, Riley, Vera, Petta, Antonio et al. (2020) Occupational therapist use of the 'Timed Up and Go' test in a Memory Clinic to compare performance between cognitive diagnoses and screen for falls risk. Australian occupational therapy journal 67(1): 13-21	- Data not reported in an extractable format or a format that can be analysed

Study	Code [Reason]
Harrington, Linda, Luquire, Rosemary, Vish, Nancy et al. (2010) Meta-analysis of fall-risk tools in hospitalized adults. The Journal of nursing administration 40(11): 483-8	- Systematic review used as source of primary studies
Hawk, Cheryl, Hyland, John K, Rupert, Ronald et al. (2006) Assessment of balance and risk for falls in a sample of community-dwelling adults aged 65 and older. Chiropractic & osteopathy 14: 3	- Data not reported in an extractable format or a format that can be analysed
Healey, Frances and Haines, Terry P (2013) A pragmatic study of the predictive values of the Morse falls score. Age and ageing 42(4): 462-8	- Study design not relevant to this review protocol
Heim, Noor, van Fenema, Ester M, Weverling-Rijnsburger, Annelies W E et al. (2015) Optimal screening for increased risk for adverse outcomes in hospitalised older adults. Age and ageing 44(2): 239-44	- Study does not contain an intervention relevant to this review protocol
Herman, Talia, Mirelman, Anat, Giladi, Nir et al. (2010) Executive control deficits as a prodrome to falls in healthy older adults: a prospective study linking thinking, walking, and falling. The journals of gerontology. Series A, Biological sciences and medical sciences 65(10): 1086-92	- Study does not contain an intervention relevant to this review protocol
Hermann, Olena, Schmidt, Simone B, Boltzmann, Melanie et al. (2018) Comparison of fall prediction by the Hessisch Oldendorf Fall Risk Scale and the Fall Risk Scale by Huhn in neurological rehabilitation: an observational study. Clinical rehabilitation 32(5): 671-678	- Study does not contain an intervention relevant to this review protocol
Hester, Amy L and Davis, Dees M (2013) Validation of the Hester Davis Scale for fall risk assessment in a neurosciences population. The Journal of neuroscience nursing : journal of the American Association of Neuroscience Nurses 45(5): 298-305	- Study does not contain an intervention relevant to this review protocol
Hirase, Tatsuya, Inokuchi, Shigeru, Matsusaka, Nobuou et al. (2014) A modified fall risk assessment tool that is specific to physical function predicts falls in community-dwelling elderly people. Journal of geriatric physical therapy (2001) 37(4): 159-65	- Study does not contain an intervention relevant to this review protocol
Hnizdo, Sandra, Archuleta, Raquel A, Taylor, Barbara et al. (2013) Validity and reliability of the modified John Hopkins Fall Risk Assessment Tool for elderly patients in home health care. Geriatric nursing (New York, N.Y.) 34(5): 423-7	- Population not relevant to this review protocol
Hoffmann, V S, Neumann, L, Golgert, S et al. (2015) Pro-Active Fall-Risk Management is Mandatory to Sustain in Hospital-Fall Prevention in Older Patients--Validation of the LUCAS Fall-Risk Screening in 2,337 Patients. The journal of nutrition, health & aging 19(10): 1012-8	- Data not reported in an extractable format or a format that can be analysed
Hofheinz, Martin and Mibs, Michael (2016) The Prognostic Validity of the Timed Up and Go Test With a Dual Task for Predicting the Risk of Falls in the Elderly. Gerontology & geriatric medicine 2: 2333721416637798	- Study does not contain an intervention relevant to this review protocol
Hohtari-Kivimaki, Ulla, Salminen, Marika, Vahlberg, Tero et al. (2016) Predicting Value of Nine-Item Berg Balance Scale Among the Aged: A	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
3-Year Prospective Follow-Up Study. Experimental aging research 42(2): 151-60	
Hohtari-Kivimaki, Ulla, Salminen, Marika, Vahlberg, Tero et al. (2013) Short Berg Balance Scale, BBS-9, as a predictor of fall risk among the aged: a prospective 12-month follow-up study. Aging clinical and experimental research 25(6): 645-50	- Study does not contain an intervention relevant to this review protocol
Hong, J., Min, J.-Y., Kim, S. et al. (2017) Success rate in tracking moving target with center of gravity in left-right direction predicts six-month fall in elderly. Journal of Clinical Gerontology and Geriatrics 8(4): 108-113	- Study does not contain an intervention relevant to this review protocol
Horak, Fay B, Laird, Amy, Carlson-Kuhta, Patricia et al. (2023) The Instrumented Stand and Walk (ISAW) test to predict falls in older men. GeroScience 45(2): 823-836	- Study does not contain an intervention relevant to this review protocol
Hou, Wen-Hsuan, Kang, Chun-Mei, Ho, Mu-Hsing et al. (2017) Evaluation of an inpatient fall risk screening tool to identify the most critical fall risk factors in inpatients. Journal of clinical nursing 26(56): 698-706	- Study does not contain an intervention relevant to this review protocol
Howcroft, Jennifer; Kofman, Jonathan; Lemaire, Edward D (2013) Review of fall risk assessment in geriatric populations using inertial sensors. Journal of neuroengineering and rehabilitation 10(1): 91	- Study does not contain an intervention relevant to this review protocol
Hubbard, R E and Story, D A (2014) Patient frailty: the elephant in the operating room. Anaesthesia 69suppl1: 26-34	- Review article but not a systematic review
Hubbard, Ruth E, Peel, Nancye M, Samanta, Mayukh et al. (2017) Frailty status at admission to hospital predicts multiple adverse outcomes. Age and ageing 46(5): 801-806	- Study does not contain an intervention relevant to this review protocol
Huded, Jill M, Dresden, Scott M, Gravenor, Stephanie J et al. (2015) Screening for Fall Risks in the Emergency Department: A Novel Nursing-Driven Program. The western journal of emergency medicine 16(7): 1043-6	- Data not reported in an extractable format or a format that can be analysed
Hunderfund, Andrea N Leep, Sweeney, Cynthia M, Mandrekar, Jayawant N et al. (2011) Effect of a multidisciplinary fall risk assessment on falls among neurology inpatients. Mayo Clinic proceedings 86(1): 19-24	- Data not reported in an extractable format or a format that can be analysed
Hur, Eun Young, Jin, Yinji, Jin, Taixian et al. (2017) Longitudinal Evaluation of Johns Hopkins Fall Risk Assessment Tool and Nurses' Experience. Journal of nursing care quality 32(3): 242-251	- Study design not relevant to this review protocol
Ibrahim, Azianah, Singh, Devinder Kaur Ajit, Shahar, Suzana et al. (2017) Timed up and go test combined with self-rated multifactorial questionnaire on falls risk and sociodemographic factors predicts falls among community-dwelling older adults better than the timed up and go test on its own. Journal of multidisciplinary healthcare 10: 409-416	- Study does not contain an intervention relevant to this review protocol (TUG cut off <15 seconds) and retrospective study design

Study	Code [Reason]
Irvin, D J (1999) Psychiatric unit fall event. Journal of psychosocial nursing and mental health services 37(12): 8-16	- Data not reported in an extractable format or a format that can be analysed
Jacobsohn, Gwen Costa, Leaf, Margaret, Liao, Frank et al. (2022) Collaborative design and implementation of a clinical decision support system for automated fall-risk identification and referrals in emergency departments. Healthcare (Amsterdam, Netherlands) 10(1): 100598	- Study design not relevant to this review protocol
Jahantabi-Nejad, Seifollah and Azad, Akram (2019) Predictive accuracy of performance oriented mobility assessment for falls in older adults: A systematic review. Medical journal of the Islamic Republic of Iran 33: 38	- Study does not contain an intervention relevant to this review protocol
Johnson, M; Cusick, A; Chang, S (2001) Home-screen: a short scale to measure fall risk in the home. Public health nursing (Boston, Mass.) 18(3): 169-77	- Study does not contain an intervention relevant to this review protocol
Johnston, Kylie; Barras, Sarah; Grimmer-Somers, Karen (2010) Relationship between pre-discharge occupational therapy home assessment and prevalence of post-discharge falls. Journal of evaluation in clinical practice 16(6): 1333-9	- Study does not contain an intervention relevant to this review protocol
Jordre, B., Schweinle, W., Oetjen, S. et al. (2016) Fall History and Associated Physical Performance Measures in Competitive Senior Athletes. Topics in Geriatric Rehabilitation 32(1): 1-6	- Study design not relevant to this review protocol
Jung, Hyesil and Park, Hyeoun-Ae (2018) Testing the Predictive Validity of the Hendrich II Fall Risk Model. Western journal of nursing research 40(12): 1785-1799	- Study design not relevant to this review protocol
Kajzar, J, Janatova, M, Hill, M et al. (2022) Performance of Homebalance Test in an Assessment of Standing Balance in Elderly Adults. Physiological research 71(2): 305-315	- Study does not contain an intervention relevant to this review protocol
Kamide, N.; Shiba, Y.; Takahashi, K. (2011) Determination of reference values for timed up and go test in healthy Japanese elderly people using methodology of meta-analysis. Physiotherapy (United Kingdom) 97(suppl1): es1526	- Conference abstract
Kanne, Geraldine E, Sabol, Valerie K, Pierson, Dana et al. (2021) On the Move clinic: A fall prevention nurse practitioner-driven model of care. Geriatric nursing (New York, N.Y.) 42(4): 850-854	- Data not reported in an extractable format or a format that can be analysed
Karani, Mamta V; Haddad, Yara; Lee, Robin (2016) The Role of Pharmacists in Preventing Falls among America's Older Adults. Frontiers in public health 4: 250	- Study design not relevant to this review protocol

Study	Code [Reason]
Karlsson, Lee, Doe, Kelsey, Gerry, Meghan et al. (2020) Outcomes of a Physical Therapist-Led, Statewide, Community-Based Fall Risk Screening. Journal of geriatric physical therapy (2001) 43(4): 185-193	- Data not reported in an extractable format or a format that can be analysed
Kegelmeyer, Deb A, Kloos, Anne D, Thomas, Karen M et al. (2007) Reliability and validity of the Tinetti Mobility Test for individuals with Parkinson disease. Physical therapy 87(10): 1369-78	- Study does not contain an intervention relevant to this review protocol
Kehinde, Julius Oluwole (2009) Instruments for measuring fall risk in older adults living in long-term care facilities: an integrative review. Journal of gerontological nursing 35(10): 46-55	- More recent systematic review included that covers the same topic
Kelly, D, Condell, J, Gillespie, J et al. (2022) Improved screening of fall risk using free-living based accelerometer data. Journal of biomedical informatics 131: 104116	- Study does not contain an intervention relevant to this review protocol
Keuseman, Rachel and Miller, Donna (2020) A hospitalist's role in preventing patient falls. Hospital practice (1995) 48(sup1): 63-67	- Review article but not a systematic review
Kim MJ, Seino S, Kim MK et al. (2009) Validation of lower extremity performance tests for determining the mobility limitation levels in community-dwelling older women. Aging clinical and experimental research 21(6): 437-444	- Study does not contain an intervention relevant to this review protocol
Kim, Emily Ang Neo, Mordiffi, Siti Zubaidah, Bee, Wong Hwee et al. (2007) Evaluation of three fall-risk assessment tools in an acute care setting. Journal of advanced nursing 60(4): 427-35	- Population not relevant to this review protocol
Kim, Taekyoung; Yu, Xiaoqun; Xiong, Shuping (2024) A multifactorial fall risk assessment system for older people utilizing a low-cost, markerless Microsoft Kinect. Ergonomics 67(1): 50-68	- Study design not relevant to this review protocol
Kinn, Sue and Clawson, Denise (2002) Health visitor risk assessment for preventing falls in elderly people. British journal of nursing (Mark Allen Publishing) 11(5): 316-21	- Data not reported in an extractable format or a format that can be analysed
Kline, Nancy E; Davis, Mary Elizabeth; Thom, Bridgette (2011) Fall risk assessment and prevention. Oncology (Williston Park, N.Y.) 25(2supplnurseed): 17-22	- Study does not contain an intervention relevant to this review protocol
Klinkenberg, W Dean and Potter, Patricia (2017) Validity of the Johns Hopkins Fall Risk Assessment Tool for Predicting Falls on Inpatient Medicine Services. Journal of nursing care quality 32(2): 108-113	- Study design not relevant to this review protocol
Koh, Vanessa, Xuan, Lai Wei, Zhe, Tan Kai et al. (2024) Performance of digital technologies in assessing fall risks among older adults with cognitive impairment: a systematic review. GeroScience 46(3): 2951-2975	- Systematic review used as source of primary studies

Study	Code [Reason]
Kojima, Gotaro, Kendrick, Denise, Skelton, Dawn A et al. (2015) Frailty predicts short-term incidence of future falls among British community-dwelling older people: a prospective cohort study nested within a randomised controlled trial. BMC geriatrics 15: 155	- Study does not contain an intervention relevant to this review protocol
Kojima, Gotaro, Masud, Tahir, Kendrick, Denise et al. (2015) Does the timed up and go test predict future falls among British community-dwelling older people? Prospective cohort study nested within a randomised controlled trial. BMC geriatrics 15: 38	- Study does not contain an intervention relevant to this review protocol (TUG cut off <15 seconds)
Kopke, Sascha and Meyer, Gabriele (2006) The Tinetti test: Babylon in geriatric assessment. Zeitschrift fur Gerontologie und Geriatrie 39(4): 288-91	- Review article but not a systematic review
Kus, Betul; Buyukyilmaz, Funda; Ardic, Aysun (2023) Comparison of three fall risk assessment tools in older hospitalized patients in Turkey: analysis of sensitivity and specificity. Aging clinical and experimental research 35(5): 1033-1041	- Study design not relevant to this review protocol
Kozinc, Ziga, Lofler, Stefan, Hofer, Christian et al. (2020) Diagnostic Balance Tests for Assessing Risk of Falls and Distinguishing Older Adult Fallers and Non-Fallers: A Systematic Review with Meta-Analysis. Diagnostics (Basel, Switzerland) 10(9)	- Systematic review used as source of primary studies
Kristoffersson, Annica; Du, Jiaying; Ehn, Maria (2021) Performance and Characteristics of Wearable Sensor Systems Discriminating and Classifying Older Adults According to Fall Risk: A Systematic Review. Sensors (Basel, Switzerland) 21(17)	- Study does not contain an intervention relevant to this review protocol
Kubicki, A, Laroche, D, Coquisart, L et al. (2021) The Frail'BESTest: an adaptation of the "balance evaluation system test" for frail older adults; Concurrent validity, responsiveness, validity for fall prediction and detection of slower walkers. European review of aging and physical activity : official journal of the European Group for Research into Elderly and Physical Activity 18(1): 22	- Study does not contain an intervention relevant to this review protocol
Kulmala, Jenni, Viljanen, Anne, Sipila, Sarianna et al. (2009) Poor vision accompanied with other sensory impairments as a predictor of falls in older women. Age and ageing 38(2): 162-7	- Study does not contain an intervention relevant to this review protocol
Lajoie, Y and Gallagher, S P (2004) Predicting falls within the elderly community: comparison of postural sway, reaction time, the Berg balance scale and the Activities-specific Balance Confidence (ABC) scale for comparing fallers and non-fallers. Archives of gerontology and geriatrics 38(1): 11-26	- Study does not contain an intervention relevant to this review protocol
Lam, Freddy M H; Leung, Jason C S; Kwok, Timothy C Y (2019) The Clinical Potential of Frailty Indicators on Identifying Recurrent Fallers in the Community: The Mr. Os and Ms. OS Cohort Study in Hong Kong. Journal of the American Medical Directors Association 20(12): 1605-1610	- Study does not contain an intervention relevant to this review protocol
Lamb, Sarah E, McCabe, Chris, Becker, Clemens et al. (2008) The optimal sequence and selection of screening test items to predict fall risk in older disabled women: the Women's Health and Aging Study. The journals of gerontology. Series A, Biological sciences and medical sciences 63(10): 1082-8	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Latorre, Jorge, Colomer, Carolina, Alcaniz, Mariano et al. (2019) Gait analysis with the Kinect v2: normative study with healthy individuals and comprehensive study of its sensitivity, validity, and reliability in individuals with stroke. Journal of neuroengineering and rehabilitation 16(1): 97	- Study does not contain an intervention relevant to this review protocol
Latt, Mark D, Lord, Stephen R, Morris, John G L et al. (2009) Clinical and physiological assessments for elucidating falls risk in Parkinson's disease. Movement disorders : official journal of the Movement Disorder Society 24(9): 1280-9	- Study does not contain an intervention relevant to this review protocol
Lee, Chia-Hsuan, Chen, Shih-Hai, Jiang, Bernard C et al. (2020) Estimating Postural Stability Using Improved Permutation Entropy via TUG Accelerometer Data for Community-Dwelling Elderly People. Entropy (Basel, Switzerland) 22(10)	- Study does not contain an intervention relevant to this review protocol
Lee, Jacob; Geller, Andrew I; Strasser, Dale C (2013) Analytical review: focus on fall screening assessments. PM & R : the journal of injury, function, and rehabilitation 5(7): 609-21	- Systematic review used as source of primary studies
Lee, S.M., Loo, G., Long, W. et al. (2017) Risk assessment and falls prevention in the older adult: Asian experience with the Falls Risk for Older People in the Community tool. Geriatrics and Gerontology International 17(3): 518-519	- Not a peer-reviewed publication
Lektip, Charupa, Lapmanee, Sarawut, Rattananupong, Thanapoom et al. (2020) Predictive validity of three home fall hazard assessment tools for older adults in Thailand. PloS one 15(12): e0244729	- Study does not contain an intervention relevant to this review protocol
Leroy, V, Martinet, V, Nunkessore, O et al. (2023) The Nebulous Association between Cognitive Impairment and Falls in Older Adults: A Systematic Review of the Literature. International journal of environmental research and public health 20(3)	- Systematic review used as source of primary studies
Li, Guowei, Thabane, Lehana, Ioannidis, George et al. (2015) Comparison between frailty index of deficit accumulation and phenotypic model to predict risk of falls: data from the global longitudinal study of osteoporosis in women (GLOW) Hamilton cohort. PloS one 10(3): e0120144	- Study does not contain an intervention relevant to this review protocol
Li, J J, Jiang, S, Zhu, M L et al. (2021) Comparison of Three Frailty Scales for Prediction of Adverse Outcomes among Older Adults: A Prospective Cohort Study. The journal of nutrition, health & aging 25(4): 419-424	- Study does not contain an intervention relevant to this review protocol
Liang, Junqing, Wang, Ying, Zhang, Weilin et al. (2023) Incidence and risk factors of falls in patients undergoing hemodialysis: A multicenter survey in northern China. Hemodialysis international. International Symposium on Home Hemodialysis 27(2): 155-164	- No useable outcome data
Lima, C A, Ricci, N A, Nogueira, E C et al. (2018) The Berg Balance Scale as a clinical screening tool to predict fall risk in older adults: a systematic review. Physiotherapy 104(4): 383-394	- Study does not contain an intervention relevant to this review protocol
Lin, Sumika Mori, Aliberti, Marlon Juliano Romero, Fortes-Filho, Sileno de Queiroz et al. (2018) Comparison of 3 Frailty Instruments in a Geriatric Acute Care Setting in a Low-Middle Income Country. Journal of the American Medical Directors Association 19(4): 310-314e3	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Lin, Mau-Roung, Hwang, Hei-Fen, Hu, Ming-Hsia et al. (2004) Psychometric comparisons of the timed up and go, one-leg stand, functional reach, and Tinetti balance measures in community-dwelling older people. Journal of the American Geriatrics Society 52(8): 1343-8	- Data not reported in an extractable format or a format that can be analysed
Lindholm, Beata, Nilsson, Maria H, Hansson, Oskar et al. (2016) External validation of a 3-step falls prediction model in mild Parkinson's disease. Journal of neurology 263(12): 2462-2469	- Study does not contain an intervention relevant to this review protocol
Lindholm, Beata, Nilsson, Maria H, Hansson, Oskar et al. (2018) The clinical significance of 10-m walk test standardizations in Parkinson's disease. Journal of neurology 265(8): 1829-1835	- Study does not contain an intervention relevant to this review protocol
Liu, Jian; Zhang, Xiaoyue; Lockhart, Thurmon E (2012) Fall risk assessments based on postural and dynamic stability using inertial measurement unit. Safety and health at work 3(3): 192-8	- Study design not relevant to this review protocol
Liu, Tai-Wa and Ng, Shamay S M (2019) Assessing the fall risks of community-dwelling stroke survivors using the Short-form Physiological Profile Assessment (S-PPA). PloS one 14(5): e0216769	- Study design not relevant to this review protocol
Lockhart, Thurmon E, Soangra, Rahul, Yoon, Hyunsoo et al. (2021) Prediction of fall risk among community-dwelling older adults using a wearable system. Scientific reports 11(1): 20976	- Study does not contain an intervention relevant to this review protocol
Loonlawong, Sriprapa, Limroongreungrat, Weerawat, Rattananupong, Thanapoom et al. (2022) Predictive validity of the Stopping Elderly Accidents, Deaths & Injuries (STEADI) program fall risk screening algorithms among community-dwelling Thai elderly. BMC medicine 20(1): 78	- Study does not contain an intervention relevant to this review protocol
Long, Siyu, Hu, Liangzhu, Luo, Yetao et al. (2023) Incidence and risk factors of falls in older adults after discharge: A prospective study. International journal of nursing sciences 10(1): 23-29	- No useable outcome data
Lord, S R and Dayhew, J (2001) Visual risk factors for falls in older people. Journal of the American Geriatrics Society 49(5): 508-15	- Study does not contain an intervention relevant to this review protocol
Lovallo, Carmela, Rolandi, Stefano, Rossetti, Anna Maria et al. (2010) Accidental falls in hospital inpatients: evaluation of sensitivity and specificity of two risk assessment tools. Journal of advanced nursing 66(3): 690-6	- Study does not contain an intervention relevant to this review protocol
Lundin-Olsson, Lillemor, Jensen, Jane, Nyberg, Lars et al. (2003) Predicting falls in residential care by a risk assessment tool, staff judgement, and history of falls. Aging clinical and experimental research 15(1): 51-9	- Study does not contain an intervention relevant to this review protocol
Luo, Shuhong; Kalman, Melanie; Haines, Pamela (2020) Evaluating a Fall Risk Assessment Tool in an Emergency Department. Journal for healthcare quality : official publication of the National Association for Healthcare Quality 42(4): 205-214	- Study design not relevant to this review protocol

Study	Code [Reason]
Lusardi, Michelle M, Fritz, Stacy, Middleton, Addie et al. (2017) Determining Risk of Falls in Community Dwelling Older Adults: A Systematic Review and Meta-analysis Using Posttest Probability. Journal of geriatric physical therapy (2001) 40(1): 1-36	- Study does not contain an intervention relevant to this review protocol
Ma, L (2019) Current situation of frailty screening tools for older adults. The journal of nutrition, health & aging 23(1): 111-118	- Review article but not a systematic review
Mahoney, Jeannette R, Oh-Park, Mooyeon, Ayers, Emmeline et al. (2017) Quantitative trunk sway and prediction of incident falls in older adults. Gait & posture 58: 183-187	- Study does not contain an intervention relevant to this review protocol
Mak, Margaret K Y and Auyeung, Mandy M (2013) The mini-BESTest can predict parkinsonian recurrent fallers: a 6-month prospective study. Journal of rehabilitation medicine 45(6): 565-71	- Study does not contain an intervention relevant to this review protocol
Maki, B E; Holliday, P J; Fernie, G R (1987) A posture control model and balance test for the prediction of relative postural stability. IEEE transactions on bio-medical engineering 34(10): 797-810	- Data not reported in an extractable format or a format that can be analysed
Maki, B E; Holliday, P J; Topper, A K (1994) A prospective study of postural balance and risk of falling in an ambulatory and independent elderly population. Journal of gerontology 49(2): m72-84	- Data not reported in an extractable format or a format that can be analysed
Marano, Massimo, Motolese, Francesco, Rossi, Mariagrazia et al. (2021) Remote smartphone gait monitoring and fall prediction in Parkinson's disease during the COVID-19 lockdown. Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology 42(8): 3089-3092	- Study does not contain an intervention relevant to this review protocol
Marques, Nise Ribeiro, Spinoso, Deborah Hebling, Cardoso, Bruna Carvalho et al. (2018) Is it possible to predict falls in older adults using gait kinematics?. Clinical biomechanics (Bristol, Avon) 59: 15-18	- Study does not contain an intervention relevant to this review protocol
Marschollek, M, Rehwald, A, Wolf, K H et al. (2011) Sensor-based fall risk assessment--an expert 'to go'. Methods of information in medicine 50(5): 420-6	- Study does not contain an intervention relevant to this review protocol
Marschollek, Michael, Rehwald, Anja, Wolf, Klaus-Hendrik et al. (2011) Sensors vs. experts - a performance comparison of sensor-based fall risk assessment vs. conventional assessment in a sample of geriatric patients. BMC medical informatics and decision making 11: 48	- Population not relevant to this review protocol
Marschollek, Michael, Schulze, Mareike, Gietzelt, Matthias et al. (2013) Fall prediction with wearable sensors--an empirical study on expert opinions. Studies in health technology and informatics 190: 138-40	- Study does not contain an intervention relevant to this review protocol
Marschollek, Michael, Wolf, Klaus-Hendrik, Gietzelt, Matthias et al. (2008) Assessing elderly persons' fall risk using spectral analysis on accelerometric data--a clinical evaluation study. Annual International	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2008: 3682-5	
Martinez, Maria Carmen, Iwamoto, Viviane Ernesto, Latorre, Maria do Rosario Dias de Oliveira et al. (2019) Validity and reliability of the Brazilian version of the Johns Hopkins Fall Risk Assessment Tool to assess the risk of falls. Revista brasileira de epidemiologia = Brazilian journal of epidemiology 22: e190037	- Data not reported in an extractable format or a format that can be analysed
Martinez, Matthew; De Leon, Phillip L; Keeley, David (2019) Bayesian classification of falls risk. Gait & posture 67: 99-103	- Study does not contain an intervention relevant to this review protocol
Matarese, Maria and Ivziku, Dhurata (2016) Falls risk assessment in older patients in hospital. Nursing standard (Royal College of Nursing (Great Britain) : 1987) 30(48): 53-63	- Data not reported in an extractable format or a format that can be analysed
Matarese, Maria, Ivziku, Dhurata, Bartolozzi, Francesco et al. (2015) Systematic review of fall risk screening tools for older patients in acute hospitals. Journal of advanced nursing 71(6): 1198-209	- Systematic review used as source of primary studies
Matinolli, M, Korpelainen, J T, Korpelainen, R et al. (2009) Mobility and balance in Parkinson's disease: a population-based study. European journal of neurology 16(1): 105-11	- Data not reported in an extractable format or a format that can be analysed
Matsumoto, Hiromi, Makabe, Tomoyuki, Morita, Tetsuji et al. (2015) Accelerometry-based gait analysis predicts falls among patients with a recent fracture who are ambulatory: a 1-year prospective study. International journal of rehabilitation research. Internationale Zeitschrift fur Rehabilitationsforschung. Revue internationale de recherches de readaptation 38(2): 131-6	- Study does not contain an intervention relevant to this review protocol
Meekes, Wytske Ma, Korevaar, Joke C, Leemrijse, Chantal J et al. (2021) Practical and validated tool to assess falls risk in the primary care setting: a systematic review. BMJ open 11(9): e045431	- Systematic review used as source of primary studies
Melillo, Paolo, Castaldo, Rossana, Sannino, Giovanna et al. (2015) Wearable technology and ECG processing for fall risk assessment, prevention and detection. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2015: 7740-3	- Study does not contain an intervention relevant to this review protocol
Menant, Jasmine C, Schoene, Daniel, Sarofim, Mina et al. (2014) Single and dual task tests of gait speed are equivalent in the prediction of falls in older people: a systematic review and meta-analysis. Ageing research reviews 16: 83-104	- Data not reported in an extractable format or a format that can be analysed
Meyer, Gabriele, Kopke, Sascha, Bender, Ralf et al. (2005) Predicting the risk of falling--efficacy of a risk assessment tool compared to nurses' judgement: a cluster-randomised controlled trial [ISRCTN37794278]. BMC geriatrics 5: 14	- Study design not relevant to this review protocol

Study	Code [Reason]
Middleton, Addie, Fulk, George D, Herter, Troy M et al. (2016) Self-Selected and Maximal Walking Speeds Provide Greater Insight Into Fall Status Than Walking Speed Reserve Among Community-Dwelling Older Adults. American journal of physical medicine & rehabilitation 95(7): 475-82	- Study design not relevant to this review protocol
Mignardot, Jean-Baptiste, Deschamps, Thibault, Barrey, Eric et al. (2014) Gait disturbances as specific predictive markers of the first fall onset in elderly people: a two-year prospective observational study. Frontiers in aging neuroscience 6: 22	- Study does not contain an intervention relevant to this review protocol
Milisen, K, Dejaeger, E, Braes, T et al. (2006) Process evaluation of a nurse-led multifactorial intervention protocol for risk screening and assessment of fall problems among community-dwelling older persons: a pilot-study. The journal of nutrition, health & aging 10(5): 446-52	- Data not reported in an extractable format or a format that can be analysed
Milisen, Koen, Coussement, Joke, Flamaing, Johan et al. (2012) Fall prediction according to nurses' clinical judgment: differences between medical, surgical, and geriatric wards. Journal of the American Geriatrics Society 60(6): 1115-21	- Study does not contain an intervention relevant to this review protocol
Mir, F.; Zafar, F.; Rodin, M.B. (2014) Falls in Older Adults with Cancer. Current Geriatrics Reports 3(3): 175-181	- Data not reported in an extractable format or a format that can be analysed
Miranda-Cantellops, Natalia and Tiu, Timothy K. (2021) Berg Balance Testing.	- Study does not contain an intervention relevant to this review protocol
Mizumoto, A., Ihira, H., Makino, K. et al. (2015) Hip walking performance predicts the fall one year later in community dwelling old-old women. Physiotherapy (United Kingdom) 101(suppl1): es939-es940	- Conference abstract
Mohler, M Jane, Wendel, Christopher S, Taylor-Piliae, Ruth E et al. (2016) Motor Performance and Physical Activity as Predictors of Prospective Falls in Community-Dwelling Older Adults by Frailty Level: Application of Wearable Technology. Gerontology 62(6): 654-664	- Study does not contain an intervention relevant to this review protocol
Moiz, Jamal Ali, Bansal, Vishal, Noohu, Majumi M et al. (2017) Activities-specific balance confidence scale for predicting future falls in Indian older adults. Clinical interventions in aging 12: 645-651	- Study does not contain an intervention relevant to this review protocol
Mojtaba, Mahnaz; Alinaghizadeh, Hassan; Rydwik, Elisabeth (2018) Downton Fall Risk Index during hospitalisation is associated with fall-related injuries after discharge: a longitudinal observational study. Journal of physiotherapy 64(3): 172-177	- Data not reported in an extractable format or a format that can be analysed
Montesinos, Luis; Castaldo, Rossana; Pecchia, Leandro (2018) Wearable Inertial Sensors for Fall Risk Assessment and Prediction in Older Adults: A Systematic Review and Meta-Analysis. IEEE transactions on neural systems and rehabilitation engineering : a	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
publication of the IEEE Engineering in Medicine and Biology Society 26(3): 573-582	
Moore, T; Martin, J; Stonehouse, J (1996) Predicting falls: risk assessment tool versus clinical judgement. Perspectives (Gerontological Nursing Association (Canada)) 20(1): 8-11	- Study does not contain an intervention relevant to this review protocol
Morris, Meg E, Haines, Terry, Hill, Anne Marie et al. (2021) Divesting from a Scored Hospital Fall Risk Assessment Tool (FRAT): A Cluster Randomized Non-Inferiority Trial. Journal of the American Geriatrics Society 69(9): 2598-2604	- Data not reported in an extractable format or a format that can be analysed
Morris, Rob (2007) Predicting falls in older women. Menopause international 13(4): 170-7	- Study does not contain an intervention relevant to this review protocol
Morris, Rob, Harwood, Rowan H, Baker, Ros et al. (2007) A comparison of different balance tests in the prediction of falls in older women with vertebral fractures: a cohort study. Age and ageing 36(1): 78-83	- Population not relevant to this review protocol
Morse, J M, Black, C, Oberle, K et al. (1989) A prospective study to identify the fall-prone patient. Social science & medicine (1982) 28(1): 81-6	- Data not reported in an extractable format or a format that can be analysed
Mousavipour, S.-S., Ebadi, A., Saremi, M. et al. (2022) Reliability, sensitivity, and specificity of the morse fall scale: A hospitalized population in Iran. Archives of Trauma Research 11(2): 65-70	- Population not relevant to this review protocol
Muir, Susan W, Berg, Katherine, Chesworth, Bert et al. (2010) Balance impairment as a risk factor for falls in community-dwelling older adults who are high functioning: a prospective study. Physical therapy 90(3): 338-47	- Study does not contain an intervention relevant to this review protocol
Muir, Susan W, Berg, Katherine, Chesworth, Bert et al. (2010) Application of a fall screening algorithm stratified fall risk but missed preventive opportunities in community-dwelling older adults: a prospective study. Journal of geriatric physical therapy (2001) 33(4): 165-72	- Study does not contain an intervention relevant to this review protocol
Muir, Susan W, Berg, Katherine, Chesworth, Bert et al. (2008) Use of the Berg Balance Scale for predicting multiple falls in community-dwelling elderly people: a prospective study. Physical therapy 88(4): 449-59	- Study does not contain an intervention relevant to this review protocol
Muir-Hunter, S W and Wittwer, J E (2016) Dual-task testing to predict falls in community-dwelling older adults: a systematic review. Physiotherapy 102(1): 29-40	- Study does not contain an intervention relevant to this review protocol
Mulasso, Anna, Roppolo, Mattia, Gobbens, Robbert J et al. (2017) Mobility, balance and frailty in community-dwelling older adults: What is the best 1-year predictor of falls?. Geriatrics & gerontology international 17(10): 1463-1469	- Data not reported in an extractable format or a format that can be analysed

Study	Code [Reason]
Myers, Helen and Nikoletti, Sue (2003) Fall risk assessment: a prospective investigation of nurses' clinical judgement and risk assessment tools in predicting patient falls. International journal of nursing practice 9(3): 158-65	- Study does not contain an intervention relevant to this review protocol
Nagamatsu, Lindsay S, Voss, Michelle, Neider, Mark B et al. (2011) Increased cognitive load leads to impaired mobility decisions in seniors at risk for falls. Psychology and aging 26(2): 253-9	- Study does not contain an intervention relevant to this review protocol
Nandy, S., Parsons, S., Cryer, C. et al. (2005) Erratum: Development and preliminary examination of the predictive validity of the Falls Risk Assessment Tool (FRAT) for use in primary care (Journal of Public Health (2004) 26, 2 (138-143)). Journal of Public Health 27(1): 129-130	- Not a peer-reviewed publication
Narayanan, V, Dickinson, A, Victor, C et al. (2016) Falls screening and assessment tools used in acute mental health settings: a review of policies in England and Wales. Physiotherapy 102(2): 178-83	- Review article but not a systematic review
Neuls, Patrick D, Clark, Tammie L, Van Heuklon, Nicole C et al. (2011) Usefulness of the Berg Balance Scale to predict falls in the elderly. Journal of geriatric physical therapy (2001) 34(1): 3-10	- Study does not contain an intervention relevant to this review protocol
Newland, Pamela, Wagner, Joanne M, Salter, Amber et al. (2016) Exploring the feasibility and acceptability of sensor monitoring of gait and falls in the homes of persons with multiple sclerosis. Gait & posture 49: 277-282	- Study does not contain an intervention relevant to this review protocol
Ni Scanaill, Cliodhna, Garattini, Chiara, Greene, Barry R et al. (2011) Technology Innovation Enabling Falls Risk Assessment in a Community Setting. Ageing international 36(2): 217-231	- Study does not contain an intervention relevant to this review protocol
Nishimura, Hirosuke, Endo, Kenji, Suzuki, Hidekazu et al. (2015) Gait Analysis in Cervical Spondylotic Myelopathy. Asian spine journal 9(3): 321-6	- Study does not contain an intervention relevant to this review protocol
Noohu, M.M.; Dey, A.B.; Hussain, M.E. (2014) Relevance of balance measurement tools and balance training for fall prevention in older adults. Journal of Clinical Gerontology and Geriatrics 5(2): 31-35	- Review article but not a systematic review
Nordin, E, Moe-Nilssen, R, Ramnemark, A et al. (2010) Changes in step-width during dual-task walking predicts falls. Gait & posture 32(1): 92-7	- Study does not contain an intervention relevant to this review protocol
Nouredanesh, Mina, Godfrey, Alan, Howcroft, Jennifer et al. (2021) Fall risk assessment in the wild: A critical examination of wearable sensor use in free-living conditions. Gait & posture 85: 178-190	- Study does not contain an intervention relevant to this review protocol
Nunan, Susan, Brown Wilson, Christine, Henwood, Timothy et al. (2018) Fall risk assessment tools for use among older adults in long-term care settings: A systematic review of the literature. Australasian journal on ageing 37(1): 23-33	- Systematic review used as source of primary studies

Study	Code [Reason]
Nyberg, L and Gustafson, Y (1996) Using the Downton index to predict those prone to falls in stroke rehabilitation. Stroke 27(10): 1821-4	- Data not reported in an extractable format or a format that can be analysed
Oddsson, L.I.E., Bisson, T., Cohen, H.S. et al. (2020) The Effects of a Wearable Sensory Prosthesis on Gait and Balance Function After 10 Weeks of Use in Persons With Peripheral Neuropathy and High Fall Risk - The walk2Wellness Trial. Frontiers in Aging Neuroscience 12: 592751	- Study does not contain an intervention relevant to this review protocol
O'Donoghue, P., Halloran, A.O., Kenny, R.A. et al. (2022) Frail by four different measures and new adverse events from lower blood pressure control in hypertensive older adults: A 2-year prospective study in The Irish Longitudinal Study on Ageing (TILDA). European Respiratory Journal 60(supplement66): 2180	- Conference abstract
Oh, Koei, Furuya, Takefumi, Inoue, Eisuke et al. (2021) A simple screening test to assess risk of falls in Japanese patients with rheumatoid arthritis: Results from the IORRA cohort study. Modern rheumatology 31(2): 506-509	- Study does not contain an intervention relevant to this review protocol
Oliver, David, Daly, Fergus, Martin, Finbarr C et al. (2004) Risk factors and risk assessment tools for falls in hospital in-patients: a systematic review. Age and ageing 33(2): 122-30	- Study does not contain an intervention relevant to this review protocol
Oliver, David and Healy, Frances (2009) Falls risk prediction tools for hospital inpatients: do they work?. Nursing times 105(7): 18-21	- Study does not contain an intervention relevant to this review protocol
Omana, Humberto, Bezaire, Kari, Brady, Kyla et al. (2021) Functional Reach Test, Single-Leg Stance Test, and Tinetti Performance-Oriented Mobility Assessment for the Prediction of Falls in Older Adults: A Systematic Review. Physical therapy 101(10)	- Systematic review used as source of primary studies
Ong, Mei Fong, Soh, Kim Lam, Saimon, Rosalia et al. (2022) Falls risk screening tools intended to reduce fall risk among independent community-dwelling older adults: A systematic review. International journal of nursing practice: e13083	- Systematic review used as source of primary studies
Otoguro, M., Ohnuma, T., Hirao, K. et al. (2012) Can a newly - established test for assessing standing and balance function be an alternative to the timed up-and-go test? -Functional assessment of gait and balance in elderly patients for a comprehensive geriatric assessment initiative named 'Dr. SUPERMAN'. Japanese Journal of Geriatrics 49(5): 589-596	- Study does not contain an intervention relevant to this review protocol
Overcash, Janine (2007) Prediction of falls in older adults with cancer: a preliminary study. Oncology nursing forum 34(2): 341-6	- Study does not contain an intervention relevant to this review protocol
Pajala, Satu, Era, Pertti, Koskenvuo, Markku et al. (2008) Force platform balance measures as predictors of indoor and outdoor falls in community-dwelling women aged 63-76 years. The journals of gerontology. Series A, Biological sciences and medical sciences 63(2): 171-8	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Pajewski, Nicholas M, Lenoir, Kristin, Wells, Brian J et al. (2019) Frailty Screening Using the Electronic Health Record Within a Medicare Accountable Care Organization. The journals of gerontology. Series A, Biological sciences and medical sciences 74(11): 1771-1777	- Study does not contain an intervention relevant to this review protocol
Palumbo, Pierpaolo, Palmerini, Luca, Bandinelli, Stefania et al. (2015) Fall Risk Assessment Tools for Elderly Living in the Community: Can We Do Better?. PloS one 10(12): e0146247	- Study design not relevant to this review protocol
Park, Seong-Hi (2018) Tools for assessing fall risk in the elderly: a systematic review and meta-analysis. Aging clinical and experimental research 30(1): 1-16	- Systematic review used as source of primary studies
Park, Seong-Hi and Lee, Young-Shin (2017) The Diagnostic Accuracy of the Berg Balance Scale in Predicting Falls. Western journal of nursing research 39(11): 1502-1525	- Study does not contain an intervention relevant to this review protocol
Pasa, Thiana Sebben, Magnago, Tania Solange Bosi De Souza, Urbanetto, Janete De Souza et al. (2017) Risk assessment and incidence of falls in adult hospitalized patients. Revista latino-americana de enfermagem 25: e2862	- Data not reported in an extractable format or a format that can be analysed
Paul, Serene S, Canning, Colleen G, Sherrington, Catherine et al. (2013) Three simple clinical tests to accurately predict falls in people with Parkinson's disease. Movement disorders : official journal of the Movement Disorder Society 28(5): 655-62	- Study does not contain an intervention relevant to this review protocol
Paulson, Daniel and Lichtenberg, Peter A (2015) The Paulson-Lichtenberg Frailty Index: evidence for a self-report measure of frailty. Aging & mental health 19(10): 892-901	- Study does not contain an intervention relevant to this review protocol
Peeters, G.M.E.E., Pluijm, S.M.F., Van Schoor, N.M. et al. (2010) Validation of the LASA fall risk profile for recurrent falling in older recent fallers. Journal of Clinical Epidemiology 63(11): 1242-1248	- Study does not contain an intervention relevant to this review protocol
Pelicioni, Paulo H S, Waters, Debra L, Still, Amanda et al. (2022) A pilot investigation of reliability and validity of balance and gait assessments using telehealth with healthy older adults. Experimental gerontology 162: 111747	- Data not reported in an extractable format or a format that can be analysed
Pellicciari, Leonardo, Piscitelli, Daniele, Caselli, Serena et al. (2019) A Rasch analysis of the Conley Scale in patients admitted to a general hospital. Disability and rehabilitation 41(23): 2807-2816	- Study does not contain an intervention relevant to this review protocol
Perell, K L, Nelson, A, Goldman, R L et al. (2001) Fall risk assessment measures: an analytic review. The journals of gerontology. Series A, Biological sciences and medical sciences 56(12): m761-6	- More recent systematic review included that covers the same topic
Perez-Zepeda, Mario Ulises; Cesari, Matteo; Garcia-Pena, Carmen (2016) Predictive Value of Frailty Indices for Adverse Outcomes in	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Older Adults. Revista de investigacion clinica; organo del Hospital de Enfermedades de la Nutricion 68(2): 92-8	
Persad, C C; Cook, S; Giordani, B (2010) Assessing falls in the elderly: should we use simple screening tests or a comprehensive fall risk evaluation?. European journal of physical and rehabilitation medicine 46(2): 249-59	- Review article but not a systematic review
Perttila, N M, Pitkala, K H, Kautiainen, H et al. (2017) Various Diagnostic Measures of Frailty as Predictors for Falls, Weight Change, Quality of Life, and Mortality among Older Finnish Men. The Journal of frailty & aging 6(4): 188-194	- Study does not contain an intervention relevant to this review protocol
Pettersson, Beatrice, Nordin, Ellinor, Ramnemark, Anna et al. (2020) Neither Timed Up and Go test nor Short Physical Performance Battery predict future falls among independent adults aged >=75 years living in the community. Journal of frailty, sarcopenia and falls 5(2): 24-30	- Study does not contain an intervention relevant to this review protocol (TUG no cut off reported)
Poe, Stephanie S, Dawson, Patricia B, Cvach, Maria et al. (2018) The Johns Hopkins Fall Risk Assessment Tool: A Study of Reliability and Validity. Journal of nursing care quality 33(1): 10-19	- Population not relevant to this review protocol
Pozaic, T., Lindemann, U., Grebe, A.-K. et al. (2016) Sit-to-Stand Transition Reveals Acute Fall Risk in Activities of Daily Living. IEEE Journal of Translational Engineering in Health and Medicine 4: 7763750	- Data not reported in an extractable format or a format that can be analysed
Pua, Yong-Hao and Matchar, David B (2019) Physical Performance Predictor Measures in Older Adults With Falls-Related Emergency Department Visits. Journal of the American Medical Directors Association 20(6): 780-784	- Data not reported in an extractable format or a format that can be analysed
Quijoux, F., Nicolai, A., Aflalo, J. et al. (2021) Contribution of posturography to balance assessment in elderly people. Pratique Neurologique - FMC 12(4): 290-302	- Study does not contain an intervention relevant to this review protocol
Quinn, Gillian, Comber, Laura, Galvin, Rose et al. (2018) The ability of clinical balance measures to identify falls risk in multiple sclerosis: a systematic review and meta-analysis. Clinical rehabilitation 32(5): 571-582	- Systematic review used as source of primary studies
Quinn, Gillian, Comber, Laura, McGuigan, Chris et al. (2019) Discriminative ability and clinical utility of the Timed Up and Go (TUG) in identifying falls risk in people with multiple sclerosis: a prospective cohort study. Clinical rehabilitation 33(2): 317-326	- Study does not contain an intervention relevant to this review protocol *Cut-off score is 11sec*
Rantz, Marilyn J, Skubic, Marjorie, Abbott, Carmen et al. (2013) In-home fall risk assessment and detection sensor system. Journal of gerontological nursing 39(7): 18-22	- Study does not contain an intervention relevant to this review protocol
Rasche, Peter, Nitsch, Verena, Rentemeister, Lars et al. (2019) The Aachen Falls Prevention Scale: Multi-Study Evaluation and Comparison. JMIR aging 2(1): e12114	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Rehman, Rana Zia Ur, Zhou, Yuhan, Del Din, Silvia et al. (2020) Gait Analysis with Wearables Can Accurately Classify Fallers from Non-Fallers: A Step toward Better Management of Neurological Disorders. Sensors (Basel, Switzerland) 20(23)	- Study does not contain an intervention relevant to this review protocol
Ricci, G., Barrionuevo, M.L., Bodini, S. et al. (2012) Balance, gait and falls in an elderly institutionalized population: One year monitoring by Performance Oriented Mobility Assessment (POMA). Giornale di Gerontologia 60(2): 88-98	- Study does not contain an intervention relevant to this review protocol
Riddle, D L and Stratford, P W (1999) Interpreting validity indexes for diagnostic tests: an illustration using the Berg balance test. Physical therapy 79(10): 939-48	- Study does not contain an intervention relevant to this review protocol
Ritchie, Christine, Wieland, Darryl, Tully, Chris et al. (2002) Coordination and advocacy for rural elders (CARE): a model of rural case management with veterans. The Gerontologist 42(3): 399-405	- Study does not contain an intervention relevant to this review protocol
Rivolta, Massimo W and Sassi, Roberto (2017) Linear-Sigmoidal modelling of accelerometer features and Tinetti score for automatic fall risk assessment. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2017: 3810-3813	- Study does not contain an intervention relevant to this review protocol
Rodriguez-Molinero, Alejandro, Galvez-Barron, Cesar, Narvaiza, Leire et al. (2017) A two-question tool to assess the risk of repeated falls in the elderly. PloS one 12(5): e0176703	- Study does not contain an intervention relevant to this review protocol
Roeing, Kathleen L; Hsieh, Katherine L; Sosnoff, Jacob J (2017) A systematic review of balance and fall risk assessments with mobile phone technology. Archives of gerontology and geriatrics 73: 222-226	- Study does not contain an intervention relevant to this review protocol
Rosa, Marlene Cristina, Marques, Alda, Demain, Sara et al. (2015) Fast gait speed and self-perceived balance as valid predictors and discriminators of independent community walking at 6 months post-stroke--a preliminary study. Disability and rehabilitation 37(2): 129-34	- Population not relevant to this review protocol
Rosa, Matheus Vieira; Perracini, Monica Rodrigues; Ricci, Natalia Aquaroni (2019) Usefulness, assessment and normative data of the Functional Reach Test in older adults: A systematic review and meta-analysis. Archives of gerontology and geriatrics 81: 149-170	- Data not reported in an extractable format or a format that can be analysed
Rose, Debra J.; Jones, C. Jessie; Lucchese, Nicole (2002) Predicting the Probability of Falls in Community-Residing Older Adults Using the 8-Foot Up-and-Go: A New Measure of Functional Mobility. Journal of Aging and Physical Activity 10(4): 466-475	- Study does not contain an intervention relevant to this review protocol
Roy, R. and Chippala, P. (2024) Analysis of Fall Incidence Rate and Risk Factors at a Tertiary Care Hospital Setting for Inpatient Neurological Care using the Morse Fall Scale: A Prospective Study. Journal of Clinical and Diagnostic Research 18(1): yc15-yc18	- No useable outcome data

Study	Code [Reason]
Russell, Melissa A, Hill, Keith D, Blackberry, Irene et al. (2008) The reliability and predictive accuracy of the falls risk for older people in the community assessment (FROP-Com) tool. Age and ageing 37(6): 634-9	- Study does not contain an intervention relevant to this review protocol
Safieddine, Doha, Chkeir, Aly, Herlem, Cyrille et al. (2017) Identification of the period of stability in a balance test after stepping up using a simplified cumulative sum. Medical engineering & physics 49: 14-21	- Study does not contain an intervention relevant to this review protocol
Saho, Kenshi, Fujimoto, Masahiro, Kobayashi, Yoshiyuki et al. (2022) Experimental Verification of Micro-Doppler Radar Measurements of Fall-Risk-Related Gait Differences for Community-Dwelling Elderly Adults. Sensors (Basel, Switzerland) 22(3)	- Study does not contain an intervention relevant to this review protocol
Salzman, Brooke (2010) Gait and balance disorders in older adults. American family physician 82(1): 61-8	- Review article but not a systematic review
Sample, Renee Beach, Kinney, Allison L, Jackson, Kurt et al. (2017) Identification of key outcome measures when using the instrumented timed up and go and/or posturography for fall screening. Gait & posture 57: 168-171	- Study does not contain an intervention relevant to this review protocol
Sanders, Joost B, Bremmer, Marijke A, Comijs, Hannie C et al. (2017) Gait Speed and Processing Speed as Clinical Markers for Geriatric Health Outcomes. The American journal of geriatric psychiatry : official journal of the American Association for Geriatric Psychiatry 25(4): 374-385	- Data not reported in an extractable format or a format that can be analysed
Santos, Gilmar M, Souza, Ana C S, Virtuoso, Janeisa F et al. (2011) Predictive values at risk of falling in physically active and no active elderly with Berg Balance Scale. Revista brasileira de fisioterapia (Sao Carlos (Sao Paulo, Brazil)) 15(2): 95-101	- Study does not contain an intervention relevant to this review protocol
Sattar, Schroder, Kenis, Cindy, Haase, Kristen et al. (2020) Falls in older patients with cancer: Nursing and Allied Health Group of International Society of Geriatric Oncology review paper. Journal of geriatric oncology 11(1): 1-7	- Data not reported in an extractable format or a format that can be analysed
Schniepp, Roman, Huppert, Anna, Decker, Julian et al. (2021) Fall prediction in neurological gait disorders: differential contributions from clinical assessment, gait analysis, and daily-life mobility monitoring. Journal of neurology 268(9): 3421-3434	- Study does not contain an intervention relevant to this review protocol
Schoene, Daniel, Wu, Sandy M-S, Mikolaizak, A Stefanie et al. (2013) Discriminative ability and predictive validity of the timed up and go test in identifying older people who fall: systematic review and meta-analysis. Journal of the American Geriatrics Society 61(2): 202-8	- More recent systematic review included that covers the same topic
Schoenenberger, Andreas W, Bieri, Christoph, Ozguler, Onur et al. (2014) A novel multidimensional geriatric screening tool in the ED: evaluation of feasibility and clinical relevance. The American journal of emergency medicine 32(6): 623-8	- Study does not contain an intervention relevant to this review protocol
Schonwetter, Ronald S, Kim, Sehwan, Kirby, Jackie et al. (2010) Etiology of falls among cognitively intact hospice patients. Journal of palliative medicine 13(11): 1353-63	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Schoufour, Josje D, Echteld, Michael A, Bastiaanse, Luc P et al. (2015) The use of a frailty index to predict adverse health outcomes (falls, fractures, hospitalization, medication use, comorbid conditions) in people with intellectual disabilities. Research in developmental disabilities 38: 39-47	- Data not reported in an extractable format or a format that can be analysed
Schwendimann, R; De Geest, S; Milisen, K (2006) Evaluation of the Morse Fall Scale in hospitalised patients. Age and ageing 35(3): 311-3	- Not a peer-reviewed publication
Schwesig, Rene, Fischer, David, Lauenroth, Andreas et al. (2013) Can falls be predicted with gait analytical and posturographic measurement systems? A prospective follow-up study in a nursing home population. Clinical rehabilitation 27(2): 183-90	- Study does not contain an intervention relevant to this review protocol
Scott, Robin A, Oman, Kathleen S, Flarity, Kathleen et al. (2018) Above, Beyond, and Over the Side rails: Evaluating the New Memorial Emergency Department Fall-Risk-Assessment Tool. Journal of emergency nursing 44(5): 483-490	- Not a peer-reviewed publication
Scott, Vicky, Votova, Kristine, Scanlan, Andria et al. (2007) Multifactorial and functional mobility assessment tools for fall risk among older adults in community, home-support, long-term and acute care settings. Age and ageing 36(2): 130-9	- Study does not contain an intervention relevant to this review protocol
Scura, Daniel and Munakomi, Sunil (2022) Tinetti Gait and Balance Test.	- Study does not contain an intervention relevant to this review protocol
Seiger Cronfalk, Berit, Fjell, Astrid, Carstens, Nina et al. (2017) Health team for the elderly: a feasibility study for preventive home visits. Primary health care research & development 18(3): 242-252	- Study does not contain an intervention relevant to this review protocol
Senden, R, Savelberg, H H C M, Grimm, B et al. (2012) Accelerometry-based gait analysis, an additional objective approach to screen subjects at risk for falling. Gait & posture 36(2): 296-300	- Study does not contain an intervention relevant to this review protocol
Shah, M.N., Caprio, T.V., Swanson, P. et al. (2010) A novel emergency medical services-based program to identify and assist older adults in a rural community. Journal of the American Geriatrics Society 58(11): 2205-2211	- Study does not contain an intervention relevant to this review protocol
Sharma, Anjali, Hoover, Donald R, Shi, Qiuhu et al. (2019) Frailty as a predictor of falls in HIV-infected and uninfected women. Antiviral therapy 24(1): 51-61	- Population not relevant to this review protocol
Shea, Cristina A, Ward, Rachel E, Welch, Sarah A et al. (2018) Inability to Perform the Repeated Chair Stand Task Predicts Fall-Related Injury in Older Primary Care Patients. American journal of physical medicine & rehabilitation 97(6): 426-432	- Data not reported in an extractable format or a format that can be analysed

Study	Code [Reason]
Si, Huaxin, Jin, Yaru, Qiao, Xiaoxia et al. (2021) Predictive performance of 7 frailty instruments for short-term disability, falls and hospitalization among Chinese community-dwelling older adults: A prospective cohort study. International journal of nursing studies 117: 103875	- Study does not contain an intervention relevant to this review protocol
Silva, Joana; Sousa, Ines; Cardoso, Jaime S (2020) Fusion of Clinical, Self-Reported, and Multisensor Data for Predicting Falls. IEEE journal of biomedical and health informatics 24(1): 50-56	- Study does not contain an intervention relevant to this review protocol
Smulders, Katrijn, Esselink, Rianne A J, Weiss, Aner et al. (2012) Assessment of dual tasking has no clinical value for fall prediction in Parkinson's disease. Journal of neurology 259(9): 1840-7	- Study does not contain an intervention relevant to this review protocol
Sorensen, G.V., Jorgensen, M.G., Ryg, J. et al. (2019) Development, feasibility, acceptability, and adjustment of a portable, multifactorial falls risk test battery for community-dwelling older adults. Cogent Medicine 6(1): 1674099	- Study does not contain an intervention relevant to this review protocol
Soto, D. and Fogel, J.F. (2012) Do physicians in-training assess for falls among the elderly population in the outpatient setting?. Journal of the American Geriatrics Society 60(suppl4): 158	- Conference abstract
Southerland, Lauren T, Slattery, Lauren, Rosenthal, Joseph A et al. (2017) Are triage questions sufficient to assign fall risk precautions in the ED?. The American journal of emergency medicine 35(2): 329-332	- Study does not contain an intervention relevant to this review protocol
Sri-On, Jiraporn, Tirrell, Gregory Philip, Kamsom, Anucha et al. (2018) A High-yield Fall Risk and Adverse Events Screening Questions From the Stopping Elderly Accidents, Death, and Injuries (STEADI) Guideline for Older Emergency Department Fall Patients. Academic emergency medicine : official journal of the Society for Academic Emergency Medicine 25(8): 927-938	- Study does not contain an intervention relevant to this review protocol
Sternberg, Shelley A, Bentur, Netta, Abrams, Chad et al. (2012) Identifying frail older people using predictive modeling. The American journal of managed care 18(10): e392-7	- Study does not contain an intervention relevant to this review protocol
Strini, Veronica; Schiavolin, Roberta; Prendin, Angela (2021) Fall Risk Assessment Scales: A Systematic Literature Review. Nursing reports (Pavia, Italy) 11(2): 430-443	- Data not reported in an extractable format or a format that can be analysed
Suh, Minhee and Cho, Insook (2021) Effectiveness of nursing care provided for fall prevention: Survival analysis of nursing records in a tertiary hospital. Japan journal of nursing science : JJNS 18(2): e12403	- Study does not contain an intervention relevant to this review protocol
Swanenburg, Jaap, de Bruin, Eling D, Uebelhart, Daniel et al. (2010) Falls prediction in elderly people: a 1-year prospective study. Gait & posture 31(3): 317-21	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Tan, L F, Chan, Y H, Tay, A et al. (2021) Practicality and Reliability of Self Vs Administered Rapid Geriatric Assessment Mobile App. The journal of nutrition, health & aging 25(9): 1064-1069	- Study does not contain an intervention relevant to this review protocol
Tapper, Elliot B, Finkelstein, Daniel, Mittleman, Murray A et al. (2015) Standard assessments of frailty are validated predictors of mortality in hospitalized patients with cirrhosis. Hepatology (Baltimore, Md.) 62(2): 584-90	- Study does not contain an intervention relevant to this review protocol
Tatum Iii, Paul E; Talebreza, Shaida; Ross, Jeanette S (2018) Geriatric Assessment: An Office-Based Approach. American family physician 97(12): 776-784	- Study does not contain an intervention relevant to this review protocol
Terry, Kevin; Stanley, Christopher; Damiano, Diane (2014) A new perspective on the walking margin of stability. Journal of applied biomechanics 30(6): 737-41	- Study does not contain an intervention relevant to this review protocol
Thapa, P B, Gideon, P, Brockman, K G et al. (1996) Clinical and biomechanical measures of balance as fall predictors in ambulatory nursing home residents. The journals of gerontology. Series A, Biological sciences and medical sciences 51(5): m239-46	- Study does not contain an intervention relevant to this review protocol
Thomas, J and O'Neal, S (2019) Relationship of Functional Reach Test scores and falls in Special Olympics athletes. Journal of intellectual disability research : JIDR 63(6): 587-592	- Population not relevant to this review protocol
Tideiksaar, R (1993) Falls in older persons. The Mount Sinai journal of medicine, New York 60(6): 515-21	- Data not reported in an extractable format or a format that can be analysed
Tiedemann A, Shimada H, Sherrington C et al. (2008) The comparative ability of eight functional mobility tests for predicting falls in community-dwelling older people. Age and ageing 37(4): 430-435	- Study does not contain an intervention relevant to this review protocol
Tijsma, Mylou, Vister, Eva, Hoang, Phu et al. (2017) A simple test of choice stepping reaction time for assessing fall risk in people with multiple sclerosis. Disability and rehabilitation 39(6): 601-607	- Study does not contain an intervention relevant to this review protocol
Tilson, Julie K, Wu, Samuel S, Cen, Steven Y et al. (2012) Characterizing and identifying risk for falls in the LEAPS study: a randomized clinical trial of interventions to improve walking poststroke. Stroke 43(2): 446-52	- Study does not contain an intervention relevant to this review protocol
Tipping, Claire J, Hodgson, Carol L, Harrold, Meg et al. (2019) Frailty in Patients With Trauma Who Are Critically Ill: A Prospective Observational Study to Determine Feasibility, Concordance, and Construct and Predictive Validity of 2 Frailty Measures. Physical therapy 99(8): 1089-1097	- Data not reported in an extractable format or a format that can be analysed

Study	Code [Reason]
Topper, A K; Maki, B E; Holliday, P J (1993) Are activity-based assessments of balance and gait in the elderly predictive of risk of falling and/or type of fall?. Journal of the American Geriatrics Society 41(5): 479-87	- Study does not contain an intervention relevant to this review protocol
Tripathy, Soumya Ranjan; Chakravarty, Kingshuk; Sinha, Aniruddha (2018) Eigen Posture Based Fall Risk Assessment System Using Kinect. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2018: 1-4	- Study does not contain an intervention relevant to this review protocol
Trinh, Vincent Quoc-Nam, Zhang, Steven, Kovoor, Joshua et al. (2023) The use of natural language processing in detecting and predicting falls within the healthcare setting: a systematic review. International journal for quality in health care : journal of the International Society for Quality in Health Care 35(4)	- Systematic review used as a source of primary papers
Tsai, Chang-Lin, Lai, Yun-Ru, Lien, Chia-Yi et al. (2022) Feasibility of Combining Disease-Specific and Balance-Related Measures as Risk Predictors of Future Falls in Patients with Parkinson's Disease. Journal of clinical medicine 12(1)	- Study does not contain an intervention relevant to this review protocol
Trueblood, Peggy R., Hodson-Chennault, Nichole, McCubbin, Annette et al. (2001) Performance and Impairment-Based Assessments Among Community Dwelling Elderly: Sensitivity and Specificity. Journal of Geriatric Physical Therapy 24(1)	- Study does not contain an intervention relevant to this review protocol (TUG not cut off reported)
Tsang, Charlotte S L, Lam, Freddy M H, Leung, Jason C S et al. (2023) Balance Confidence Modulates the Association of Gait Speed With Falls in Older Fallers: A Prospective Cohort Study. Journal of the American Medical Directors Association 24(12): 2002-2008	- No useable outcome data
Tueth, Lauren Elizabeth; Earhart, Gammon M; Rawson, Kerri Sharp (2021) Association between falls in Alzheimer disease and scores on the Balance Evaluation Systems Test (BESTest) and MiniBESTest. Somatosensory & motor research 38(3): 248-252	- Study does not contain an intervention relevant to this review protocol
Ullrich, Martin, Roth, Nils, Kuderle, Arne et al. (2022) Fall Risk Prediction in Parkinson's Disease Using Real-World Inertial Sensor Gait Data. IEEE journal of biomedical and health informatics pp	- Study does not contain an intervention relevant to this review protocol
Urbanek, Jacek K, Roth, David L, Karas, Marta et al. (2022) Free-living gait cadence measured by wearable accelerometer: a promising alternative to traditional measures of mobility for assessing fall risk. The journals of gerontology. Series A, Biological sciences and medical sciences	- Study does not contain an intervention relevant to this review protocol
van Rie, Kayla J; Kanji, Amisha; Naude, Alida (2022) Professional Guidelines and Reported Practice of Audiologists Performing Fall Risk Assessment With Older Adults: A Systematic Review. American journal of audiology 31(1): 243-260	- Study does not contain an intervention relevant to this review protocol
Vassallo, Michael, Stockdale, Rachel, Sharma, Jagdish C et al. (2005) A comparative study of the use of four fall risk assessment tools on acute medical wards. Journal of the American Geriatrics Society 53(6): 1034-8	- Duplicate reference
Vellas, B J, Wayne, S J, Romero, L et al. (1997) One-leg balance is an important predictor of injurious falls in older persons. Journal of the American Geriatrics Society 45(6): 735-8	- Data not reported in an extractable format or a format that can be analysed

Study	Code [Reason]
Verghese, Joe, Ambrose, Anne F, Lipton, Richard B et al. (2010) Neurological gait abnormalities and risk of falls in older adults. Journal of neurology 257(3): 392-8	- Study does not contain an intervention relevant to this review protocol
Viccaro, Laura J; Perera, Subashan; Studenski, Stephanie A (2011) Is timed up and go better than gait speed in predicting health, function, and falls in older adults?. Journal of the American Geriatrics Society 59(5): 887-92	- Data not reported in an extractable format or a format that can be analysed
Vlaeyen E, Poels J, Colemonts U et al. (2021) Predicting Falls in Nursing Homes: A Prospective Multicenter Cohort Study Comparing Fall History, Staff Clinical Judgment, the Care Home Falls Screen, and the Fall Risk Classification Algorithm. Journal of the American Medical Directors Association 22(2): 380-387	- Study does not contain an intervention relevant to this review protocol
Volrathongchai, Kanittha; Brennan, Patricia F; Ferris, Michael C (2005) Predicting the likelihood of falls among the elderly using likelihood basis pursuit technique. AMIA ... Annual Symposium proceedings. AMIA Symposium: 764-8	- Study does not contain an intervention relevant to this review protocol
Vratsistas-Curto, Angela, Tiedemann, Anne, Treacy, Daniel et al. (2018) External validation of approaches to prediction of falls during hospital rehabilitation stays and development of a new simpler tool. Journal of rehabilitation medicine 50(2): 216-222	- Study does not contain an intervention relevant to this review protocol
Vuong, Kenny, Canning, Colleen G, Menant, Jasmine C et al. (2018) Gait, balance, and falls in Huntington disease. Handbook of clinical neurology 159: 251-260	- Study does not contain an intervention relevant to this review protocol
Wang, Ya-Ping, Dai, Can, Ou-Yang, Ping et al. (2024) Evaluation of a concise fall risk stratification among older adults with cataracts in day surgery settings: A historically controlled study. Japan journal of nursing science : JJNS 21(2): e12579	- Study design not relevant to this review protocol
Welburn, Sharon C, Fanning, Erin E, Cauley, Jane A et al. (2023) Role of Perceived Physical and Mental Fatigability Severity on Prospective, Recurrent, and Injurious Fall Risk in Older Men. The journals of gerontology. Series A, Biological sciences and medical sciences 78(9): 1669-1676	- No useable outcome data
Welch, Sarah A, Ward, Rachel E, Beauchamp, Marla K et al. (2021) The Short Physical Performance Battery (SPPB): A Quick and Useful Tool for Fall Risk Stratification Among Older Primary Care Patients. Journal of the American Medical Directors Association 22(8): 1646-1651	- Data not reported in an extractable format or a format that can be analysed
Wettasinghe, Asha H, Dissanayake, Dilshani W N, Allet, Lara et al. (2020) Falls in older people with diabetes: Identification of simple screening measures and explanatory risk factors. Primary care diabetes 14(6): 723-728	- Study does not contain an intervention relevant to this review protocol
Whitney, Julie, Close, Jacqueline C T, Lord, Stephen R et al. (2012) Identification of high risk fallers among older people living in residential care facilities: a simple screen based on easily collectable measures. Archives of gerontology and geriatrics 55(3): 690-5	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Whitney, Susan L, Marchetti, Gregory F, Schade, Annika et al. (2004) The sensitivity and specificity of the Timed "Up & Go" and the Dynamic Gait Index for self-reported falls in persons with vestibular disorders. Journal of vestibular research : equilibrium & orientation 14(5): 397-409	- Study does not contain an intervention relevant to this review protocol
Whitney, Julie C; Lord, Stephen R; Close, Jacqueline C T (2005) Streamlining assessment and intervention in a falls clinic using the Timed Up and Go Test and Physiological Profile Assessments. Age and ageing 34(6): 567-71	- Study design not relevant to this review protocol
Widagdo, Imaina S, Pratt, Nicole, Russell, Mary et al. (2015) Predictive performance of four frailty measures in an older Australian population. Age and ageing 44(6): 967-72	- Study does not contain an intervention relevant to this review protocol
Wilbur, Jason, Jogerst, Gerald, Butler, Nicholas et al. (2022) How accurate are geriatricians' fall predictions?. BMC geriatrics 22(1): 436	- Population not relevant to this review protocol
Winser, Stanley J, Kannan, Priya, Bello, Umar Muhhamad et al. (2019) Measures of balance and falls risk prediction in people with Parkinson's disease: a systematic review of psychometric properties. Clinical rehabilitation 33(12): 1949-1962	- Study does not contain an intervention relevant to this review protocol
Wolfson, L I, Whipple, R, Amerman, P et al. (1986) Stressing the postural response. A quantitative method for testing balance. Journal of the American Geriatrics Society 34(12): 845-50	- Study does not contain an intervention relevant to this review protocol
Wong Shee, Annkarin; Phillips, Bev; Hill, Keith (2012) Comparison of two fall risk assessment tools (FRATs) targeting falls prevention in sub-acute care. Archives of gerontology and geriatrics 55(3): 653-9	- Study design not relevant to this review protocol
Wood, Tyler A; Wajda, Douglas A; Sosnoff, Jacob J (2019) Use of a Short Version of the Activities-specific Balance Confidence Scale in Multiple Sclerosis. International journal of MS care 21(1): 15-21	- Study does not contain an intervention relevant to this review protocol
Wright, Jonathan R, Koch-Hanes, Trisha, Cortney, Ciera et al. (2022) Planning for Safe Hospital Discharge by Identifying Patients Likely to Fall After Discharge. Physical therapy 102(2)	- Study does not contain an intervention relevant to this review protocol
Xia, Lixia, Zheng, Yining, Lin, Zheng et al. (2022) Gap between risk factors and prevention strategies? A nationwide survey of fall prevention among medical and surgical patients. Journal of advanced nursing 78(8): 2472-2481	- Study does not contain an intervention relevant to this review protocol
Yamada, Minoru and Ichihashi, Noriaki (2010) Predicting the probability of falls in community-dwelling elderly individuals using the trail-walking test. Environmental health and preventive medicine 15(6): 386-91	- Study does not contain an intervention relevant to this review protocol
Yang, Yaqin, Wang, Yongjun, Zhou, Yanan et al. (2014) Validity of the Functional Gait Assessment in patients with Parkinson disease: construct, concurrent, and predictive validity. Physical therapy 94(3): 392-400	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Yelnik, A and Bonan, I (2008) Clinical tools for assessing balance disorders. Neurophysiologie clinique = Clinical neurophysiology 38(6): 439-45	- Data not reported in an extractable format or a format that can be analysed
Yingyongyudha, Anyamanee, Saengsirisuwan, Vitoon, Panichaporn, Wanvisa et al. (2016) The Mini-Balance Evaluation Systems Test (Mini-BESTest) Demonstrates Higher Accuracy in Identifying Older Adult Participants With History of Falls Than Do the BESTest, Berg Balance Scale, or Timed Up and Go Test. Journal of geriatric physical therapy (2001) 39(2): 64-70	- Study does not contain an intervention relevant to this review protocol
Zasadzka, Ewa, Borowicz, Adrianna Maria, Roszak, Magdalena et al. (2015) Assessment of the risk of falling with the use of timed up and go test in the elderly with lower extremity osteoarthritis. Clinical interventions in aging 10: 1289-98	- Data not reported in an extractable format or a format that can be analysed
Zaslavsky, Oleg, Zelber-Sagi, Shira, LaCroix, Andrea Z et al. (2017) Comparison of the Simplified sWHI and the Standard CHS Frailty Phenotypes for Prediction of Mortality, Incident Falls, and Hip Fractures in Older Women. The journals of gerontology. Series A, Biological sciences and medical sciences 72(10): 1394-1400	- Study does not contain an intervention relevant to this review protocol
Zhou, Rong; Li, Jiayu; Chen, Meiling (2022) The Value of Cognitive and Physical Function Tests in Predicting Falls in Older Adults: A Prospective Study. Frontiers in medicine 9: 900488	- Study does not contain an intervention relevant to this review protocol
Zhou, Yuhan, Zia Ur Rehman, Rana, Hansen, Clint et al. (2020) Classification of Neurological Patients to Identify Fallers Based on Spatial-Temporal Gait Characteristics Measured by a Wearable Device. Sensors (Basel, Switzerland) 20(15)	- Study does not contain an intervention relevant to this review protocol
Zhou, Jian, Liu, Bo, Ye, Hui et al. (2023) A prospective cohort study on the association between new falls and balancing ability among older adults over 80 years who are independent. Experimental gerontology 180: 112259	- Study does not contain an intervention relevant to this review protocol (TUG <15 seconds cut off)
Zhu, Kun, Devine, Amanda, Lewis, Joshua R et al. (2011) "'Timed up and go' test and bone mineral density measurement for fracture prediction. Archives of internal medicine 171(18): 1655-61	- Data not reported in an extractable format or a format that can be analysed
Ziegl, Andreas, Hayn, Dieter, Kastner, Peter et al. (2020) Machine Learning Based Walking Aid Detection in Timed Up-and-Go Test Recordings of Elderly Patients. Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference 2020: 808-811	- Population not relevant to this review protocol
Zijlstra, A, Ufkes, T, Skelton, D A et al. (2008) Do dual tasks have an added value over single tasks for balance assessment in fall prevention programs? A mini-review. Gerontology 54(1): 40-9	- Study does not contain an intervention relevant to this review protocol

Study	Code [Reason]
Zur, Oz, Berner, Yitshal, Ohel, Yair et al. (2018) Two-Year Follow-Up of Fall Prediction Among Older Adults in an Independent-Living Community. Advances in experimental medicine and biology 1040: 63-71	- Study does not contain an intervention relevant to this review protocol

J.2 Health Economic studies

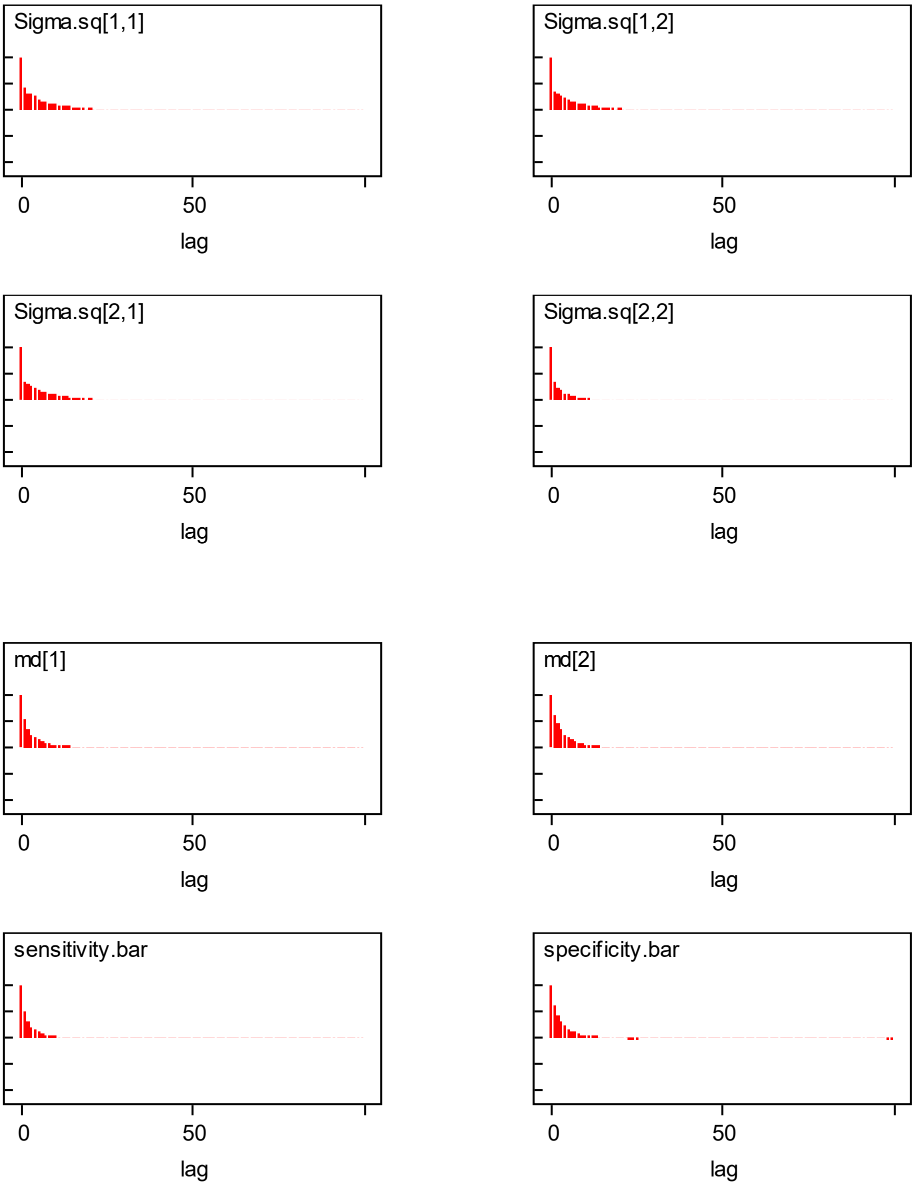
Published health economic studies that met the inclusion criteria (relevant population, comparators, economic study design, published 2008 or later and not from non-OECD country or USA) but that were excluded following appraisal of applicability and methodological quality are listed below. See the health economic protocol for more details.

Table 23: Studies excluded from the health economic review

Reference	Reason for exclusion
Kim, Taekyoung; Yu, Xiaoqun; Xiong, Shuping (2024) A multifactorial fall risk assessment system for older people utilizing a low-cost, markerless Microsoft Kinect. Ergonomics 67(1): 50-68	Excluded as rated as not applicable. This is not a full cost-effective study and the intervention takes longer than 5 minutes to complete.
Smith, M. I., de Lusignan, S., Mullett, D. et al. (2016) Predicting Falls and When to Intervene in Older People: A Multilevel Logistical Regression Model and Cost Analysis. PLoS ONE [Electronic Resource] 11(7): e0159365	Excluded as rated not applicable. This is not a comparative analysis

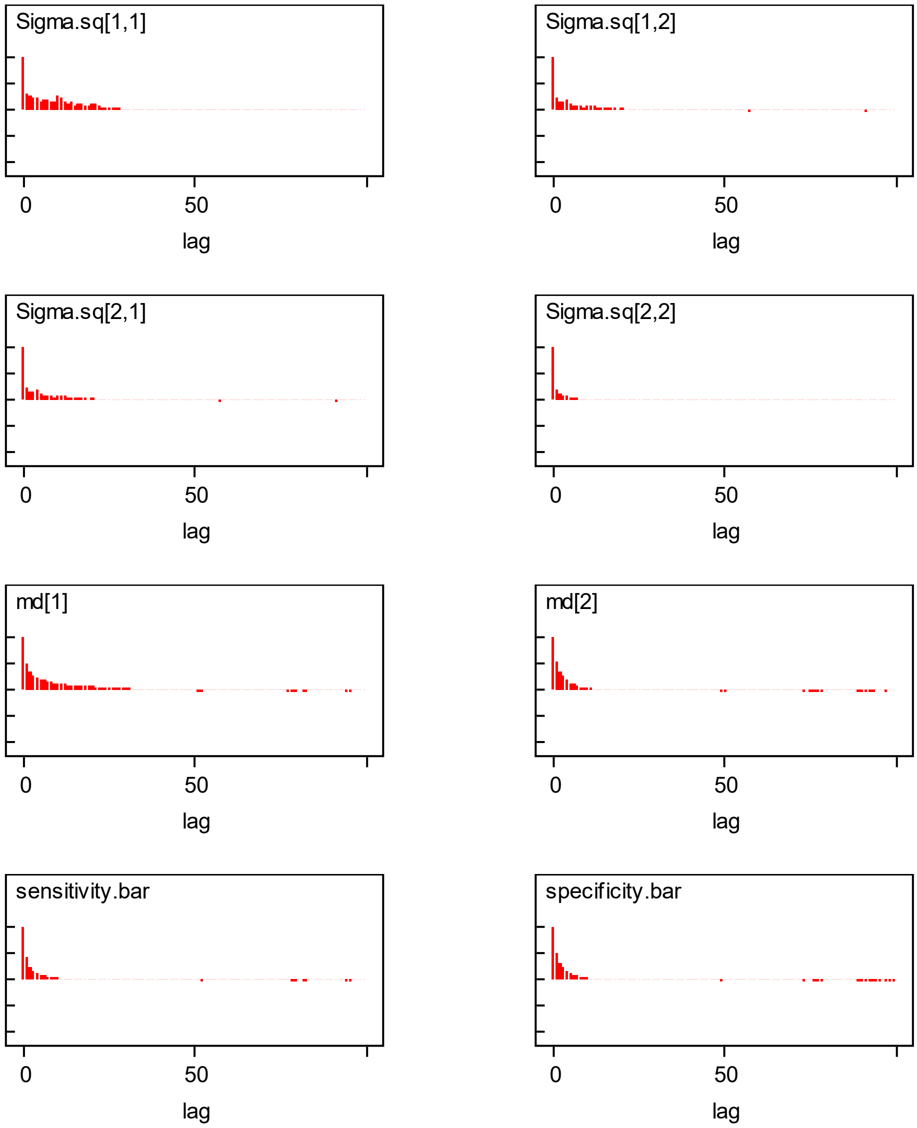
Appendix K Winbugs output

Figure 72: **OpenBUGS output- Downton Falls Risk Index (cut-off 3)**



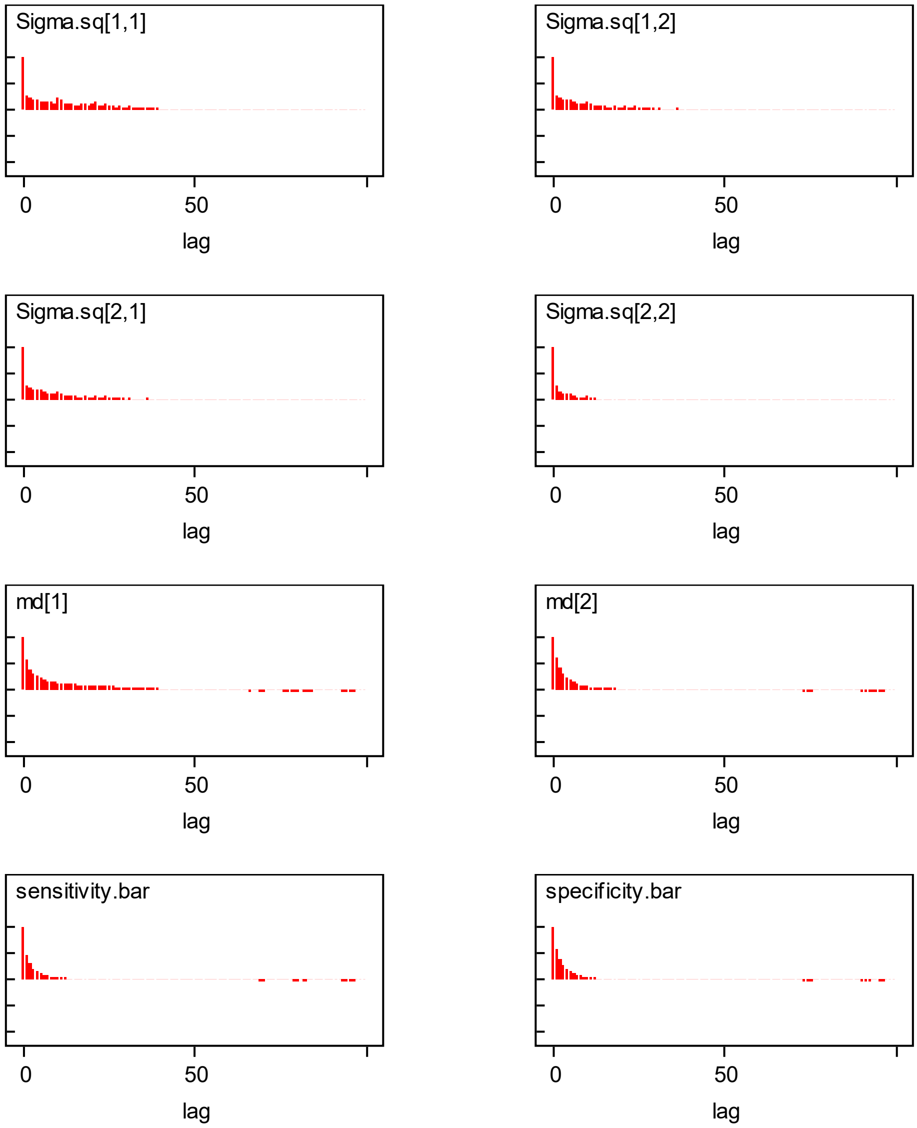
	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
Sigma.sq[1,1]	0.8194	1.187	0.01283	0.1764	0.5563	3.024	60001	60000
Sigma.sq[1,2]	0.6735	1.283	0.01342	-0.3239	0.4145	3.187	60001	60000
Sigma.sq[2,1]	0.6735	1.283	0.01342	-0.3239	0.4145	3.187	60001	60000
Sigma.sq[2,2]	1.8	2.662	0.02337	0.2391	1.115	7.625	60001	60000
md[1]	0.03932	0.4134	0.003986	-0.7722	0.04317	0.8337	60001	60000
md[2]	-0.2689	0.6853	0.007558	-1.618	-0.2726	1.112	60001	60000
sensitivity.bar	0.5098	0.09494	8.221E-4	0.316	0.5108	0.6971	60001	60000
specificity.bar	0.4391	0.1456	0.001523	0.1655	0.4323	0.7526	60001	60000

Figure 73: **OpenBUGS output- Gait speed (Self-selected walking speed)**



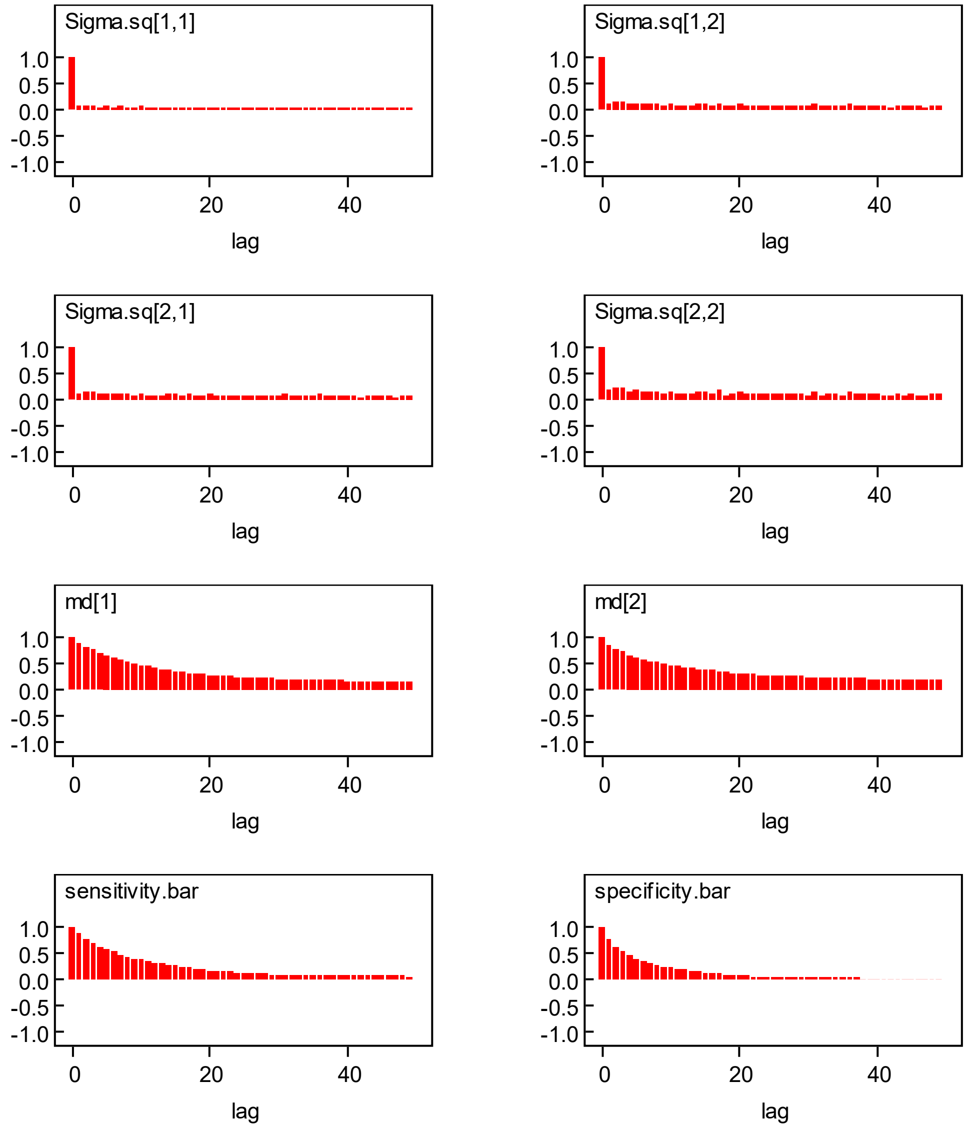
	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
Sigma.sq[1,1]	1.12	5.837	0.07306	0.1172	0.4655	5.224	60001	60000
Sigma.sq[1,2]	0.09056	3.405	0.03107	-1.746	0.02563	2.129	60001	60000
Sigma.sq[2,1]	0.09056	3.405	0.03107	-1.746	0.02563	2.129	60001	60000
Sigma.sq[2,2]	1.381	8.228	0.0532	0.1266	0.5496	6.592	60001	60000
md[1]	0.477	0.6123	0.007583	-0.6297	0.4866	1.576	60001	60000
md[2]	0.5698	0.7258	0.006469	-0.8569	0.5696	1.975	60001	60000
sensitivity.bar	0.6117	0.1173	9.984E-4	0.3476	0.6193	0.8286	60001	60000
specificity.bar	0.6282	0.1375	0.001199	0.298	0.6387	0.8781	60001	60000

Figure 74: **OpenBUGS output- Hendrich II Falls Risk Model (cut-off ≥5)**



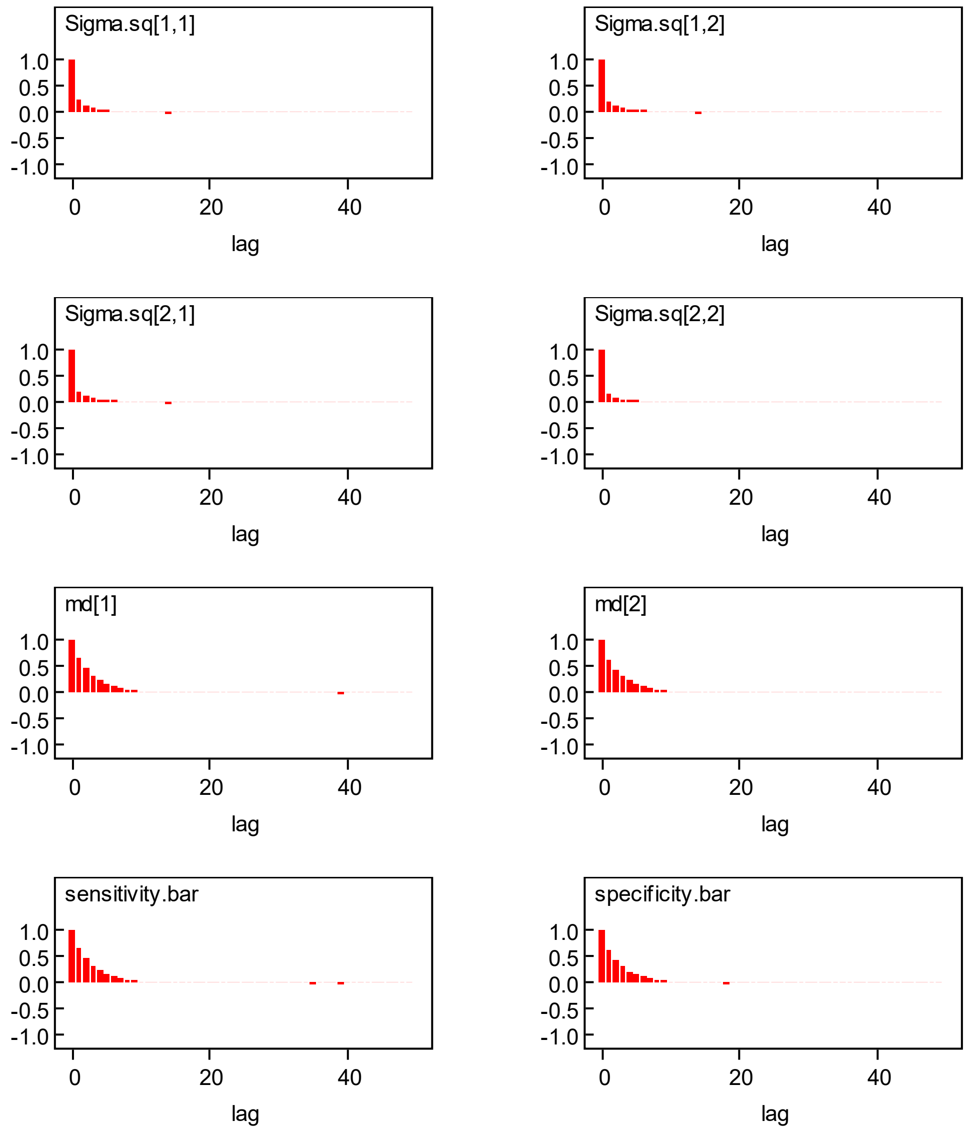
mean sd	**MC_error**		**val2.5pcmedian**		**val97.5pc**		**start**	**sample**
Sigma.sq[1,1]	1.624	6.996	0.07113	0.1708	0.6914	7.834	60001	60000
Sigma.sq[1,2]	0.514	4.489	0.04449	-1.649	0.1886	4.413	60001	60000
Sigma.sq[2,1]	0.514	4.489	0.04449	-1.649	0.1886	4.413	60001	60000
Sigma.sq[2,2]	1.89	6.955	0.05499	0.1638	0.7646	9.836	60001	60000
md[1]	0.6126	0.7371	0.007927	-0.7709	0.6265	1.944	60001	60000
md[2]	0.5784	0.85	0.008927	-1.118	0.5814	2.234	60001	60000
sensitivity.bar	0.6392	0.1348	0.001154	0.3163	0.6517	0.8748	60001	60000
specificity.bar	0.6266	0.1575	0.001522	0.2463	0.6414	0.9032	60001	60000

Figure 75: **OpenBUGS output- STRATIFY (cut-off value ≥1)**



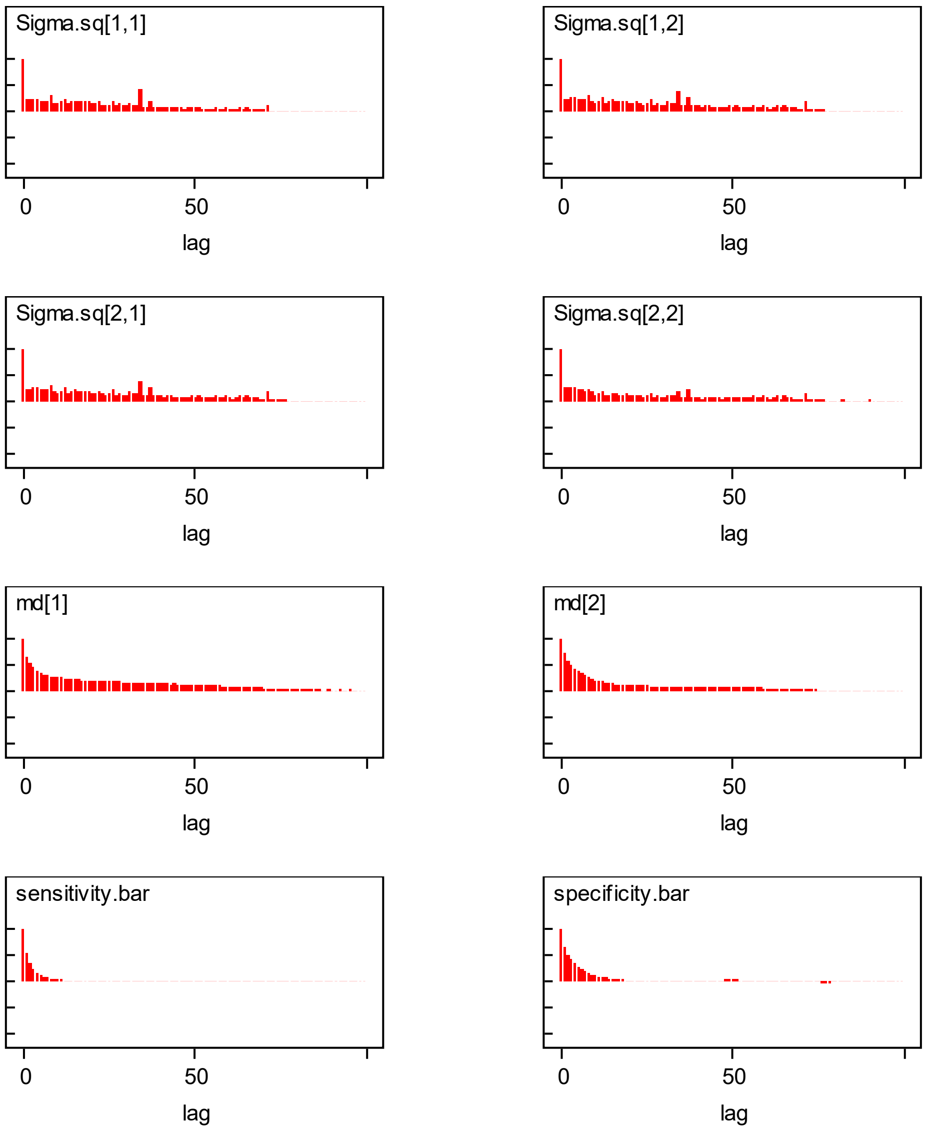
	mean	sd	MC error	2.5%	median	97.5%	start	sample
Sigma.sq[1,1]	8.789	71.48	0.647	0.3639	3.105	45.46	60001	60000
Sigma.sq[1,2]	-9.186	70.44	0.8581	-46.69	-3.344	0.2426	60001	60000
Sigma.sq[2,1]	-9.186	70.44	0.8581	-46.69	-3.344	0.2426	60001	60000
Sigma.sq[2,2]	14.21	88.84	1.273	1.229	5.578	67.94	60001	60000
md[1]	1.677	1.723	0.04113	-2.102	1.832	4.553	60001	60000
md[2]	0.287	2.176	0.0537	-3.484	0.1772	4.537	60001	60000
sensitivity.bar	0.7863	0.2149	0.004208	0.1089	0.862	0.9896	60001	60000
specificity.bar	0.5357	0.2745	0.004255	0.02977	0.5442	0.9894	60001	60000

Figure 76**: OpenBUGS output- STRATIFY (cut-off value ≥2)- Hospital setting**



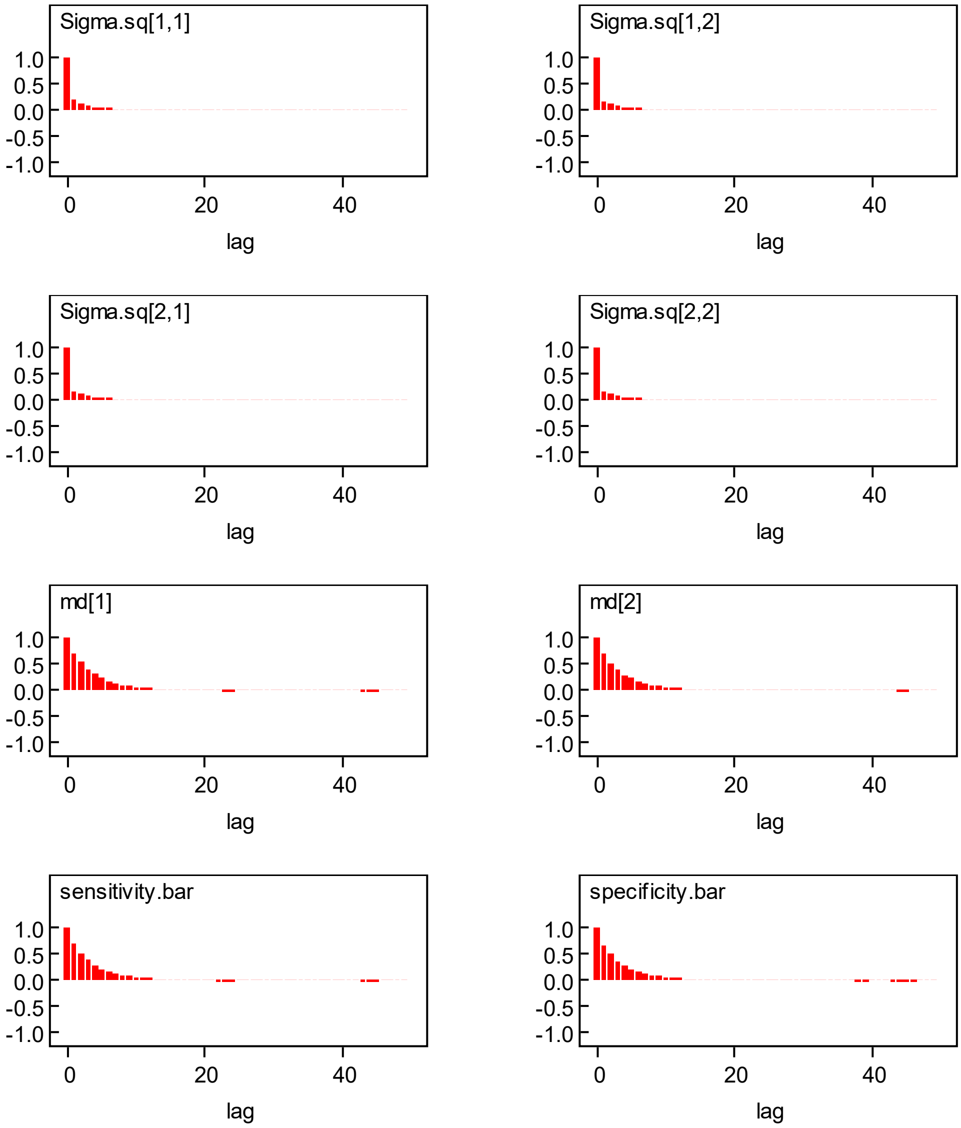
	mean	**sd**	**MC error**	**2.5%**	**median**	**97.5%**	**start**	**sample**
Sigma.sq[1,1]	2.118	1.834	0.01171	0.561	1.63	6.577	60001	60000
Sigma.sq[1,2]	-1.477	1.446	0.009493	-4.968	-1.115	-0.1308	60001	60000
Sigma.sq[2,1]	-1.477	1.446	0.009493	-4.968	-1.115	-0.1308	60001	60000
Sigma.sq[2,2]	1.908	1.585	0.009782	0.5421	1.487	5.812	60001	60000
md[1]	0.1573	0.5701	0.004837	-0.9987	0.1623	1.296	60001	60000
md[2]	0.8425	0.5262	0.004389	-0.217	0.84	1.916	60001	60000
sensitivity.bar	0.5367	0.1292	0.00108	0.2692	0.5405	0.7852	60001	60000
specificity.bar	0.6887	0.1063	8.57E-4	0.446	0.6985	0.8717	60001	60000

Figure 77: **OpenBUGS output- STRATIFY (cut-off value ≥3)- Hospital setting**



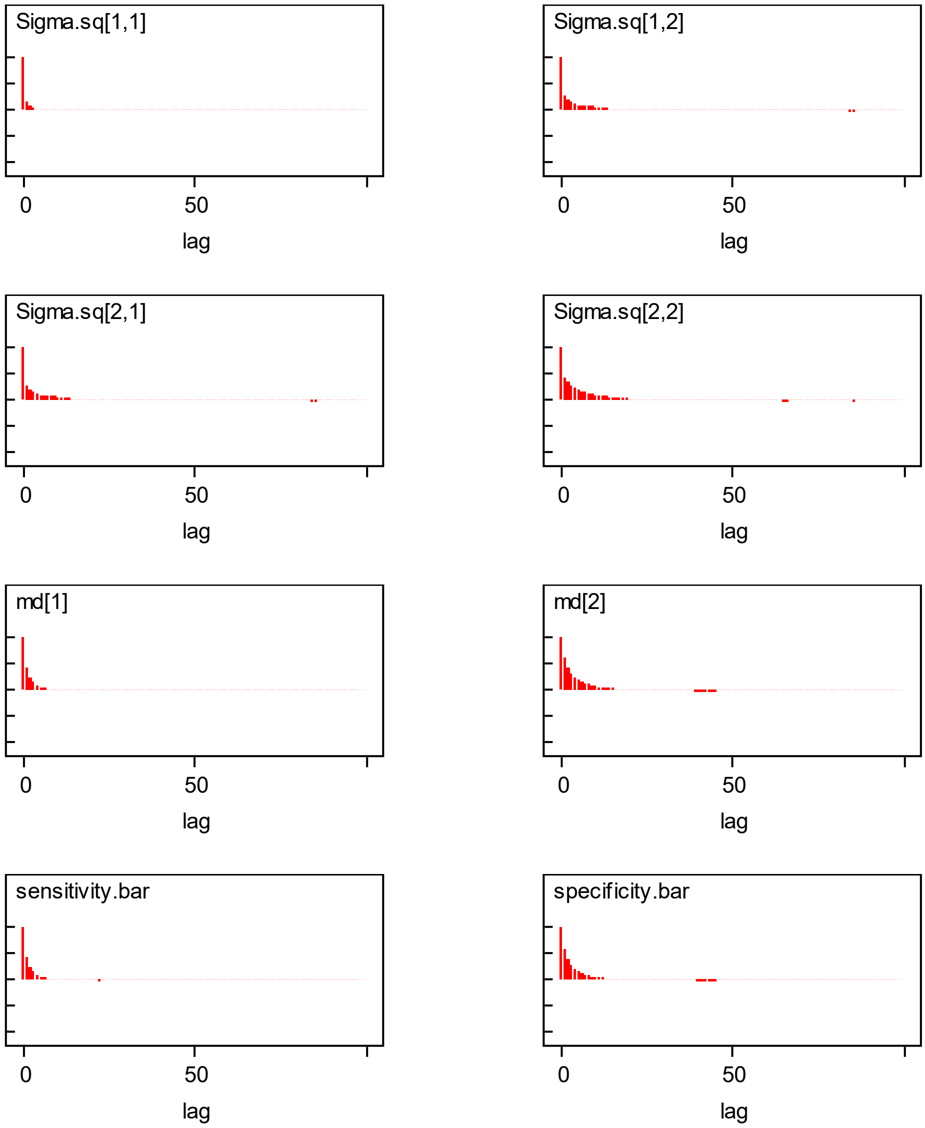
	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
Sigma.sq[1,1]	1.564	10.36	0.1875	0.2399	0.8247	6.064	60001	60000
Sigma.sq[1,2]	1.453	10.99	0.2182	-0.7555	0.6222	6.993	60001	60000
Sigma.sq[2,1]	1.453	10.99	0.2182	-0.7555	0.6222	6.993	60001	60000
Sigma.sq[2,2]	4.057	16.36	0.2888	0.2409	1.794	19.75	60001	60000
md[1]	1.139	0.6733	0.01477	0.002106	1.118	2.352	60001	60000
md[2]	1.155	1.19	0.02193	-1.232	1.208	3.263	60001	60000
sensitivity.bar	0.7421	0.1026	9.813E-4	0.5005	0.7535	0.9131	60001	60000
specificity.bar	0.7239	0.1822	0.002247	0.2259	0.77	0.9631	60001	60000

Figure 78: **OpenBUGS output- Timed Up and Go test**



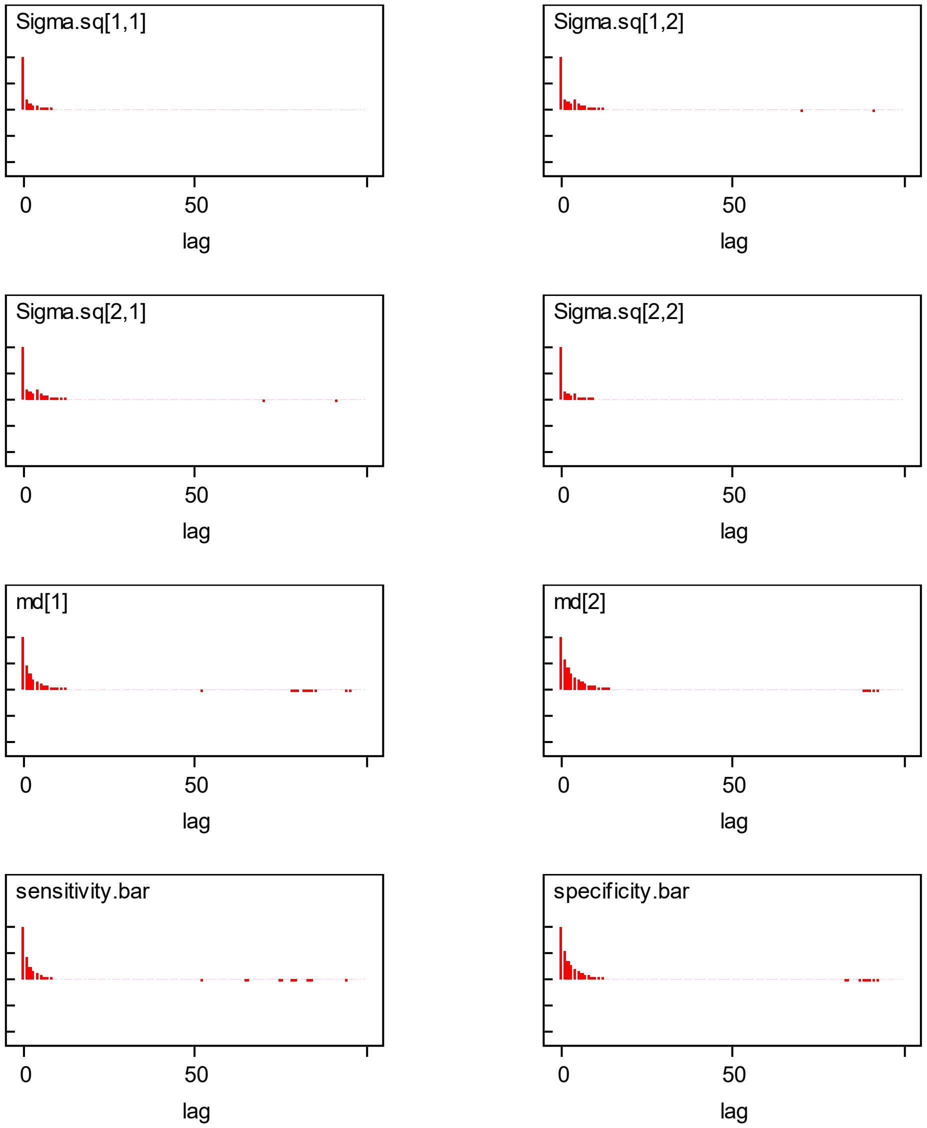
	mean	sd	MC error	2.5%	median	97.5%	start	sample
Sigma.sq[1,1]	1.616	1.552	0.01088	0.4074	1.203	5.361	60001	60000
Sigma.sq[1,2]	-1.761	1.854	0.01185	-6.083	-1.283	-0.2593	60001	60000
Sigma.sq[2,1]	-1.761	1.854	0.01185	-6.083	-1.283	-0.2593	60001	60000
Sigma.sq[2,2]	3.132	3.056	0.01737	0.8049	2.329	10.17	60001	60000
md[1]	0.06348	0.5289	0.005608	-0.9954	0.06061	1.13	60001	60000
md[2]	1.015	0.7161	0.007605	-0.4153	1.013	2.474	60001	60000
sensitivity.bar	0.5148	0.1214	0.001262	0.2699	0.5151	0.7559	60001	60000
specificity.bar	0.7147	0.1329	0.001375	0.3976	0.7335	0.9223	60001	60000

Figure 79: **OpenBUGS output- Timed Up and Go test- Community setting**



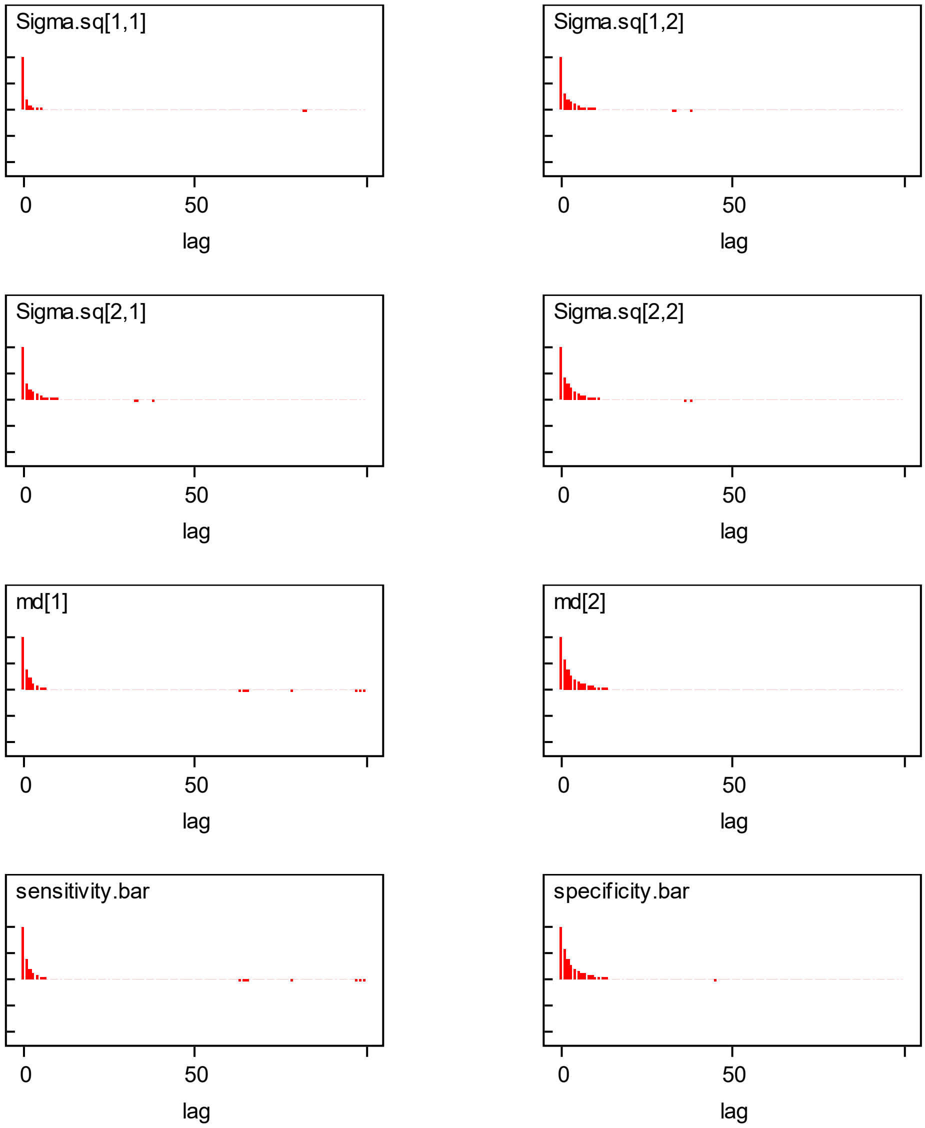
	mean	**sd**	**MC_error**	**val2.5pc**	**median**	**val97.5pc**	**start**	**sample**
Sigma.sq[1,1]	0.5316	0.5654	0.003287	0.1415	0.3969	1.733	60001	60000
Sigma.sq[1,2]	0.457	0.7956	0.006847	-0.2398	0.2975	2.076	60001	60000
Sigma.sq[2,1]	0.457	0.7956	0.006847	-0.2398	0.2975	2.076	60001	60000
Sigma.sq[2,2]	1.577	2.419	0.0267	0.191	0.9524	6.623	60001	60000
md[1]	0.5795	0.2989	0.002308	-0.01861	0.5795	1.182	60001	60000
md[2]	0.8653	0.6081	0.006654	-0.2426	0.8275	2.18	60001	60000
sensitivity.bar	0.6382	0.067	5.047E-4	0.4953	0.6409	0.7653	60001	60000
specificity.bar	0.6904	0.114	0.001174	0.4397	0.6958	0.8984	60001	60000

Figure 80: **OpenBUGS output- Downton Falls Risk Index- Hospital setting**



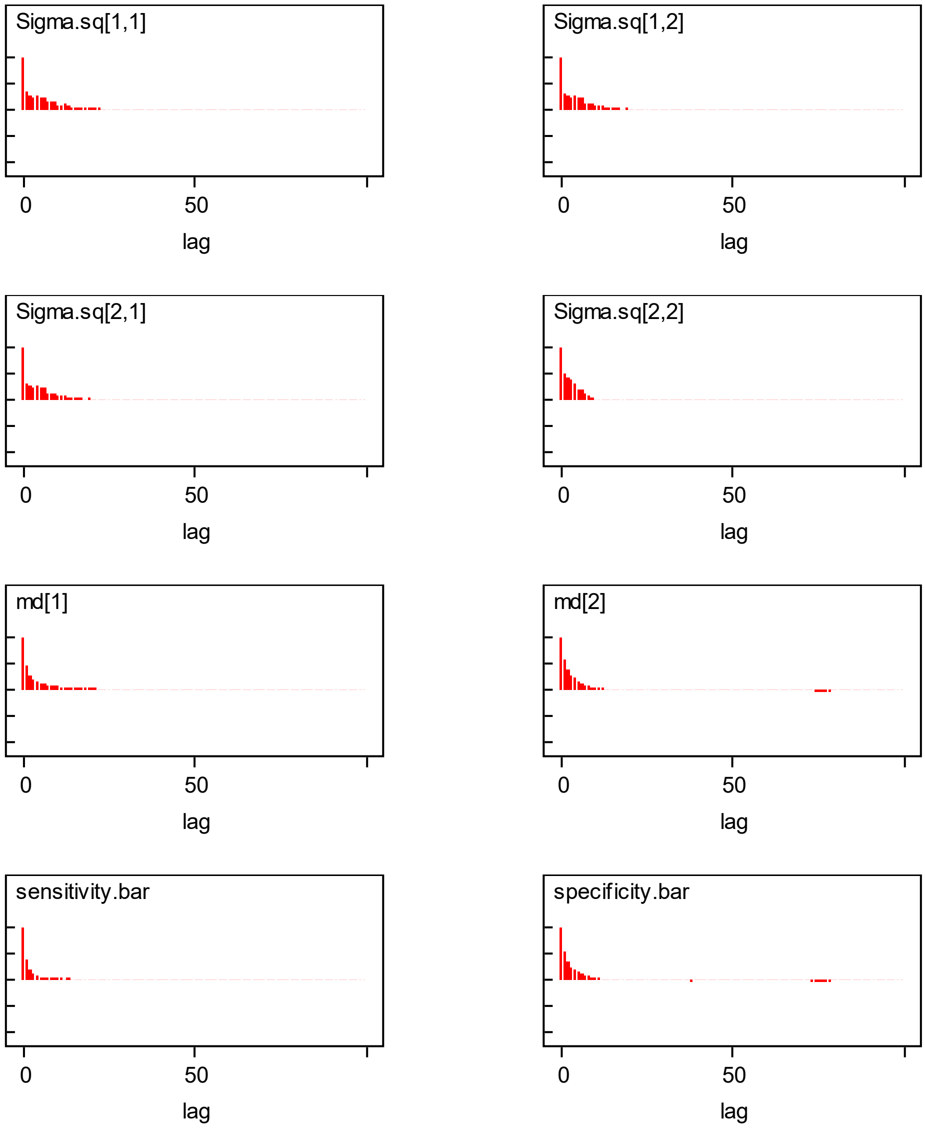
	mean	**sd**	**MC_error**	**val2.5pc**	**median**	**val97.5pc**	**start**	**sample**
Sigma.sq[1,1]	1.115	3.613	0.02323	0.1265	0.5109	5.575	60001	60000
Sigma.sq[1,2]	0.2339	3.343	0.0265	-1.765	0.07422	3.0	60001	60000
Sigma.sq[2,1]	0.2339	3.343	0.0265	-1.765	0.07422	3.0	60001	60000
Sigma.sq[2,2]	1.764	7.849	0.05879	0.1558	0.7247	8.759	60001	60000
md[1]	-0.06263	0.5954	0.005178	-1.241	-0.05277	1.092	60001	60000
md[2]	-0.5226	0.8479	0.00876	-2.192	-0.5114	1.113	60001	60000
sensitivity.bar	0.4862	0.1252	9.592E-4	0.2243	0.4868	0.7487	60001	60000
specificity.bar	0.3864	0.1586	0.001492	0.1005	0.3749	0.7527	60001	60000

Figure 81: **OpenBUGS output- STRATIFY (cut-off value ≥2)- Hospital setting**



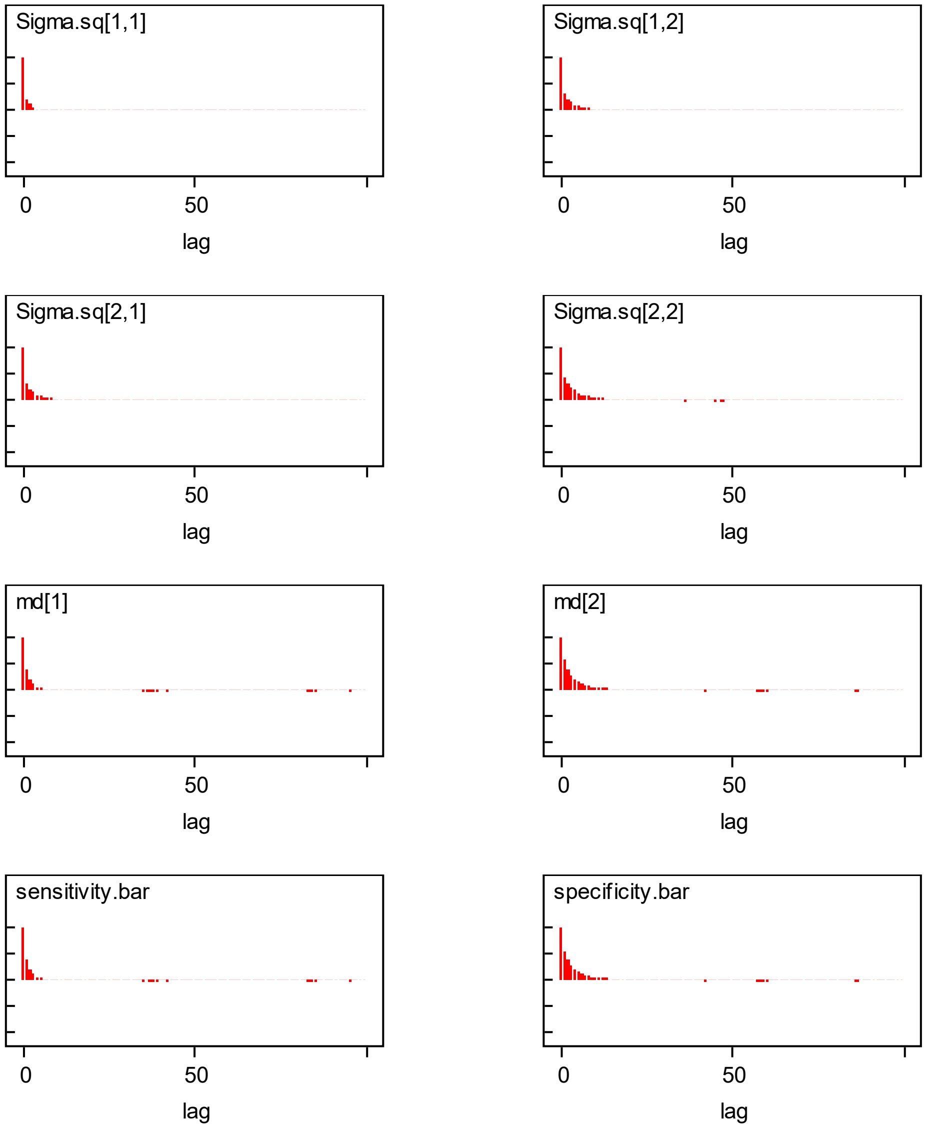
	mean	**sd**	**MC_error**	**val2.5pc**	**median**	**val97.5pc**	**start**	**sample**
Sigma.sq[1,1]	0.507	0.3127	0.001972	0.1834	0.4272	1.299	60001	60000
Sigma.sq[1,2]	0.2758	0.3019	0.002426	-0.1331	0.2197	1.008	60001	60000
Sigma.sq[2,1]	0.2758	0.3019	0.002426	-0.1331	0.2197	1.008	60001	60000
Sigma.sq[2,2]	0.6743	0.5354	0.004528	0.1683	0.5306	2.05	60001	60000
md[1]	0.6	0.2366	0.001529	0.1334	0.5985	1.075	60001	60000
md[2]	0.8075	0.3273	0.003148	0.1678	0.8036	1.47	60001	60000
sensitivity.bar	0.6439	0.05346	3.434E-4	0.5333	0.6453	0.7456	60001	60000
specificity.bar	0.6874	0.0683	6.563E-4	0.5419	0.6907	0.8131	60001	60000

Figure 82**: OpenBUGS output- Downton Falls Risk Index (cut-off value ≥3)- Participants aged 65 years or older**



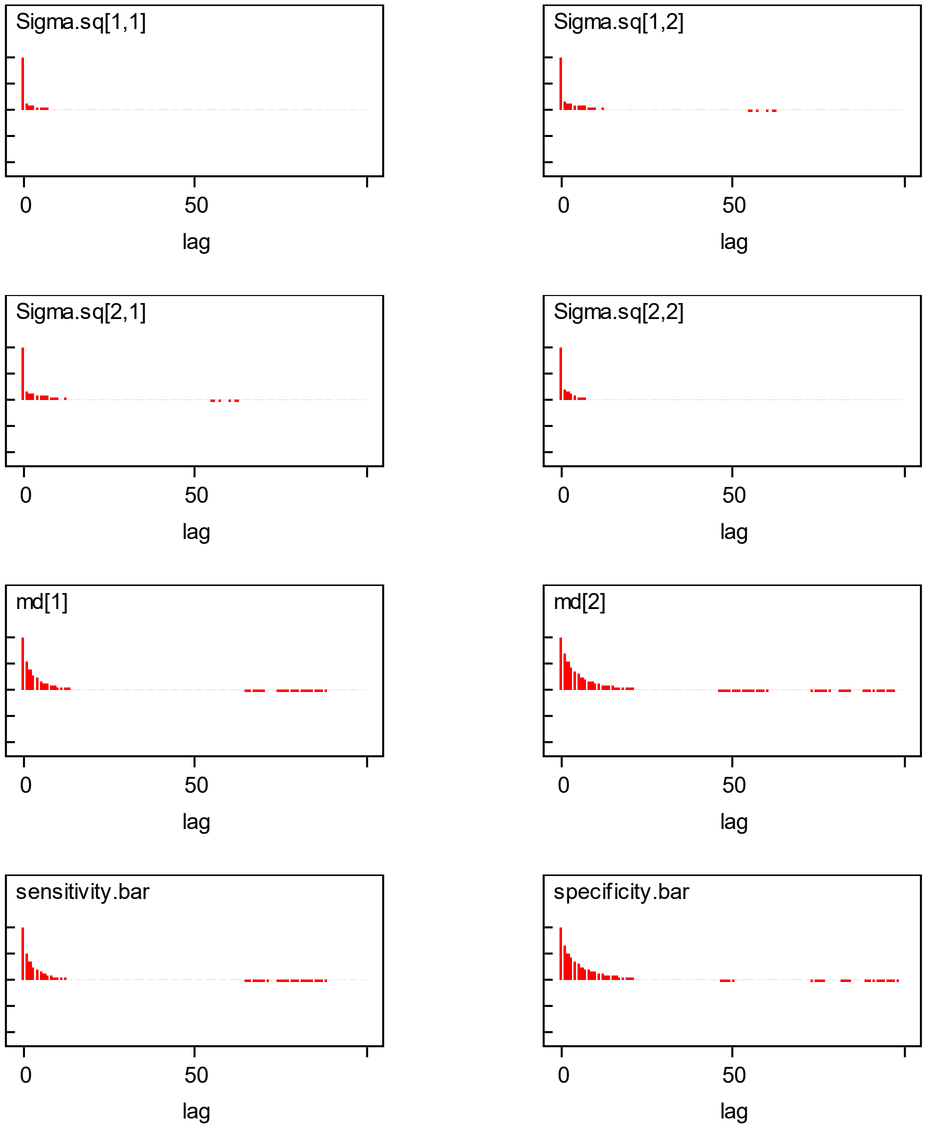
	mean	sd	MC_error	val2.5pc	median	val97.5pc	start	sample
Sigma.sq[1,1]	0.7268	1.772	0.01899	0.1212	0.4182	3.088	60001	60000
Sigma.sq[1,2]	0.2058	1.552	0.01593	-0.8731	0.09494	1.837	60001	60000
Sigma.sq[2,1]	0.2058	1.552	0.01593	-0.8731	0.09494	1.837	60001	60000
Sigma.sq[2,2]	1.149	3.364	0.03176	0.1491	0.6045	5.107	60001	60000
md[1]	-0.174	0.4493	0.004646	-1.032	-0.171	0.6653	60001	60000
md[2]	-0.6902	0.6363	0.006004	-1.912	-0.6879	0.5308	60001	60000
sensitivity.bar	0.4583	0.09825	8.545E-4	0.2627	0.4574	0.6605	60001	60000
specificity.bar	0.3447	0.1235	0.001114	0.1287	0.3345	0.6297	60001	60000

Figure 83**: OpenBUGS output- STRATIFY (cut-off value ≥2)- Participants aged 65 years or older**



mean sd	**MC_error**		**val2.5pcmedian**	**val97.5pc**		**start**	**sample**	
Sigma.sq[1,1]	0.4978	0.3382	0.001983	0.1696	0.4105	1.343	60001	60000
Sigma.sq[1,2]	0.2748	0.3546	0.002498	-0.1959	0.2116	1.117	60001	60000
Sigma.sq[2,1]	0.2748	0.3546	0.002498	-0.1959	0.2116	1.117	60001	60000
Sigma.sq[2,2]	0.8168	0.7328	0.006623	0.1836	0.6207	2.644	60001	60000
md[1]	0.487	0.2471	0.001675	0.006319	0.4835	0.9878	60001	60000
md[2]	0.8075	0.3776	0.003635	0.08459	0.7971	1.594	60001	60000
sensitivity.bar	0.6177	0.05717	3.858E-4	0.5016	0.6186	0.7287	60001	60000
specificity.bar	0.6861	0.07761	7.339E-4	0.5211	0.6893	0.8311	60001	60000

Figure 84: **OpenBUGS output- STRATIFY (cut-off point ≥3)- Participants aged 65 years or older**



	mean	**sd**	**MC_error**	**val2.5pc**	**median**	**val97.5pc**	**start**	**sample**
Sigma.sq[1,1]	1.6	6.053	0.0375	0.178	0.7104	7.806	60001	60000
Sigma.sq[1,2]	1.183	6.721	0.04729	-1.944	0.3966	8.525	60001	60000
Sigma.sq[2,1]	1.183	6.721	0.04729	-1.944	0.3966	8.525	60001	60000
Sigma.sq[2,2]	5.781	33.7	0.2288	0.2268	1.905	31.18	60001	60000
md[1]	0.8128	0.6951	0.006899	-0.577	0.8231	2.156	60001	60000
md[2]	0.6954	1.554	0.01889	-2.52	0.7973	3.511	60001	60000
sensitivity.bar	0.6796	0.1298	0.001199	0.3596	0.6949	0.8963	60001	60000
specificity.bar	0.6359	0.2352	0.002944	0.07443	0.6894	0.971	60001	60000