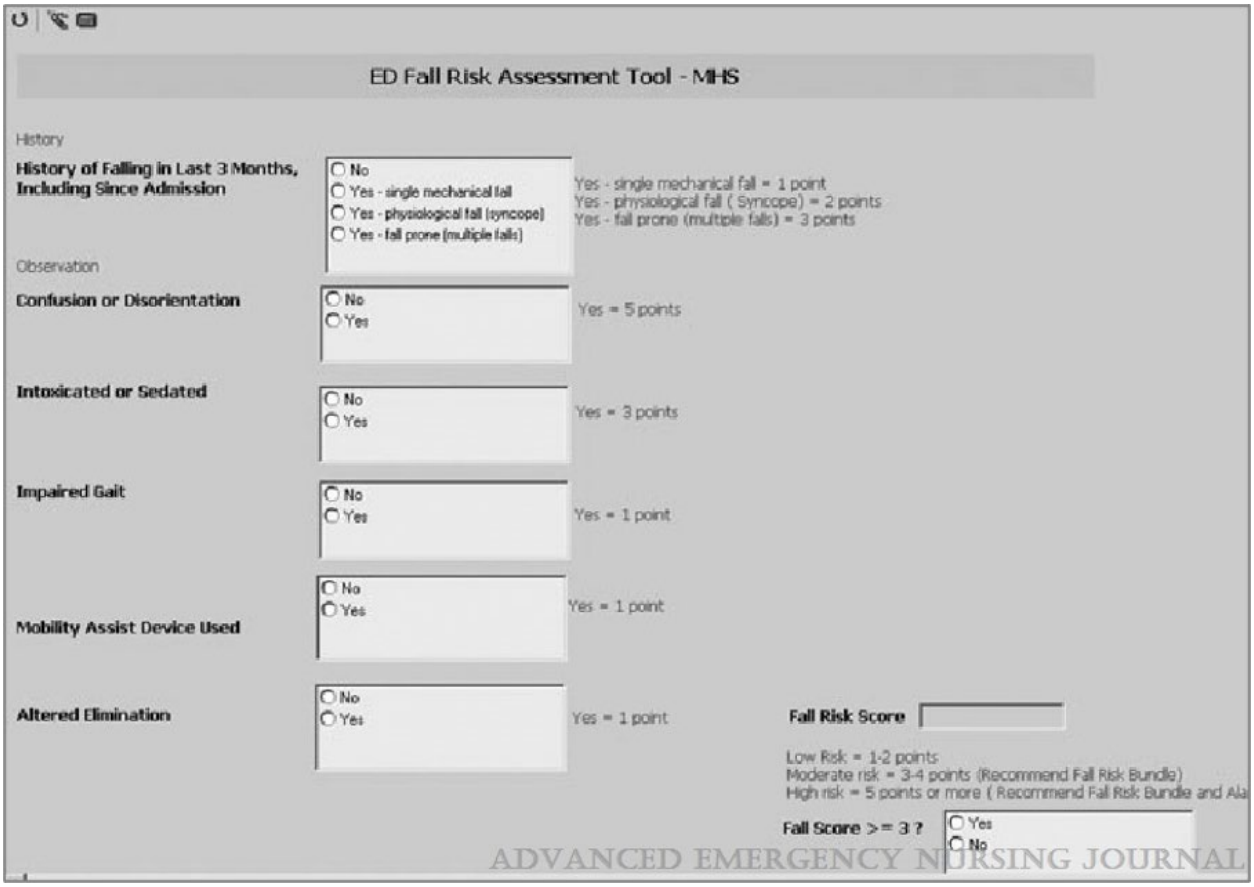
Supplement 3

Appendix of ED Fall Risk Assessment Instruments

Memorial Emergency Department Fall Risk Assessment Tool



Reference:
Flarity K, Pate T, Finch H. Development and implementation of the Memorial Emergency Department Fall Risk Assessment Tool. Adv Emerg Nurs J 2013;35(1):57-66. doi:10.1097/TME.0b013e31827c6a54

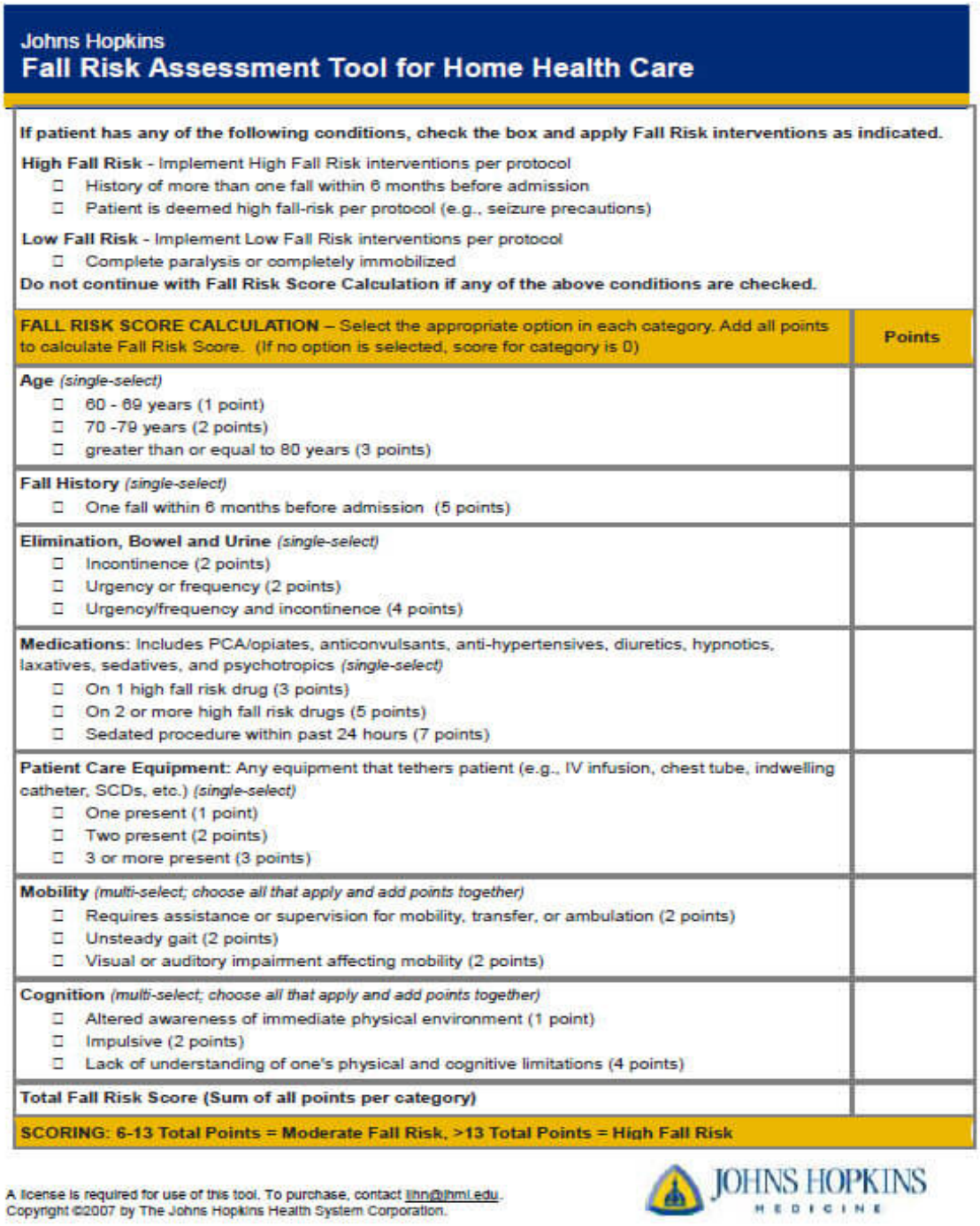
Kinder Fall Risk Assessment Tool

Risk Assessment	Yes*	No	Fall Intervention (Yellow "Fall Risk bracelet" applied)	Triage RN
Presented to emergency department because of falls (Syncope, seizure, or loss of consciousness)				
Age > 70				
Altered Mental Status Intoxication with alcohol or substance confusion (Disorientation, impaired judgment, poor safety awareness, or inability to follow instructions)				
Impaired Mobility: Ambulates or transfers with assistive devices or assistance; Unable to ambulate or transfer.				
Nurse Judgment: (Bowel or bladder incontinence, diarrhea, urinary frequency or urgency, Sensory deficits, leg weakness, orthostatic hypotension, dizziness or vertigo, and medications such as diuretics, narcotics, sedatives)				

*YES to any risk category = high fall risk

Reference:
Townsend AB, Valle-Ortiz M, Sansweet T. A Successful ED Fall Risk Program Using the KINDER 1 Fall RiskAssessment Tool. J Emerg Nurs 2016;42(6):492-497. doi:10.1016/j.jen.2016.03.028

Johns Hopkins Fall Risk Assessment Tool



Johns Hopkins
Fall Risk Assessment Tool for Home Health Care

If patient has any of the following conditions, check the box and apply Fall Risk interventions as indicated.

High Fall Risk - Implement High Fall Risk interventions per protocol
- ☐ History of more than one fall within 6 months before admission
- ☐ Patient is deemed high fall-risk per protocol (e.g., seizure precautions)

Low Fall Risk - Implement Low Fall Risk interventions per protocol
- ☐ Complete paralysis or completely immobilized

Do not continue with Fall Risk Score Calculation if any of the above conditions are checked.

FALL RISK SCORE CALCULATION – Select the appropriate option in each category. Add all points to calculate Fall Risk Score. (If no option is selected, score for category is 0)	**Points**
Age *(single-select)* ☐ 60 - 69 years (1 point) ☐ 70 -79 years (2 points) ☐ greater than or equal to 80 years (3 points)	
Fall History *(single-select)* ☐ One fall within 6 months before admission (5 points)	
Elimination, Bowel and Urine *(single-select)* ☐ Incontinence (2 points) ☐ Urgency or frequency (2 points) ☐ Urgency/frequency and incontinence (4 points)	
Medications: Includes PCA/opiates, anticonvulsants, anti-hypertensives, diuretics, hypnotics, laxatives, sedatives, and psychotropics *(single-select)* ☐ On 1 high fall risk drug (3 points) ☐ On 2 or more high fall risk drugs (5 points) ☐ Sedated procedure within past 24 hours (7 points)	
Patient Care Equipment: Any equipment that tethers patient (e.g., IV infusion, chest tube, indwelling catheter, SCDs, etc.) *(single-select)* ☐ One present (1 point) ☐ Two present (2 points) ☐ 3 or more present (3 points)	
Mobility *(multi-select; choose all that apply and add points together)* ☐ Requires assistance or supervision for mobility, transfer, or ambulation (2 points) ☐ Unsteady gait (2 points) ☐ Visual or auditory impairment affecting mobility (2 points)	
Cognition *(multi-select; choose all that apply and add points together)* ☐ Altered awareness of immediate physical environment (1 point) ☐ Impulsive (2 points) ☐ Lack of understanding of one's physical and cognitive limitations (4 points)	
Total Fall Risk Score (Sum of all points per category)	
SCORING: 6-13 Total Points = Moderate Fall Risk, >13 Total Points = High Fall Risk	

JOHNS HOPKINS MEDICINE

Reference:

Luo S, Kalman M, Haines P. Evaluating a Fall Risk Assessment Tool in an Emergency Department. J Healthc Qual 2020;42(4):205-214. doi:10.1097/JHQ.0000000000000233

Hendrich II Fall Risk Model

Hendrich II Fall Risk Model		
RISK FACTOR	RISK POINTS	SCORE
Confusion/Disorientation/Impulsivity	4	
Symptomatic Depression	2	
Altered Elimination	1	
Dizziness/Vertigo	1	
Gender (Male)	1	
Any Administered Antiepileptics (anticonvulsants): (Carbamazepine, Divalproex Sodium, Ethotoin, Ethosuximide, Felbamate, Fosphenytoin, Gabapentin, Lamotrigine, Mephenytoin, Methsuximide, Phenobarbital, Phenytoin, Primidone, Topiramate, Trimethadione, Valproic Acid)[1]	2	
Any Administered Benzodiazepines:[2] (Alprazolam, Chloridiazepoxide, Clonazepam, Clorazepate Dipotassium, Diazepam, Flurazepam, Halazepam[3], Lorazepam, Midazolam, Oxazepam, Temazepam, Triazolam)	1	
Get-Up-and-Go Test: "Rising from a Chair" If unable to assess, monitor for change in activity level, assess other risk factors, document both on patient chart with date and time.		
Ability to rise in single movement - No loss of balance with steps	0	
Pushes up, successful in one attempt	1	
Multiple attempts but successful	3	
Unable to rise without assistance during test If unable to assess, document this on the patient chart with the date and time.	4	
(A score of 5 or greater = High Risk)	TOTAL SCORE	

On-going Medication Review Updates:

1. Levetiracetam (Keppra) was not assessed during the original research conducted to create the Hendrich Fall Risk Model. As an antiepileptic, levetiracetam does have a side effect of somnolence and dizziness which contributes to its fall risk and should be scored (effective June 2010).
2. The study did not include the effect of benzodiazepine-like drugs since they were not on the market at the time. However, due to their similarity in drug structure, mechanism of action and drug effects, they should also be scored (effective January 2010).
3. Halazepam was included in the study but is no longer available in the United States (effective June 2010).

Reference:

Hendrich AL, Bender PS, Nyhuis A. Validation of the Hendrich II Fall Risk Model: a large concurrent case/control study of hospitalized patients [published correction appears in Appl Nurs Res 2003 Aug;16(3):208]. Appl Nurs Res 2003;16(1):9-21. doi:10.1053/apnr.2003.YAPNR2

Falls Risk for Older People in the Community (FROP-Com) tool

Balance

1) Number of falls in the past 12 months?
- No falls (0 points); 1 fall (1); 2 falls (2); 3 or more falls (3)
2) Was an injury sustained in any of the fall/s in the past 12 months?
- No (0); minor injury, did not require medical attention (1); minor injury, did require medical attention (2); severe injury (fracture, etc.) (3)
3) Describe the circumstances of the most recent fall in the past 12 months.

Medications

4) List all medications currently taken.
5) Number of prescription medications.
- No medication (0); 1-2 medications (1); 3 medications (2); 4 or more medications (3)
6) Does the individual take any of the following type of medication? E.g sedative, antidepressant, anti-epileptic, central acting analgesic, digoxin, diuretics, type 1A antiarrhythmic, vestibular suppressant
- None apply (0); 1-2 apply (1); 3 apply (2); 4 or more apply (3)

Medical conditions

7) Does the individual have a chronic medical condition/s affecting their balance & mobility? E.g. arthritis, respiratory condition, Parkinson's disease, diabetes, dementia, peripheral neuropathy, cardiac condition, stroke, other neurological conditions, lower limb amputation, osteoporosis, vestibular disorder, other dizziness, back pain, lower limb joint replacement
- None apply (0); 1-2 apply (1); 3-4 apply (2); 5 or more apply (3)

Sensory loss

8) Does the client have an uncorrected sensory deficit/s that limits their functional ability?
- Vision: No (0), Yes (1)
- Somatosensory: No (0); Yes (1)

Feet and footwear

9) Does the client have foot problems, e.g. corns, bunions, swelling, etc.?
- No (0); Yes (1)
10) Does the client have inappropriate, poorly fitting, or worn footwear?
- No (0); Yes (1)

Cognitive status

11) AMTS score -- age, time (to the nearest hour), address to recall, current year, current location (where are we?), recognition of two persons (Dr., nurse), date of birth, years of first World War, name of current prime minister, count backwards from 20 by ones
- Number of correct responses: 9-10 (0); 7-8 (1); 5-6 (2); 4 or less (3)

Continence

12) Is the individual continent?

- Yes (0); No (1)

13) Does the individual regularly have to go to the toilet in the night (3 or more times)?

- No (0); Yes (1)

Nutritional status

14) Has the individual's food intake declined in the past three months due to a loss of appetite, digestive problems, chewing or swallowing difficulties?

- No (0); small change, but intake remains good (1); moderate loss of appetite (2); severe loss of appetite, poor oral intake (3)

15) Weight loss during the last 3-12 months

- Nil (0); minimal (<1 kg) or unsure (1); moderate (1-3 kg) (2); marked (>3 kg) (3)

16) Number of alcoholic drinks consumed in the past week

- Nil (0); 1-3 (1); 4-10 (2); 11+ (3)

Environment

17) Did the home environment appear safe?

- Yes (0); minimal environmental hazards (1); moderate environment hazards requiring modification (2); extremely unsafe environment (3)

Functional behavior

18) Observed behaviors in Activities of Daily Living and Mobility indicate

- Consistently aware of current abilities/seeks appropriate assistance as required (0); generally aware of current abilities/occasional risk-taking behavior (1); under-estimates abilities/inappropriately fearful of activity (2); over-estimates abilities/frequent risk-taking behavior (3)

Function

19) Prior to this fall, how much assistance was the individual requiring for personal care activities of daily living (eg dressing, grooming, toileting)?

- None (completely independent) (0); supervision (1); some assistance required (2); completely dependent (3)

20) Has this changed since the most recent fall?

- No (0); Yes (1)

21) Prior to this fall, how much assistance was the individual requiring for instrumental activities of daily living (eg shopping, housework, laundry)?

- None (completely independent (0); supervision (1); some assistance required (2); completely dependent (3)

22) Has this changed since the most recent fall?

- No (0); Yes (1)

Balance

23) Does the individual, upon observation of walking and turning, appear unsteady or at risk of losing their balance?

- No unsteadiness observed (0); Yes, minimally unsteady on walking or turning (1); Yes moderately unsteady on walking or turning (needs supervision) (2); Yes, consistently and severely unsteady on walking or turning (needs constant hands on assistance (3)

Gail/Physical activity

24) Can the individual walk safely around their own home?
- Independent, no gait aid needed (0); independent with a gait aid (1); safe with supervision/physical assistance (2); unsafe (3)

25) Can the individual walk safely in the community?
- Independent, no gait aid needed (0); independent with a gait aid (1); safe with supervision/physical assistance (2); unsafe (3)

26) If a walking aid is used, list the aid and when it is used.

27) How physically active is the individual?
- Very active (exercises 3 times per week) (0); moderately active (exercises less than twice per week) (1); not very active (rarely leaves the house (2); inactive (rarely leaves one room of the house (3)

28) Has this changed since the most recent fall?
- No (0); Yes (1)

Grading of falls risk:

0-11; Mild falls risk; Implement actions for identified individual risk factors, & recommend health promotion behaviour to minimise future ongoing risk (eg – increased physical activity, good nutrition)
12-18; Moderate falls risk; Implement actions for identified individual risk factors
19-60; High falls risk; Implement actions for identified individual risk factors, and implement additional actions for high falls risk (e.g. refer to a specialist Falls Clinic)

Reference:

Mascarenhas M, Hill KD, Barker A, Burton E. Validity of the Falls Risk for Older People in the Community (FROP-Com) tool to predict falls and fall injuries for older people presenting to the emergency department after falling. Eur J Ageing 2019;16(3):377-386. Published 2019 Jan 21. doi:10.1007/s10433-018-0496-x

Tiedemann score

1) Two or more falls in the past year? (2 points)
2) Take 6 or more medications? (1 point)

Interpretation Score > 2 = older adult at increased risk for falls.

Reference:
Tiedemann A, Sherrington C, Orr T, et al. Identifying older people at high risk of future falls: development and validation of a screening tool for use in emergency departments. Emerg Med J 2013;30(11):918-922. doi:10.1136/emermed-2012-201783

Centers for Disease Control & Prevention STEADI tool

Check Your Risk for Falling

Circle "Yes" or "No" for each statement below			Why it matters
Yes (2)	No (0)	I have fallen in the past year.	People who have fallen once are likely to fall again.
Yes (2)	No (0)	I use or have been advised to use a cane or walker to get around safely.	People who have been advised to use a cane or walker may already be more likely to fall.
Yes (1)	No (0)	Sometimes I feel unsteady when I am walking.	Unsteadiness or needing support while walking are signs of poor balance.
Yes (1)	No (0)	I steady myself by holding onto furniture when walking at home.	This is also a sign of poor balance.
Yes (1)	No (0)	I am worried about falling.	People who are worried about falling are more likely to fall.
Yes (1)	No (0)	I need to push with my hands to stand up from a chair.	This is a sign of weak leg muscles, a major reason for falling.
Yes (1)	No (0)	I have some trouble stepping up onto a curb.	This is also a sign of weak leg muscles.
Yes (1)	No (0)	I often have to rush to the toilet.	Rushing to the bathroom, especially at night, increases your chance of falling.
Yes (1)	No (0)	I have lost some feeling in my feet.	Numbness in your feet can cause stumbles and lead to falls.
Yes (1)	No (0)	I take medicine that sometimes makes me feel light-headed or more tired than usual.	Side effects from medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I take medicine to help me sleep or improve my mood.	These medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I often feel sad or depressed.	Symptoms of depression, such as not feeling well or feeling slowed down, are linked to falls.
Total _____		Add up the number of points for each "yes" answer. If you scored 4 points or more, you may be at risk for falling. Discuss this brochure with your doctor.	

This checklist was developed by the Greater Los Angeles VA Geriatric Research Education Clinical Center and affiliates and is a validated fall risk self-assessment tool (Rubenstein et al. J Safety Res; 2011: 42(6)493-499). Adapted with permission of the authors.

Reference:
Sri-On J, Tirrell GP, Kamsom A, Marill KA, Shankar KN, Liu SW. 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 [published online ahead of print, 2018 Mar 25]. Acad Emerg Med 2018;10.1111/acem.13413. doi:10.1111/acem.13413

Timed Up and Go

ASSESSMENT

Timed Up & Go (TUG)

Purpose: To assess mobility

Equipment: A stopwatch

Directions: Patients wear their regular footwear and can use a walking aid, if needed. Begin by having the patient sit back in a standard arm chair and identify a line 3 meters, or 10 feet away, on the floor.

NOTE: Always stay by the patient for safety.

① Instruct the patient:

When I say "Go," I want you to:

1. Stand up from the chair.
2. Walk to the line on the floor at your normal pace.
3. Turn.
4. Walk back to the chair at your normal pace.
5. Sit down again.

② On the word "Go," begin timing.

③ Stop timing after patient sits back down.

④ Record time.

Time in Seconds: _____

An older adult who takes ≥12 seconds to complete the TUG is at risk for falling.

Patient _____

Date _____

Time _____ ☐ AM ☐ PM

OBSERVATIONS

Observe the patient's postural stability, gait, stride length, and sway.

Check all that apply:

- ☐ Slow tentative pace
- ☐ Loss of balance
- ☐ Short strides
- ☐ Little or no arm swing
- ☐ Steadying self on walls
- ☐ Shuffling
- ☐ En bloc turning
- ☐ Not using assistive device properly

These changes may signify neurological problems that require further evaluation.

ASSESSMENT

30-Second Chair Stand

Purpose: To test leg strength and endurance

Equipment: A chair with a straight back without arm rests (seat 17" high), and a stopwatch.

NOTE: Stand next to the patient for safety.

① Instruct the patient:

1. Sit in the middle of the chair.
2. Place your hands on the opposite shoulder crossed, at the wrists.
3. Keep your feet flat on the floor.
4. Keep your back straight, and keep your arms against your chest.
5. On **"Go,"** rise to a full standing position, then sit back down again.
6. Repeat this for 30 seconds.

② On the word "Go," begin timing.

If the patient must use his/her arms to stand, stop the test. Record "0" for the number and score.

③ Count the number of times the patient comes to a full standing position in 30 seconds.

If the patient is over halfway to a standing position when 30 seconds have elapsed, count it as a stand.

④ Record the number of times the patient stands in 30 seconds.

Number: _____ Score: _____

Patient _____

Date _____

Time _____ ☐ AM ☐ PM

SCORING

Chair Stand
Below Average Scores

AGE	MEN	WOMEN
60-64	< 14	< 12
65-69	< 12	< 11
70-74	< 12	< 10
75-79	< 11	< 10
80-84	< 10	< 9
85-89	< 8	< 8
90-94	< 7	< 4

A below average score indicates a risk for falls.

Reference:

Chow RB, Lee A, Kane BG, et al. Effectiveness of the "Timed Up and Go" (TUG) and the Chair test as screening tools for geriatric fall risk assessment in the ED. Am J Emerg Me. 2019;37(3):457-460. doi:10.1016/j.ajem.2018.06.015

Morse Fall Scale

Morse Fall Scale

(Adapted with permission, SAGE Publications)

The Morse Fall Scale (MFS) is a rapid and simple method of assessing a patient's likelihood of falling. A large majority of nurses (82.9%) rate the scale as "quick and easy to use," and 54% estimated that it took less than 3 minutes to rate a patient. It consists of six variables that are quick and easy to score, and it has been shown to have predictive validity and interrater reliability. The MFS is used widely in acute care settings, both in the hospital and long term care inpatient settings.

Item	*Scale*	*Scoring*
1. History of falling; immediate or within 3 months	No 0 Yes 25	_____
2. Secondary diagnosis	No 0 Yes 15	_____
3. Ambulatory aid Bed rest/nurse assist Crutches/cane/walker Furniture	0 15 30	_____
4. IV/Heparin Lock	No 0 Yes 20	_____
5. Gait/Transferring Normal/bedrest/immobile Weak Impaired	0 10 20	_____
6. Mental status Oriented to own ability Forgets limitations	0 15	_____

The items in the scale are scored as follows:

History of falling: This is scored as 25 if the patient has fallen during the present hospital admission or if there was an immediate history of physiological falls, such as from seizures or an impaired gait prior to admission. If the patient has not fallen, this is scored 0. Note: If a patient falls for the first time, then his or her score immediately increases by 25.

Secondary diagnosis: This is scored as 15 if more than one medical diagnosis is listed on the patient's chart; if not, score 0.

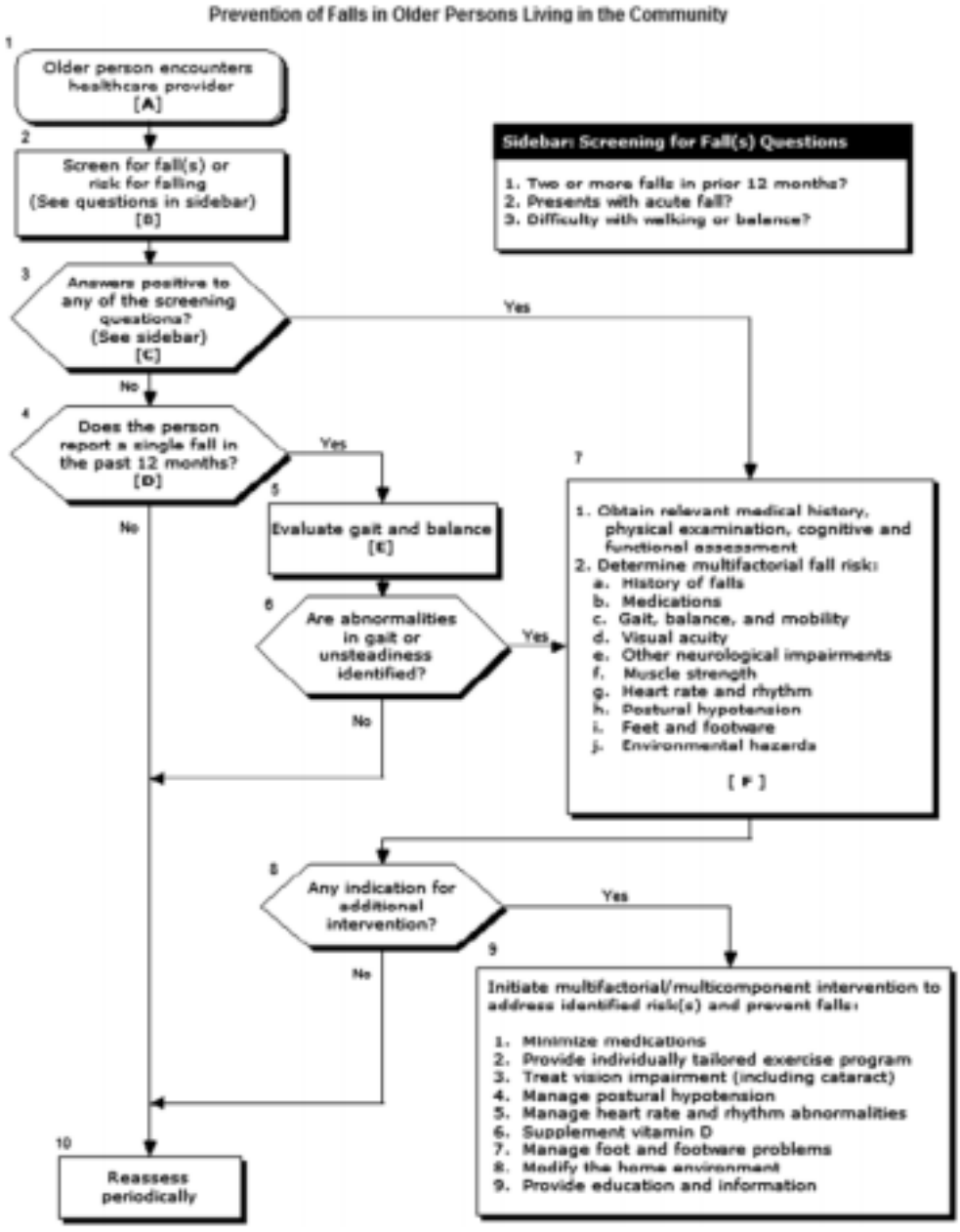
Ambulatory aids: This is scored as 0 if the patient walks without a walking aid (even if assisted by a nurse), uses a wheelchair, or is on a bed rest and does not get out of bed at all. If the patient uses crutches, a cane, or a walker, this item scores 15; if the patient ambulates clutching onto the furniture for support, score this item 30.

Intravenous therapy: This is scored as 20 if the patient has an intravenous apparatus or a heparin lock

Reference:

Çinarli T, Koç Z. Fear and Risk of Falling, Activities of Daily Living, and Quality of Life: Assessment When Older Adults Receive Emergency Department Care. Nurs Res 2017;66(4):330-335. doi:10.1097/NNR.0000000000000227

Prevention of Falls in Older Persons Living in the Community



Reference:

Panel on Prevention of Falls in Older Persons, American Geriatrics Society and British Geriatrics Society. Summary of the Updated American Geriatrics Society/British Geriatrics Society clinical practice guideline for prevention of falls in older persons. J Am Geriatr Soc 2011;59(1):148-157. doi:10.1111/j.1532-5415.2010.03234.x