PRIMARY CARE
MED437

Falls in the Elderly

Objectives:

- Define falls and the mechanism of falls (mechanical vs. non mechanical)
- Discuss the prevalence (local studies vs. international)
- Explain falls risk factors (both intrinsic such as gait and extrinsic such as environmental hazards)
- Discuss the consequence of falls such as hip fractures, lacerations, wounds, bleeding
- Demonstrate the ability to identify falls and recurrent falls (Falls risk assessment) i.e. history and physical examination
- Falls prevention and management in community dwelling elderly.
-

Done by:

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Revised by: Salem AlAmmari, Sondos Alhawamdeh

References

- Doctor's slides and notes

Important *Notes* *Extra* *Golden*

Editing file link

The doctor spent most of the lecture discussing the case at the end.

What is a fall?

An unintentional event that results in a person coming to rest on the ground, or another lower level, not as a result of a major intrinsic event such as stroke or epilepsy) or an overwhelming hazard (such as being pushed). Kellogg, 1987

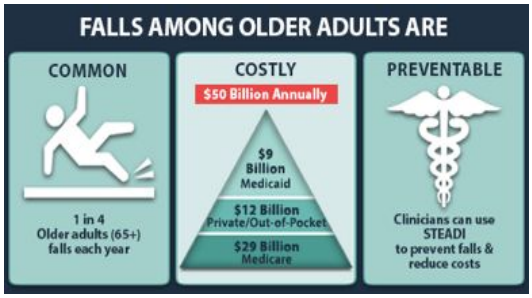
Falls

Community Dwelling

Most falls occur in the community

In the Hospital

Prevalence



- **30 %** of community-dwelling people over the age of 65 years fall each year.
- **50 %** for those 80 years and older .
- The 1 year prevalence of falling among old Saudis (>=60 years) was **49.9%**
- **74%** of the participants who experienced falls had post fall injuries.

BMJ Open

Period prevalence, risk factors and consequent injuries of falling among the Saudi elderly living in Riyadh, Saudi Arabia: a cross-sectional study

Recurrent Falls:

- **60%** of those with a history of a fall in the previous year will have a subsequent fall.
- No. 1 risk factor of a fall is a **previous fall**.

Gender:

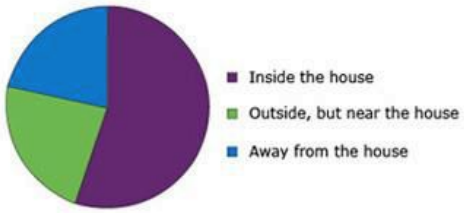
- Female > Male
- Falls are more likely to result in injury in women

When do falls occur?

- Statistics show that most falls occur in the **daytime** when people are more active. mostly inside the house
- Around 11am and between 4pm and 6pm.

Where? Respectively

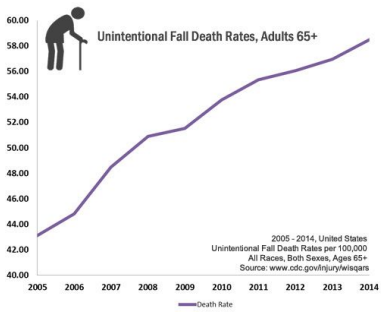
1. Inside the house
2. Outside but near the house
3. Away from the house



Consequences of Falls

Significant **morbidity and mortality** may result from falls in older individuals, Other causes :

- Physical injury
- Emotional trauma fear of falls
- Psychological problems
- Social consequences
- Financial impact



- ½ falls result in injury (10-15% in fractures).

- ¼ of all fallers limit their activities and lifestyle due to **fear of falling.**

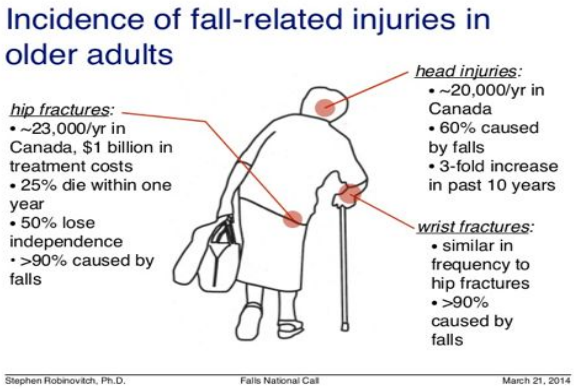
Fall Severity Index:

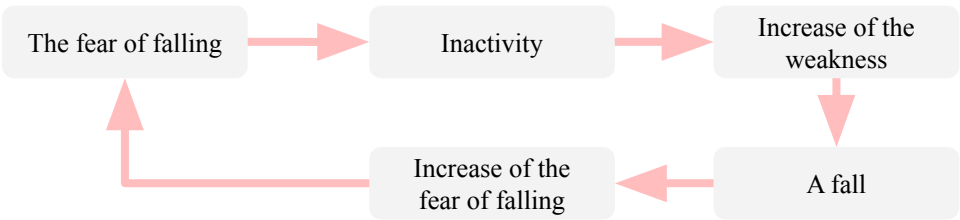
1. **None** means no injury or disability
2. **Minor Injury** means injuries, which are minor in nature. For example, abrasion, bruise, minor laceration and hematomas.
3. **Major Injury** means injuries that require medical or surgical intervention, increased hospital stays, or are disabling and/or disfiguring to a degree that the patient will have any degree of permanent lessened function or require surgical repair. For example, **hip fracture, head trauma and arm fracture.**
4. **Death** means fall related death.

Hip fracture:

- **1-2%** of falls result in a fractured hip.
- **50%** Of those who suffer fractured femurs will not fully recover.
- **25%** will die within 12 months.

“ 80 % of older women preferred death to a "bad" hip fracture that would result in nursing home admission.”





Costs of Fall:

- In US alone, the total cost of fall injuries for people 65 and older was **$30 billion** in 2012.
- (The cost covered 2.4 millions **ER visits** for non fatal injuries and more than 722,000 **hospitalizations**).

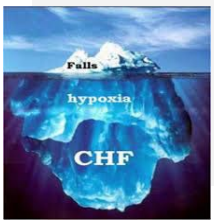
Indirect Cost:

- Quality of life.
- Loss of independence.
- Caregiving requirements

Falls often go without clinical attention, why? for a variety of reasons:

- The patient never mentions falls.
- There is no injury at the time of the fall. thus feels no need to go to the hospital
- The provider fails to ask the patient about a history of falls.
- Believes that falls are an inevitable part of the aging process.
- Treatment of injuries resulting from a fall does not include investigation of the cause of the fall.

Causes of Falls

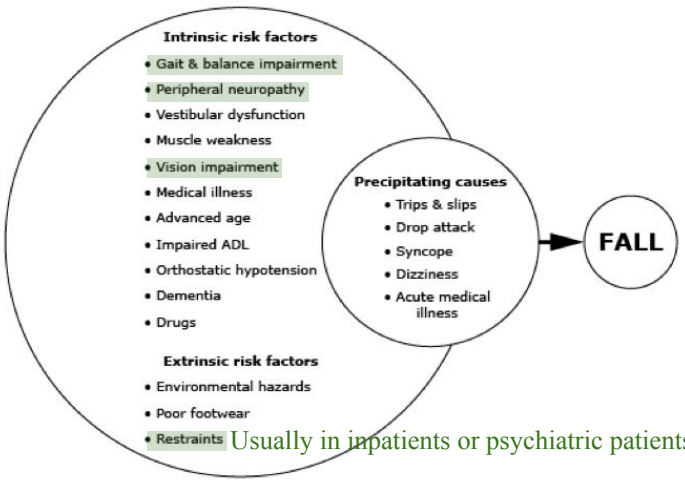


A fall in a geriatric patient should be perceived as **a symptom** of a disease, to be investigated like any other serious symptom.
The underlying cause should be identified → usually multifactorial

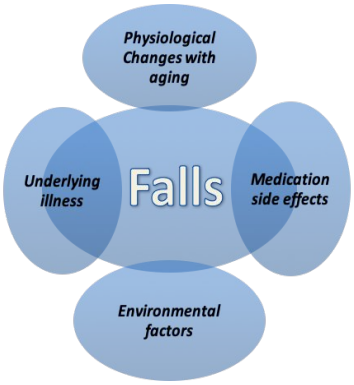
Theory of Why People Fall

Falls occur when:

- Older adults who are predisposed because of accumulated effect of diseases / impairments (intrinsic)
- Are exposed to precipitating challenges (extrinsic)



Usually in inpatients or psychiatric patients



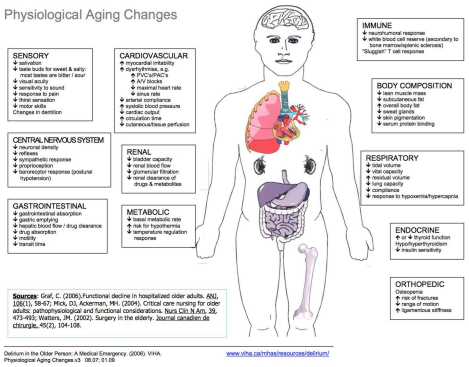


Table 3. Falls Risk Factors and Associated Relative Risk

RISK FACTOR	MEAN RELATIVE RISK RATIO (RANGE)
Muscle weakness	4.4 (1.5-10.3)
History of falls	3.0 (1.7-7.0)
Gait deficit	2.9 (1.3-5.6)
Balance deficit	2.9 (1.6-5.4)
Use of assistive device	2.6 (1.2-4.6)
Visual deficit	2.5 (1.6-3.5)
Arthritis	2.4 (1.9-2.9)
Impaired activities of daily living	2.3 (1.5-3.1)
Depression	2.2 (1.7-2.5)
Cognitive impairment	1.8 (1.0-2.3)
Age 80 or older	1.7 (1.1-2.5)

Source: Rubenstein LZ, Josephson KR. The epidemiology of falls and syncope. *Clin Geriatr Med* 2002 May;18(2):141-58.

Table 2. Medication Types Associated with Falls Events Reported to the Pennsylvania Patient Safety Authority, 2009

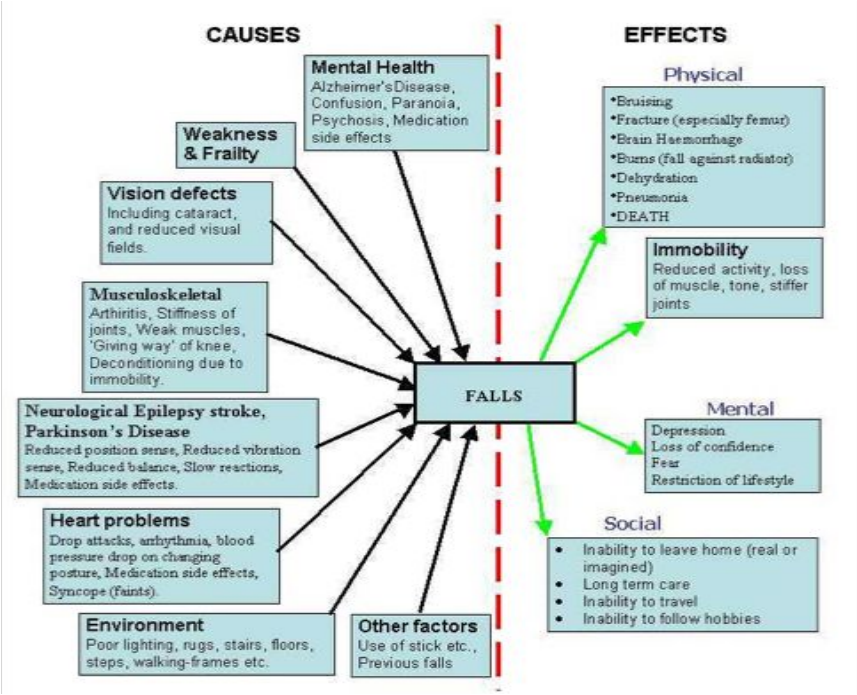
	FALLS EVENTS AT BEHAVIORAL HEALTH HOSPITALS (N = 313)		FALLS EVENTS AT NON-BEHAVIORAL HEALTH HOSPITALS (N = 34,641)	
MEDICATION TYPE	**Number**	**Percentage***	**Number**	**Percentage***
Antipsychotics	55	17.6%	1,645	4.7%
Benzodiazepines	54	17.3%	2,825	8.2%
Antiseizures	33	10.5%	1,176	3.4%
Cardiovasculars	17	5.4%	3,915	11.3%
Opiates	7	2.2%	3,237	9.3%
Diuretics	6	1.9%	1,268	3.7%
Laxatives	4	1.3%	1,054	3.0%
Anticoagulants	1	0.3%	1,994	5.8%
Other	43	13.7%	2,826	8.2%
Total	**220**	**70.3%**	**19,940**	**57.6%**

* Percentages calculated on number of falls in each medication category, not accounting for the lack of medications involved nor multiple medications. Additionally, not all submissions noted medications.

"The prediction of Falls among older people in Saudi Arabia"

This study found that the three main factors that affect older persons' likelihood of falling are:

1. Number of medications taken per day. polypharmacy
2. Sedentary lifestyle.
3. Use of assistive devices. If the patient was given an inappropriate size, or doesn't know how to use the device



Case

Mrs.Fatmah is a 75 year old lady was brought by her daughter. The daughter tells you her mother had a fall last week.

What questions do you want to ask about the fall?

History: from the patient or a witness of the fall

- Describe the fall.
- Ask questions to R/O syncope, pre fall symptoms.
- Use systematic method to look into etiology of falls. don't forget drug history.

Describe the fall:

- Accidental Fall occurs when a patient is oriented but rolls out of bed or trips / slips due to environmental risk factors, or an infant is dropped by a parent or caregiver.
- Assisted Fall means that the patient was being assisted when the fall took place. While any fall is bad, assisted falls generally result in less injury than do unassisted falls.
- Near Fall describes a sudden loss of balance that does not result in a fall or other injury. This can include a person who slips, stumbles or trips but who is able to regain balance; a near miss.
- Unwitnessed Fall describes the event when a patient is found on the floor and neither the patient nor anyone else knows how he / she got there. (worst type)

Mechanism of fall

Elderly fall usually on the side or back and cause hip fractures not like Young adults they fall into front.

- Lives alone in her 2 storey house.
- Patient fell 2 days earlier while rushing to answer the phone as she was putting away the groceries.
- Felt unsteady just prior to the fall as she tripped on kitchen mat. Was wearing shoes. Adequate lighting. Was able to get up right way. Uses no assistive walking devices at baseline
- Reports new left arm pain immediately after the fall. Scattered bruising and swelling of Left forearm.

History:

- No Head trauma, LOC, syncope or presyncope, vertigo, visual changes, bowel or bladder incontinence, eating and drinking as usual, no medication changes.
- Prior fall was 1 year ago while rushing down the stairs. No injury was incurred. (the number 1 risk factor for falls is history of prior falls)
- Had many near falls while running barefooted on waxed, wooden floors.

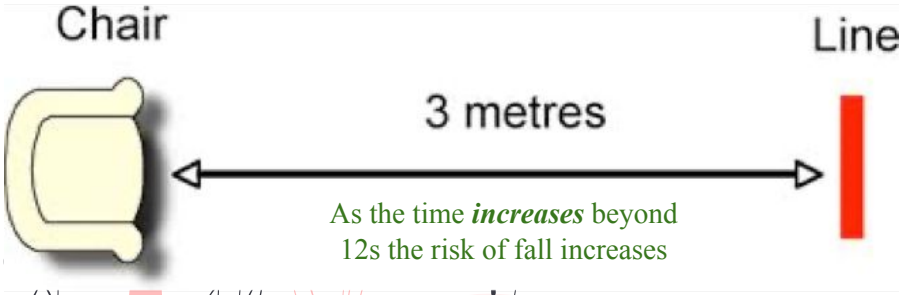
PMHx:

- DM neuropathy > loss of proprioception
- HTN
- Atrial fibrillation.
- Lt hip osteoarthritis
- Depression
- Insomnia
- Insulin hypoglycemia
- Lisinopril + Amlodipine hypotension
- Warfarin + digoxin
- Tylenol regular + Tylenol #3 PRN (contains codeine)
- Citalopram SSRI > fall
- Zolpidem QHS sleeping pills > sleepiness > fall

Physical Examination:

- Check orthostatic blood pressure
- Perform a visual exam
- Evaluate cognition, NEUROLOGICAL EXAM.
- Gait Assessment:
- Motor + Balance + Coordination

1. Timed up & Go test (>12 Seconds)



The "Get up and go" test for gait assessment in older adult patients

The "Get up and go" test for gait assessment in older adult patients[1]	
Have the patient sit in a straight-backed high-seat chair	
Instructions for patient:	
Get up (without use of armrests, if possible)	
Stand still momentarily	
Walk forward 10 feet (3 meters)	
Turn around and walk back to chair	
Turn and be seated	
Factors to note:	
Sitting balance	
Transfers from sitting to standing	
Pace and stability of walking	
Ability to turn without staggering	
Modified qualitative scoring[2]	
(1) No fall risk	Well-coordinated movements, without walking aid
(2) Low fall risk	Controlled, but adjusted movements
(3) Some fall risk	Uncoordinated movements
(4) High fall risk	Supervision necessary
(5) Very high fall risk	Physical support of stand by physical support necessary
Timed test (record time from initial rising to re-seating)[3]	
Age (years)	**Mean time (seconds)**
60 to 69	8.1 (7.1 to 9.0)
70 to 79	9.2 (8.2 to 10.2)
80 to 99	11.3 (10.0 to 12.7

Sources:

1. *Reproduced with permission from: Fleming KC, Evand JM, Weber DC, Chutka DS. Practical Functional Assessment of Elderly Persons: A Primary-Care Approach [Symposium on Geriatrics-Part III]. Mayo Clinic Proceedings 1995; 70:890. Copyright © 1995 Mayo Foundation.*
2. *From: Nordin E, Lindelöf N, Rosendahl E. 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 Ageing 2008; 37:442. By permission of the British Geriatrics Society. Copyright © 2013 Oxford University Press.*
3. *Data from: Bohannon RW. Reference Values for the Timed Up and Go Test: A Descriptive Meta-Analysis. J Geriatr Phys Ther 2006; 29:64.*

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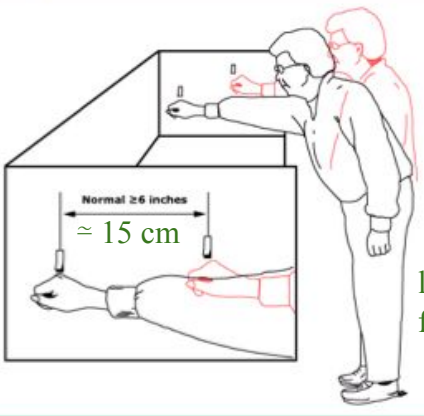
2. Functional Reach Test

Diagram of functional reach test to assess balance in elderly persons



leans forward

Subject stands with fist extended alongside a wall. Subject leans forward as far as possible, moving fist along wall without taking a step or losing stability. Length of fist movement is measured. Distances of less than 6 in (15 cm) indicate an increased risk of falling.

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Coordination Assessment:

Abnormal if:

- Hesitant start
- Broad-based gait
- Path deviates
- Heels do not clear toes of other foot
- Extended arms

EXTRA:

ASSESSMENT

30-Second Chair Stand

Patient

Date

Time ☐ AM ☐ PM

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: _____

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.

CDC's STEADI tools and resources can help you screen, assess, and intervene to reduce your patient's fall risk. For more information, visit www.cdc.gov/steadi

CDC Centers for Disease Control and Prevention National Center for Injury Prevention and Control 2017 STEADI Stopping Elderly Accidents, Deaths & Injuries

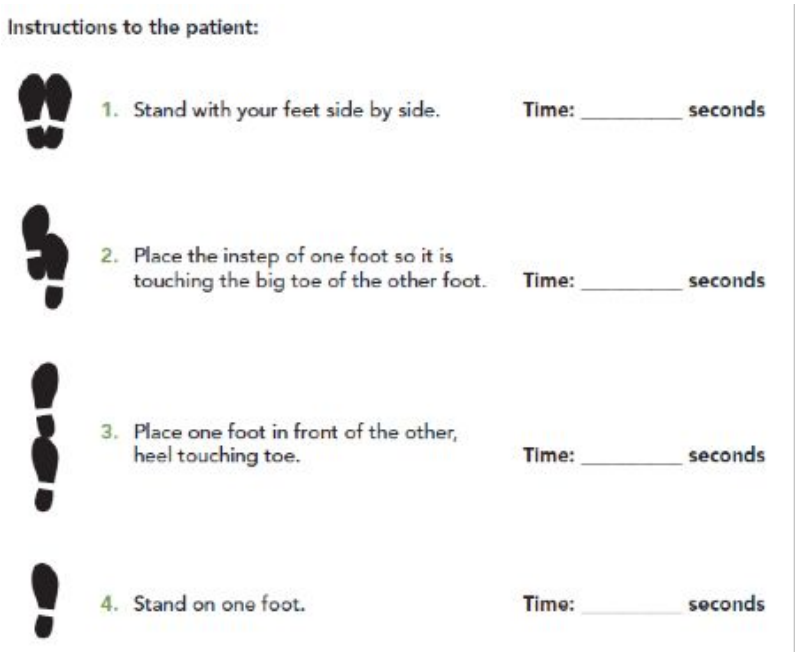
3. 30-Second Chair Stand Test

The number of times a patient can sit and stand consecutively in 30 seconds. (VIDEO)

4. Stage Balance Test

These are four standing positions that get progressively harder to maintain.

The shorter the time they remain in each position the higher the risk of fall, this test is usually performed by a physiotherapist.



Instructions to the patient:

1. Stand with your feet side by side. Time: _____ seconds
2. Place the instep of one foot so it is touching the big toe of the other foot. Time: _____ seconds
3. Place one foot in front of the other, heel touching toe. Time: _____ seconds
4. Stand on one foot. Time: _____ seconds

Physical Examination:

- Orthostatic: 135/70 88 sitting. Standing 120/65 100
- Eye: +cataract. visual acuity: 20/40 L and 20/80 R. Corrected with bifocals
- Gait:
- Motor: Bilateral Quad weakness + decreased sensation in her feet.
- TUG test **(Timed Up and Go test)**:18 Sec
- Balance: semi tandem and tandem stances <10 sec, one leg stand< 10 secs
- Gait: Hesitant at start but walks with normal path, walks with extended arms, no wide based gait, no foot drop, heel clears toes of other foot. Slow turn with outstretched hands
- Cognition: 1/3 on 3 item recall
- Neuro: No Parkinsonian features or focal weakness

Case

What are the possible predisposing ‘intrinsic’ risk factors and ‘extrinsic’ precipitants of her fall?

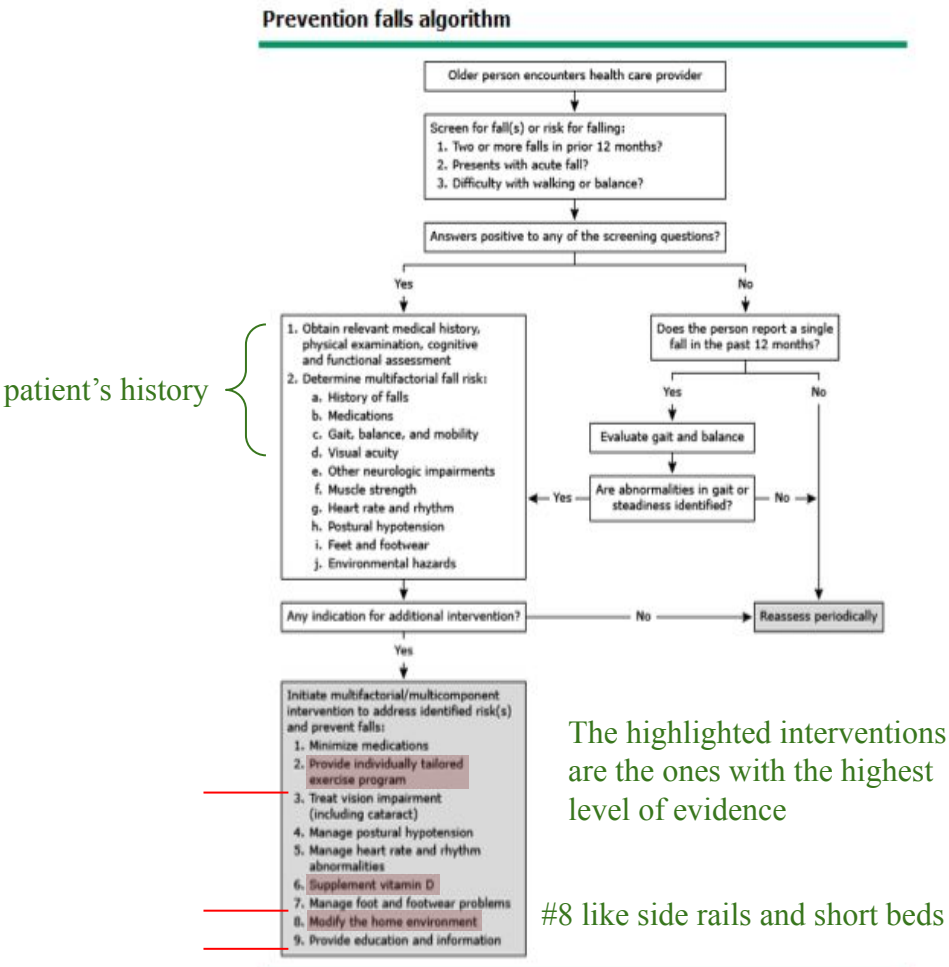
Multi-factorial

- **Unmodifiable predisposing factors:**
  - Age, female and prior history of falls
- **Modifiable predisposing and precipitating factors:**
  - Mild weakness + moderate balance impairment
  - Has cataracts + refractive error +wears bifocals
  - Takes 4+ medications, including high risk meds Bp meds, digoxin, citalopram and zolpidem
  - Borderline orthostasis
  - Cognitive impairment, depression?
  - Unsafe environment and behaviors (kitchen matt, waxed floor. barefoot, rushing)?

VERY IMPORTANT!
THE DR FOCUSED ON IT

Case

What <u>evidenced-based interventions</u> can you recommend to prevent future falls for this patient?



Reproduced with permission from: The Prevention of Falls in Older Persons: Clinical Practice Guideline (http://www.medcats.com/FALLS/frameset.htm) from the American Geriatrics Society. For more information visit the AGS online at www.americangeriatrics.org. UpToDate®

Multifactorial Assessment With Targeted Intervention

Most commonly studied & consistently effective.

20+ trials showing **27% (2-37%)** fall risk reduction for community dwelling older adults.

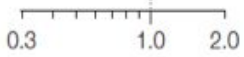
USPSTF recommendation for prevention

- Annual question about falls
- **Exercise or physical therapy and vitamin D supplementation** to prevent falls in community-dwelling adults aged 65 years or older who are at increased risk for falls.

Falls Prevention

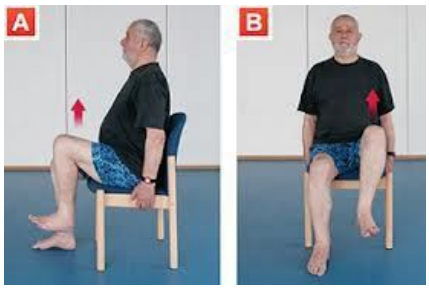
Community-Dwelling Older People[a]

Intervention[b]	No. of Trials[c]	No. of Participants	Pooled Rate Ratio (95% CI)	Heterogeneity[d] I^2, %	Heterogeneity[d] *P* Value
Exercise programs (multiple-component)					
Group classes	16	3622	0.71 (0.63-0.82)	48	.02
Home-based programs	7	951	0.68 (0.58-0.80)	0	.97
Tai Chi classes	5	1563	0.72 (0.52-1.00)	72	.006
Multifactorial interventions	19	9503	0.76 (0.67-0.86)	85	<.001
Vitamin D supplementation	7	9324	1.00 (0.90-1.11)	69	.003
Selected for lower levels of serum vitamin D	2	260	0.57 (0.37-0.89)	0	.79
Not selected for lower levels	5	9064	1.02 (0.93-1.13)	70	.009
Home safety assessment and modification	6	4208	0.81 (0.68-0.97)	64	.02
Higher risk of falling	3	851	0.62 (0.50-0.77)	0	.54
Not selected on fall risk	3	3357	0.94 (0.84-1.05)	0	.44
Cardiac pacing[e]	3	349	0.73 (0.57-0.93)	51	.13



Exercise

Tai chi



HOME SAFETY CHECKLIST

BrightStar MAKING MORE POSSIBLE

At BrightStar Care®, we understand that experiencing a fall can be a life-changing event. That's why we've developed our "Focus on Falls" program, a unique approach that pairs our clinical expertise with patient education for you and your family to reduce fall risk by helping to address common causes of falls in seniors, including environmental hazards both inside and outside the home. Use this Home Safety Checklist to guide you through key environmental considerations to see where you can increase home safety and reduce the likelihood of falls in your home or that of a loved one.

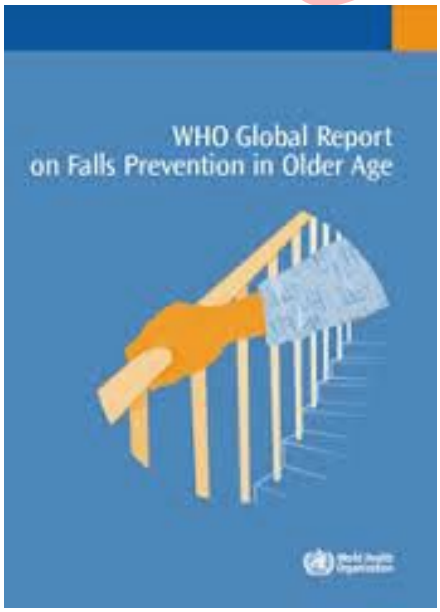
Check "YES" or "NO" for each item. Any "NO" answers indicate a potential need for changes to your environment.

BATHROOM	YES	NO
Is the path from the bedroom to the bathroom well lit?		
Are there grab bars near the toilet and in the shower and bathtub?		
If you have difficulty standing in the shower, do you use a shower seat?		
Do your bathmats have slip-resistant backing?		
Do you remove soap build in your shower/bathtub up to avoid slipping?		
Can you reach soap in the shower without bending down or turning too far around?		
Do you have a raised toilet seat if you have difficulty standing up and sitting down?		
Are spills cleaned up immediately?		
BEDROOM	**YES**	**NO**
Is there a table close to your bed with a lamp and room to store eyeglasses and a phone?		
Are cords pushed back against the wall?		
Is there clutter on the floor?		
Do you have a motion sensor night light?		
KITCHEN	**YES**	**NO**
Are throw rugs/floor mats secure?		
Can you get to regularly used items without bending down or reaching up too far?		
Are spills cleaned up immediately?		
Is food prepared at the kitchen table?		

Fall Prevention Checklist

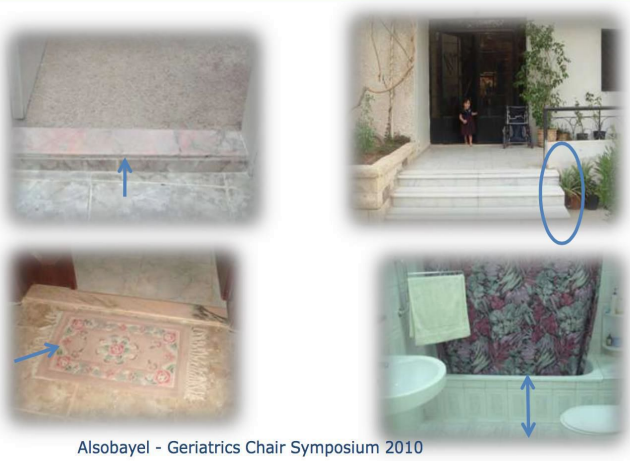
- ☐ Install sturdy handrails on both sides of stairs.
- ☐ Keep your home free of clutter. Be aware of tripping hazards; animals, small rugs, uneven flooring, and unsecured bedding.
- ☐ Place a slip-proof mat in the tub.
- ☐ Keep phone and electrical cords out of any pathway.
- ☐ Get a portable phone or medical alert device.
- ☐ Install good lighting and use night-lights throughout your home.
- ☐ Install handrails in bathtub and toilet areas.
- ☐ Walkers, canes, and other assistive devices, should be kept in good condition and used at all times rather than using furniture or walls for balance.
- ☐ Wipe up any spills immediately.

Home Safety



Done by special care providers to assess the barriers in houses and modify it to become elderly friendly.

Environment Assessment



Alsobayel - Geriatrics Chair Symposium 2010

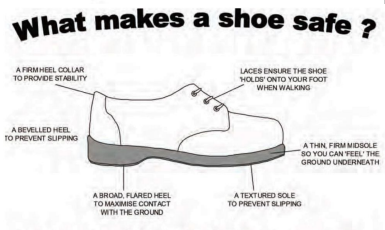
Vitamin D

Many older adults will need higher supplement levels (eg, at least **1000 IU daily**) to achieve 25 hydroxyvitamin D levels sufficient for falls and fracture prevention. (The American Geriatrics Society)

Preventing The Complications of Falls

Assistive devices:

Better than the single headed cane



Preventing the Complications of Falls

Hip protectors

- Effectiveness??
- Compliance (not good)
- Setting
- Time on floor

Summary

- It is common in elderly.
- The cause is always **multifactorial.**
- The most important risk factor is **a previous fall.**
- The prevention is **Multifactorial Assessment with Targeted Intervention.**
- We need to know the risk of falls in **any patient** in the hospital **at all times.**

Falls are preventable

IMPORTANT CASE

Mrs. FB a 82-year-old woman who recently fell at home (Slipped while in the bathroom) History of two previous falls one coming down stairs four months ago; no serious injury and one on her driveway last year: right distal radial wrist fracture. Now she has a fear of falling and needs your management!

Physical Examination

- Height: 155 cm (61 inches)
  - "I used to be 5' 4"
- Weight: 54.5 kg (120 lbs)
- Body mass index (BMI): 22.7
- Blood pressure: supine,125/80 mmHg; standing 105/70 mmHg
- Rib-to-pelvis: one finger
- Get-up-and-go test (timed): Can't rise from chair without armrests; Needs to steady herself before walking; 16 seconds for 3 m
- Mild kyphosis

Medications

- Hydrochlorothiazide 25 mg daily
- Amlodipine 10 mg daily
- Ramipril 10 mg daily
- Sertraline 100 mg daily
- Lorazepam 1 mg daily (at bedtime)
- Calcium 500 mg daily
- Multivitamin 1 daily

Social history

- Lives alone in the community in a small two-storey house (her home of 40 years)
- One supportive daughter
- Non-smoker (never smoked)
- Relatively inactive physically
- Husband died seven years ago
- Retired teacher

Family History

- Mother became very stooped, but no history of fractures
- Father had hypertension

Cognitive Assessment

- Montreal Cognitive Assessment: 27/30
- Geriatric Depression Scale (15-item): 4/15

Past medical History:

- Hypertension
- Depression (after death of her husband seven years ago); no prior episodes
- Insomnia
- Gastroesophageal reflux (GERD)
- Dependent pedal edema
- Cholecystectomy

Functional History

- Independent in all basic activities of daily living
- Daughter assists with weekly shopping; she is independent in all other instrumental daily activities (e.g., medication management, telephone, laundry and housekeeping)

IMPORTANT CASE

1. Discuss with your team important points in history taking and examination

- In the history:
  - **Age (above 65),**
  - **Gender (female),**
  - **History of fall and fracture**
  - **Fear of falling.**
- PE:
  - **Orthostatic hypotension** (a decrease of 20 mmHg in systole and/or 10 mmHg in diastole upon standing)
  - **Increased get up and go time (more than 12)**
  - **Rib to pelvis** (normal ≥4 fingers)
  - **Kyphosis** (indicates the increased risk of pathological fractures and osteoporosis)
  - **Loss of height (**might indicate a vertebral compression fracture)
- Medications: (that increase the risk of falls)
  - **Hydrochlorothiazide**
  - **Lorazepam**
  - **Amlodipine**
  - **Ramipril**
  - **Sertraline** (SSRI)

  } 3 classes of antihypertensives all in max dose (polypharmacy) → can explain orthostatic hypotension
- **Social history** (if support is available, independence)
- **Family history**
- **Cognitive assessment** (normal ≥26)
- **Screen for advanced skills** (e.g. financial management, driving, and medication use)

2. Discuss the indications for osteoporosis screening in postmenopausal woman

- **Age** (≥65 year old female)
- **Physical inactivity**
- **Family history of osteoporosis**
- **Previous fractures**
- Conditions such as **RA**, or history of taking some medications such as **glucocorticoids** (≥50 year old taking steroids) .
- **Ruling out secondary osteoporosis** (hyperthyroidism, vit D deficiency, hyperparathyroidism)

IMPORTANT CASE

3. What impact does the fall history have on Mrs. FB's risk for osteoporosis and future fractures?

- **Highest risk factor of falling**
- **History of a fragility fracture** (minor trauma caused fractures)

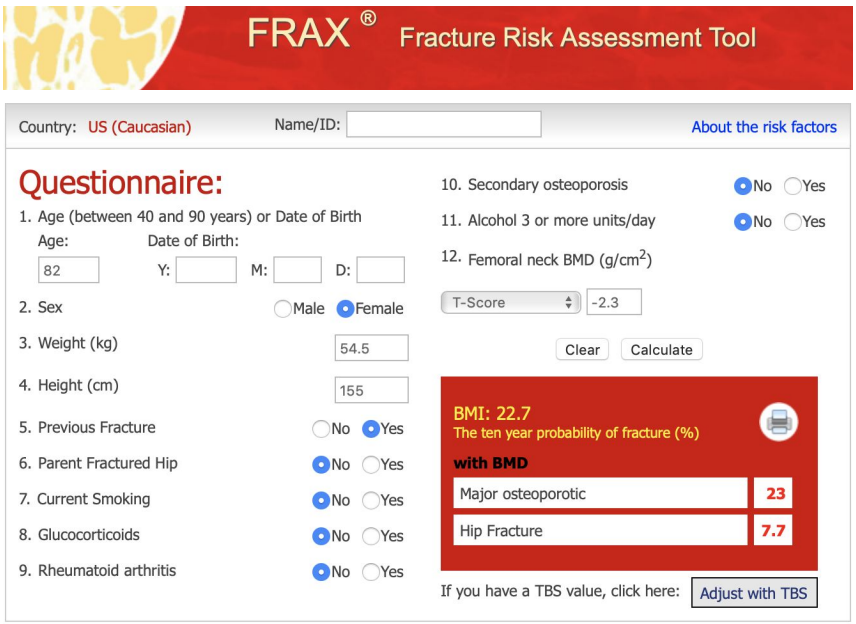
4. Given Mrs. FB's history, what further testing would you consider?

- **DEXA**, assess bone density and compares it to healthy young adults, gives T-Score
- **FRAX calculator**

5. Based on the history and results of investigations (results: BMD Femoral Neck T score = -2.3 Lumbar spine (L1-L4) T-score = -1.9, What is Mrs. FB's risk level for future fracture?

- **Major osteoporosis 23%**
- **Risk of hip fracture 7.7%**

"It is recommended to start osteoporosis medications when a patient presents with low bone mass (T-score between -1.0 and -2.5 at the femoral neck or spine) and a 10-year probability of a **hip fracture ≥ 3%** or a 10-year probability of a **major osteoporosis-related fracture ≥ 20%**"



6. **What would you recommend for treatment to reduce Mrs. FB's risk of future fracture?**
   - **Lifestyle modifications:** weight bearing and balance exercises, footwear
   - **Vit D supplements** (daily dosage 800-1000)
   - **Calcium** (daily dosage 600-1200), dietary calcium is prefered.
   - **Medications reconciliation**
   - **Home safety check by a professional**
   - **Bisphosphonate**. (alendronate)

7. **Does Mrs. FB's other medical history raise any possible concerns with pharmacologic therapy for osteoporosis?**
   - **GERD** (might not tolerate bisphosphonates because they cause GI upset and heartburn)
   - Bisphosphonates interact with calcium.

Treatment Options:

1. **Bisphosphonates (**give recommendations to cause better medication tolerance e.g. lay on your back for 30 minutes after taking it, etc…)
2. If not tolerated at all:
   - Hormone Replacement Therapy (**HRT**) OR
   - **Teriparatide** OR
   - **Denosumab (**available as a six-monthly injections)
   - Refer to endocrinology if nothing of the previous options work

Questions

1. 75 years old patient known case of HTS and DM presented with history of recurrent falls He is taking Hydrochlorothiazide 25mg OD and Metformin 500mg BID. His v/s T36C, supine BP 129/80 and standing BP 99/65, O2 sat 98%, pulse 80 bpm, RR16 and BMI 28 which of the following risk factors explain his risk of recurrent falls?
    a. Obesity
    b. Gender
    c. Orthostatic Hypotension

2. A 79-year-old female patient, well known to you from 5 years of treating her hypertension, presents to your office for DEXA scan results Which of the following options define osteoporosis?
    a. A T-score of 1.0 up to 2.5 standard deviations below the mean of a healthy young adult (-1.0 up to -2.5).
    b. A Z-score of 1.0 up to 2.5 standard deviations below the mean of same-aged females (-1.0 up to -2.5).
    c. A Z-score of 2.5 standard deviations or more below the mean of same-aged females (≤-2.5).
    d. A T-score of 2.5 standard deviations or more below the mean of a healthy young adult (≤-2.5).

3. A 78-year-old female presents to the emergency department complaining of right buttock and hip pain. She denies loss of consciousness. Her daughter was at the scene quickly and found the patient awake, alert, and moving all extremities. Her vital signs are normal. Other than right hip tenderness, her examination is unremarkable. Which of the following is most likely to assist you in determining the cause of her fall?
    a. CT Scan (Pelvis)
    b. Glucose Level
    c. Mechanism of Fall
    d. X-Ray Hip

Questions

4. All of the following data elements are required to use the Fracture Risk Assessment Tool (FRAX Calculator), EXCEPT:
    a. Smoking Status
    b. Thyroid Hormone Levels
    c. Age
    d. Weight

5. During your physical assessment of eldery, which of the following physical maneuvers is most likely to assist you in evaluating the risk of future falls?
    a. Get-up and Go Test
    b. Test for Pulsus Paradoxus
    c. Lumbar Spine Flexibility Test
    d. Test for Nystagmus

Answers:
1. C
2. D
3. C
4. B
5. A