Primary Care Approach for Evaluating the Risk of Falls with Elderly Patients

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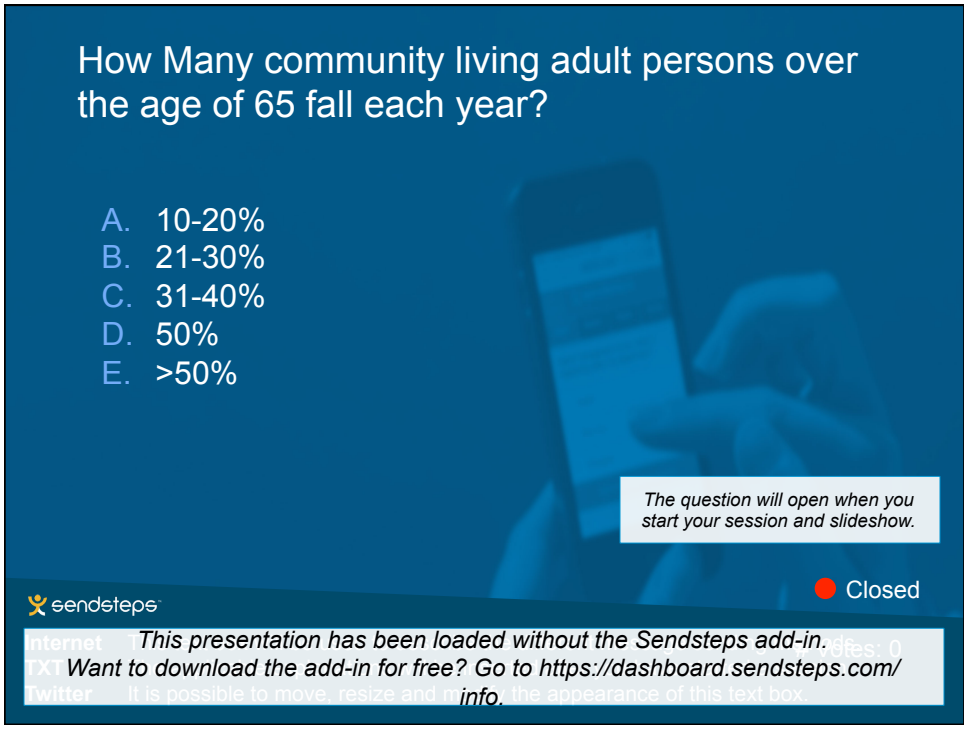
How Many community living adult persons over the age of 65 fall each year?
A. 10-20%
B. 21-30%
C. 31-40%
D. 50%
E. >50%
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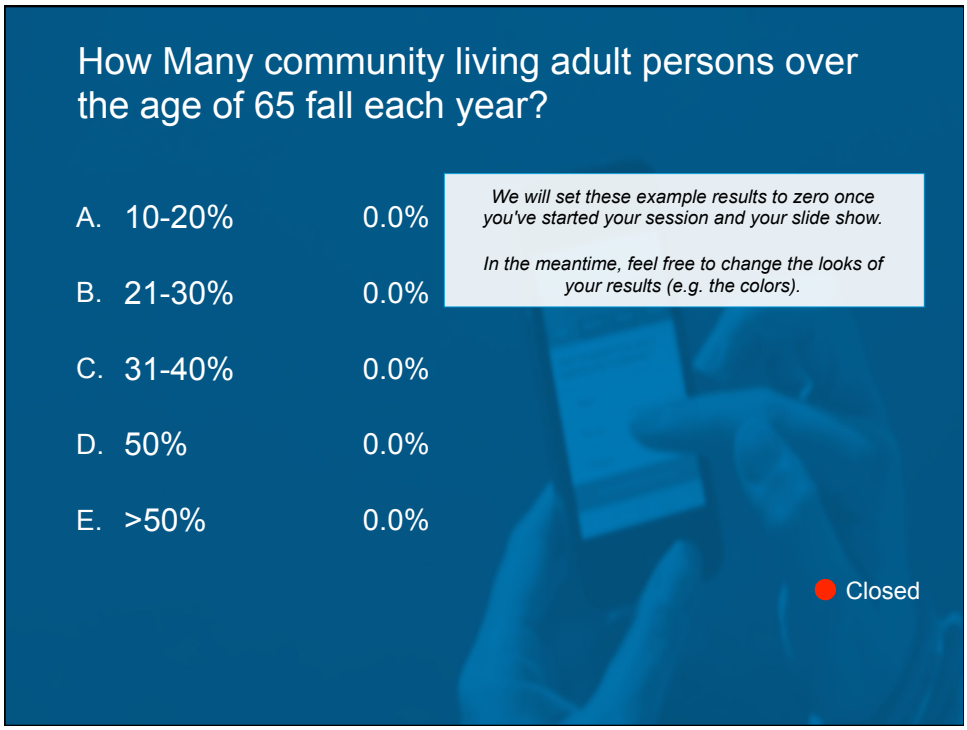
How Many community living adult persons over the age of 65 fall each year?
A. 10-20% 0.0%
B. 21-30% 0.0%
C. 31-40% 0.0%
D. 50% 0.0%
E. >50% 0.0%
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How many community living adult persons over the age of 65 fall each year?

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1. 10 – 20%
2. 21 – 30%
3. 31 – 40%
4. 50%
5. > 50%

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Which of the following statements about falls and injuries in older adults is true?

A. Falls are the leading cause of injury deaths
B. The majority of adults who die from falls are age 75 years
C. Among fallers 20-30% suffer moderate to severe injuires fractures or head injuries
D. Fallers age 75 years and older are 4-5 times
E. All of the above

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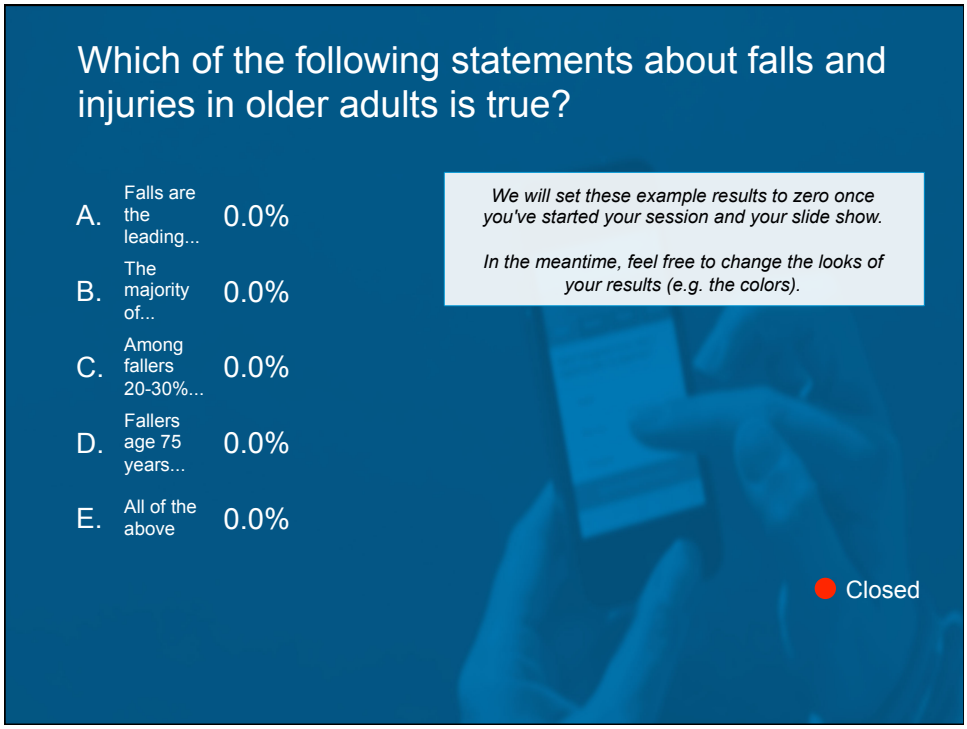
Which of the following statements about falls and injuries in older adults is true?
A. Falls are the leading... 0.0%
B. The majority of... 0.0%
C. Among fallers 20-30%... 0.0%
D. Fallers age 75 years... 0.0%
E. All of the above 0.0%
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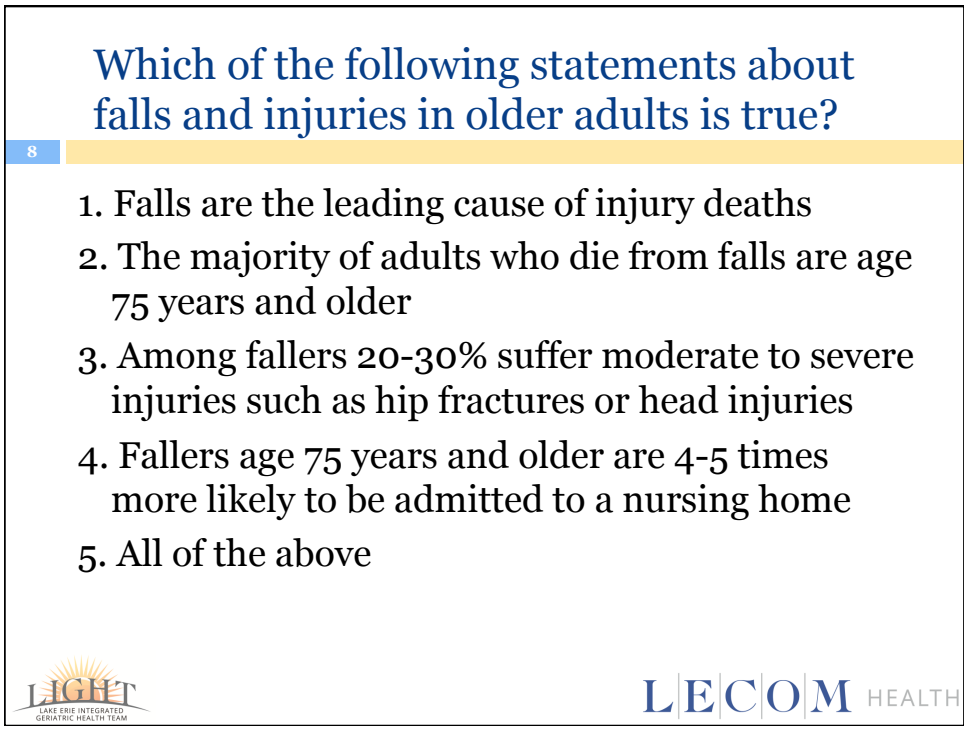
Which of the following statements about falls and injuries in older adults is true?
8
1. Falls are the leading cause of injury deaths
2. The majority of adults who die from falls are age 75 years and older
3. Among fallers 20-30% suffer moderate to severe injuries such as hip fractures or head injuries
4. Fallers age 75 years and older are 4-5 times more likely to be admitted to a nursing home
5. All of the above
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Which of the following statement about fall outcomes in older adults is true

A. Majority of falls cause fractures
B. Men sustain about 80% of all hip fractures
C. Over 300,000 hospital admissios per year for hip fracture States
D. Pelvic fractures are associated with the highest mortality related fractures

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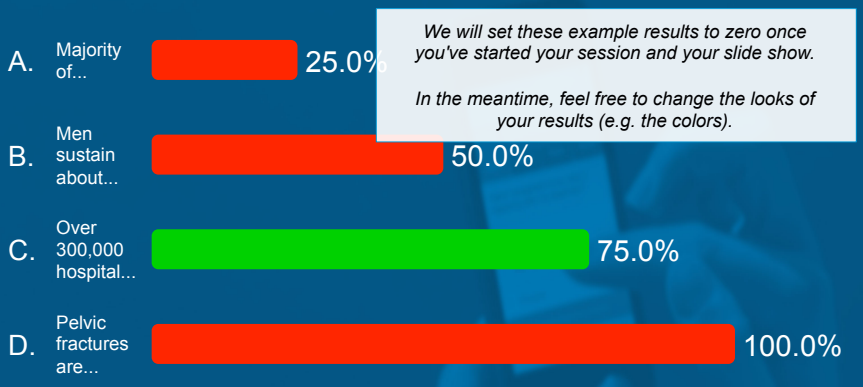

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Which of the following statement about fall outcomes in older adults is true?

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1. Majority of falls cause fractures
2. Men sustain about 80% of all hip fractures
3. Over 300,000 hospital admissions per year for hip fractures in the United States
4. Pelvic fractures are associated with the highest mortality among all fall-related fractures

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Definition of a 'Fall'

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Anyone inadvertently coming to rest on the ground or a lower level but not due to trauma or other overwhelming medical event (stroke, syncope)

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Overview of causes for falls

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- 1/3 - Intrinsic risk factors (medical and age-related factors)
- 1/3 - Medications, alcohol use and OTC products
- 1/3 - Extrinsic risk factors (environmental)

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Falls: Intrinsic Risk factors

- **Increasing Age**
- **History of Falls**
- **Female gender**
- **Medical Illness**
- **Peripheral Neuropathy**
- **Orthostasis**
- **Cognitive impairment**
- **Visual Impairment**
- **Lower extremity weakness**
- **Abnormal gait/ mobility**
- **Incontinence**
- **Depression**
- **Foot problems**
- **Hearing impairment**

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Colon-Emeric 2001

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Falls - Extrinsic Risk Factors
Medications

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- **Anticholinergics** – consider total anticholingeric load
- **Neuropsychiatric** – benzodiazepines, neuroleptics, antidepressants, anticonvulsants, antiparkinson, muscle relaxants, analgesics
- **Cardiovascular** – antihypertensives, antiarrythmics (type 1 A), digoxin, nitrates
- **Alcohol**
- **Histamine (H2) blockers** – cimetidine
- **Over-the-Counter** – cough / cold remedies, sedatives, antihistamines

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Ensrud 2002, Riefkohl 2003 LECOM HEALTH

Which of the following CNS medications has been associated with the largest increase in Falls?

A. Benzodiazepines (short and long acting)
B. Antidepressants-SSRI
C. Antidepressants-Tricyclics
D. Anticonvulsants
E. Narcotics

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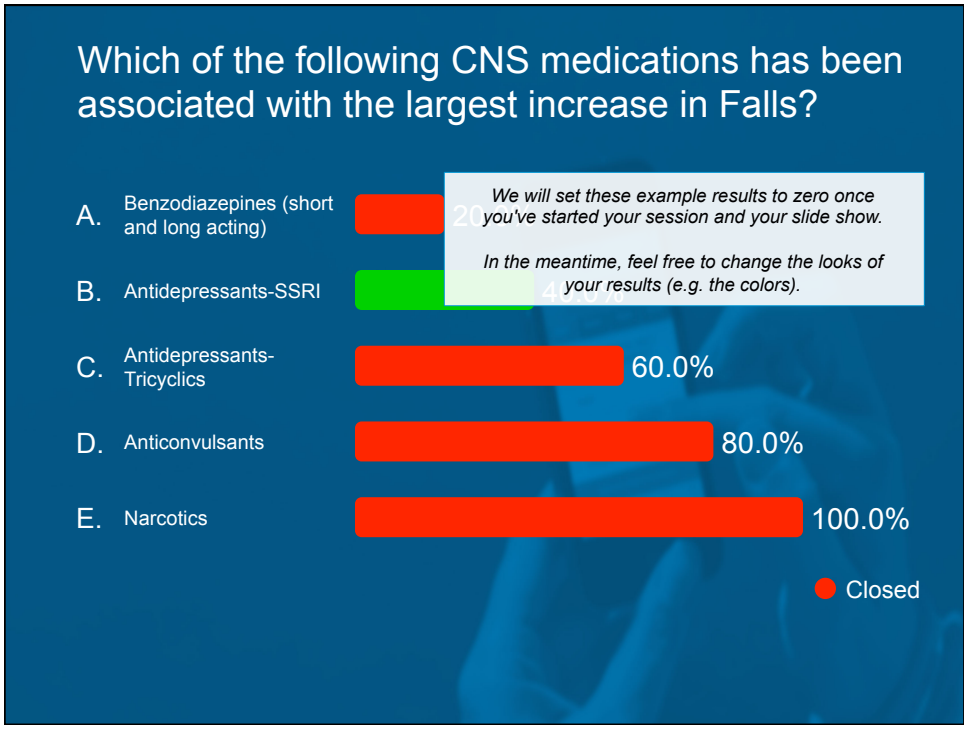

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2. Antidepressants-SSRI
3. Antidepressants-Tricyclics
4. Anticonvulsants
5. Narcotics

Ensrud KE J Am Geriatr Soc 50:1629-1637,2002

Falls: Extrinsic factors
Environment

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- Indoor hazards – slippery floors, rugs/carpet, poor lighting, shoes, bathroom fixtures, height of chair and bed, unstable furniture, stairways.
- Outdoor hazards- uneven pavement, steps, snow and ice.

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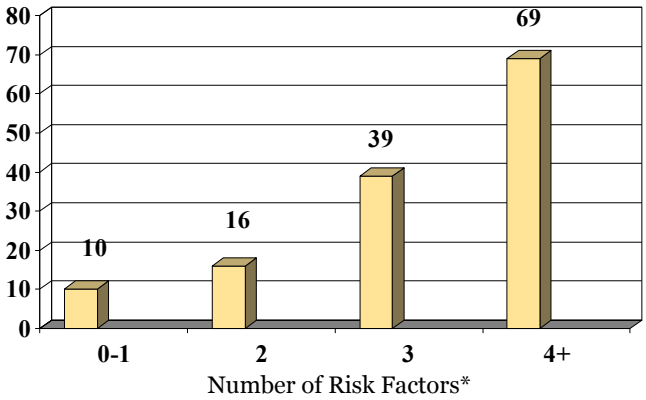
Nevitt 1989, Gill 1999 LECOM HEALTH

Multiple Falls vs. Number of Risk Factors

Percent with Two or More Falls in One Year



Number of Risk Factors*

* White, previous falls, arthritis, parkinsonism, difficulty rising, poor tandem gait. Nevitt JAMA, 1989. (n=825)

Clinical Approach to Falls

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- ***NOT*** *WHAT DISEASE* caused the problem? (Based on one disease/diagnosis model)
- ***BUT*** *WHAT COMBINATION* of Physiologic changes, impairments and diseases are contributing?
- ***AND*** *WHICH ONES* can be modified? (Multifactorial Impairment and Intervention Model)

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Timed 'Up and Go' test

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- Simple test of observing a person stand up from a chair, walk 10 feet, turn around, walk back, and sit down again.
- Correlates with ADLs
- Normal person takes < 10 seconds to complete the task
- Note: use of hands, staggering, unsteadiness
- Sensitivity, 54-87%; Specificity 74-87%

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Podsiadlo 1991 LECOM HEALTH

TUG

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Timed Get Up and Go Test

Interpretation of Performance on the Timed Get Up And Go Test

- < 10 sec.
  Low fall risk; clients are freely mobile; encourage regular exercise
- < 20 sec.
  Moderate fall risk; clients are independent with basic transfers; most go outside alone and climb stairs, many are independence with tub and shower transfers. PT referral may be appropriate.
- 20-29 sec.
  High fall risk; "Gray zone"; functional abilities vary. Physician or multidisciplinary team assessment recommended.
- ≥30 sec.
  Very high fall risk; Many are dependent with chair and toilet transfers; most are dependent with tub and shower transfers; most cannot go outside alone; few, if any, can climb stairs independently. Physician or multidisciplinary team assessment recommended.

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Timed Get Up and Go (TUG) Test

Bischoff (2003)

- Community dwelling elderly women ≤ 12 sec. on TUG normal
- Women in residential care – only 9% performed in <12 sec.; 42% were below 20 sec; 32% were between 20-30 sec. and 26% > 30sec.
- Suggests that community dwelling woman with TUG > 12 sec. should be referred for PT evaluation
- Over 50% of women in residential care at high or very high risk of falling

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Timed Get Up and Go Test

Nordin (2006)

- Individual variation in performance high in institutionalized elderly
- Variation increased with slower performance.
- Cognitive impairment or cuing did not increase variability
- Could use mean of three trials to obtain a more accurate score
- We do not know what this variability means in terms of falls risk prediction

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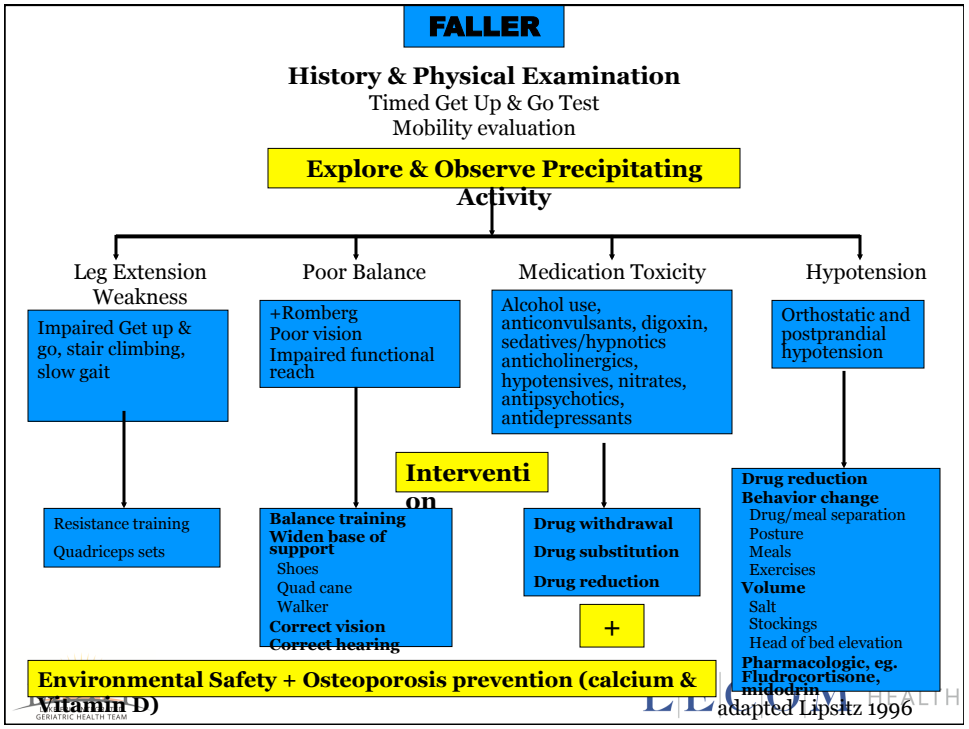

Case Study 1

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- Rose, an 80 years old widow, fell at home in bedroom.
- Able to ambulate after the fall but has slight abrasion on the right fore arm and bruise on the face.
- She has PMH of another fall 4 months ago, has OA of knees and hip, HTN, DM type 2, Macular Degeneration, urinary urgency with occasional incontinence and sleep difficulties.
- Chronic pain from OA but functional prior to the fall
- Daughter has noticed mild confusion at times and limitation of her activities due to weakness.

Case Study 1

29

- Medications: HCTZ, Fentanyl patch, KCL, Tylenol PM, Multivitamin
- Examination: BP normal, no orthostasis, edema, vision 20/50, Chest – few basal crackles on right, absent ankle reflexes, Romberg's negative, painful right hip – antalgic gait
- Timed get up and go test: 18 seconds, use of arms to get out of chair
- Lab: Hb 11, WBC 11, K 3.0, Glu 212, Urine – WBC 20, L. esterase +, protein +, nitrite +

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What is the most important risk factor for Rose's recent fall?

A. History of previous falls
B. Medications
C. Possibility of infection (UTI) and delirium
D. Gait disorder
E. visual impairment
F. All of the above

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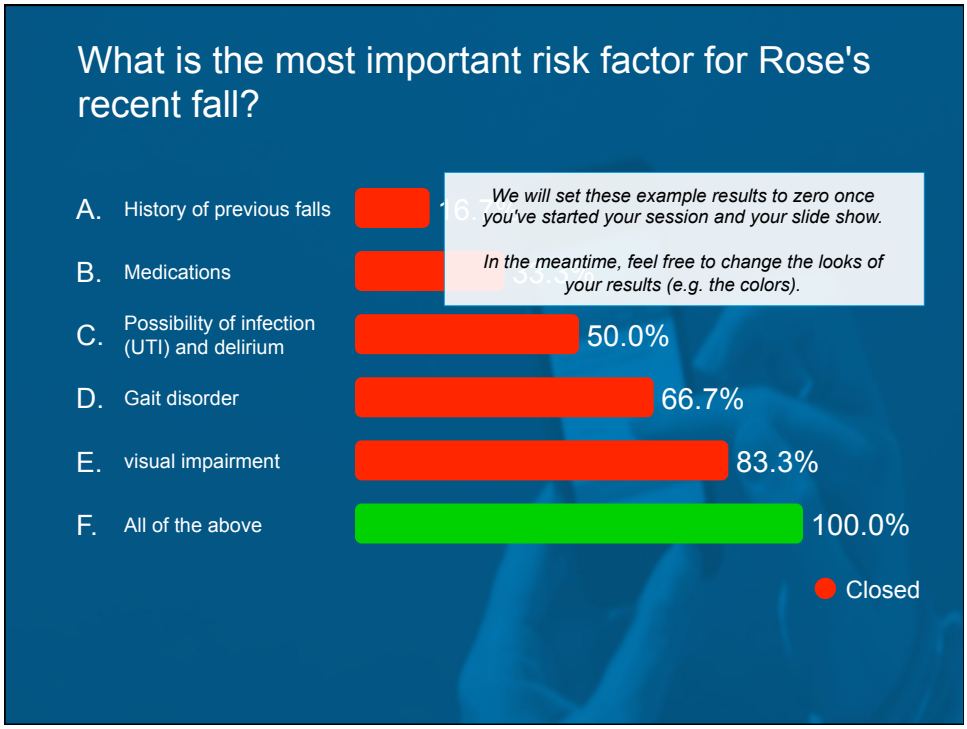

What is the most important risk factor for Rose's recent fall ?

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1. History of previous falls
2. Medications
3. Possibility of infection (UTI) and delirium
4. Gait disorder
5. Visual impairment

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- What other risk factor(s) may be contributing to Rose's falls?

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Falls: Multifactorial Risk Factors

- Orthostasis
- Electrolyte abnormalities
- Dehydration
- Visual Impairment
- Dementia
- Chronic Pain
- Urinary urgency
- Diabetes
- UTI !
- Medication side-effects and OTC
- Deconditioning
- Delirium
- Environment
- OA and poor mobility

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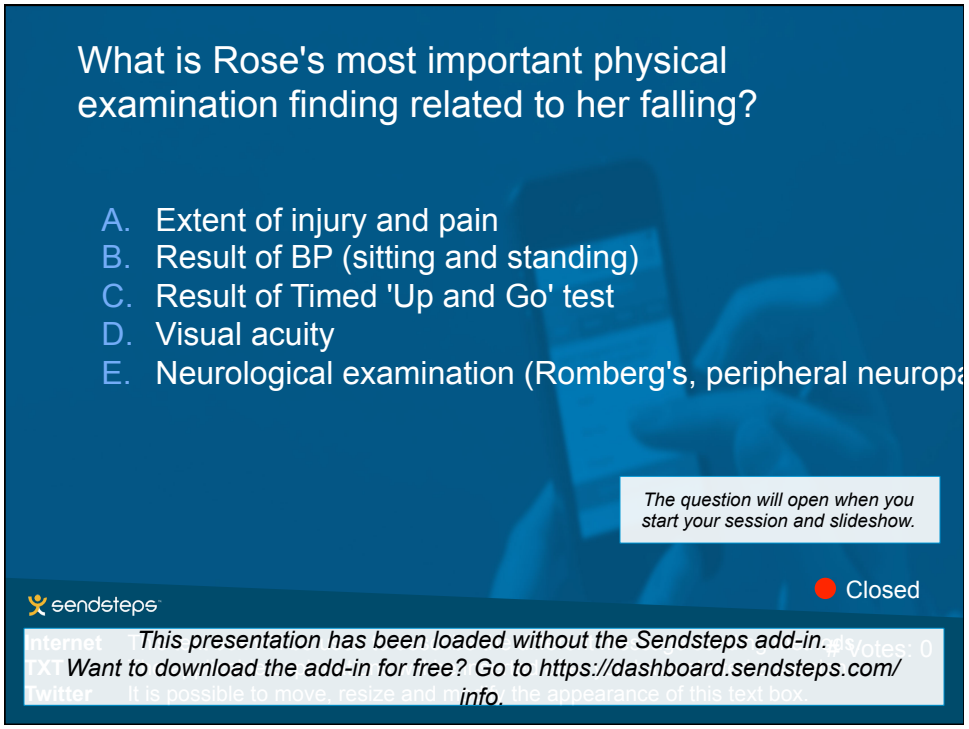
What is Rose's most important physical examination finding related to her falling?
A. Extent of injury and pain
B. Result of BP (sitting and standing)
C. Result of Timed 'Up and Go' test
D. Visual acuity
E. Neurological examination (Romberg's, peripheral neuropa
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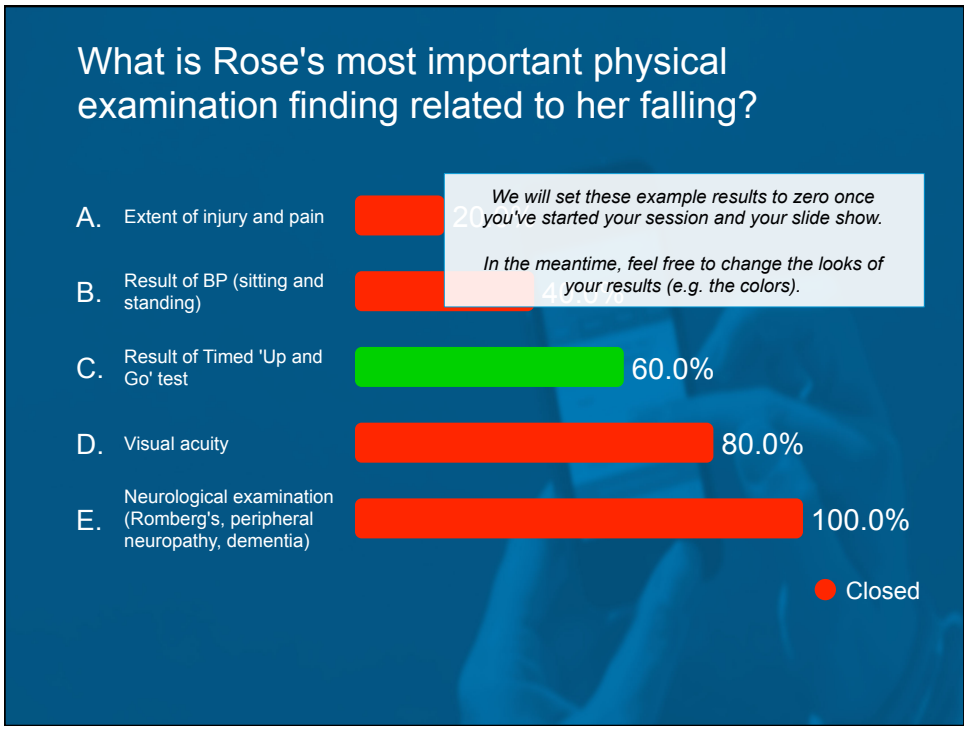
What is Rose's most important physical examination finding related to her falling?
A. Extent of injury and pain
B. Result of BP (sitting and standing)
C. Result of Timed 'Up and Go' test
60.0%
D. Visual acuity
80.0%
E. Neurological examination (Romberg's, peripheral neuropathy, dementia)
100.0%
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What is Rose's most important physical examination finding related to her falling?

37

1. Extent of injury and pain
2. Result of BP (sitting and standing)
3. Result of Timed 'Up and Go' test
4. Visual acuity
5. Neurological examination
   (Romberg's, peripheral neuropathy, dementia)

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Learning Objectives:

- Identify aging changes and risk factors for falls in the elderly.
- Develop an approach to assessment of a person with falls, balance and gait disorder in an older adult.
- Understand the role of medications and environmental factors in the prevention and management of falls.
- Learn practical effective management strategies for falls in ambulatory practice and develop practice protocols for fallers.

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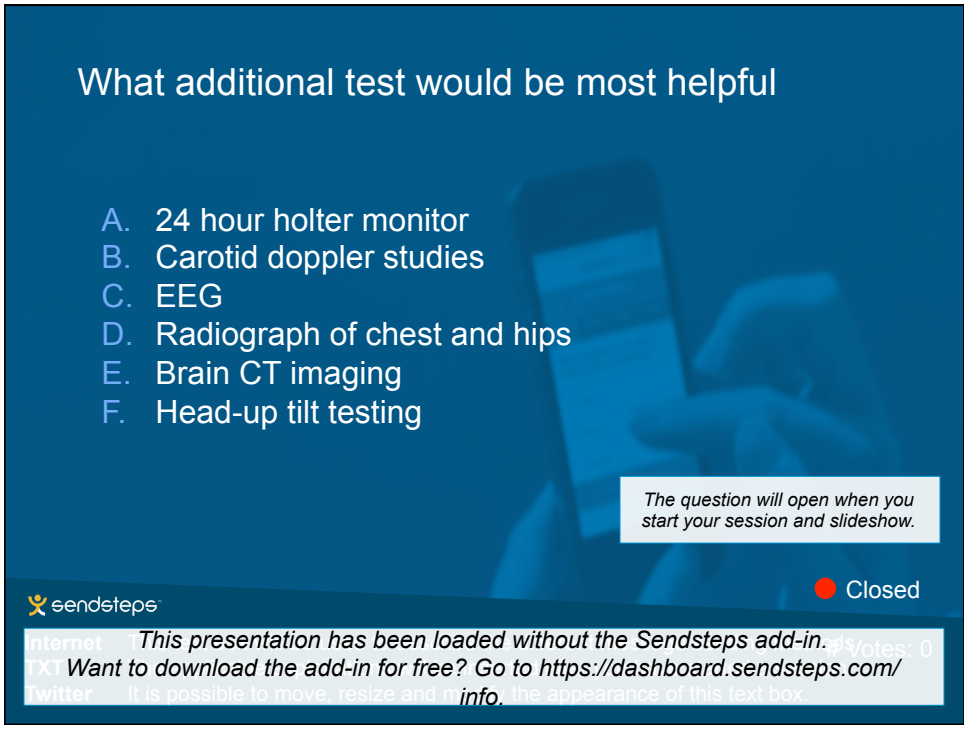
What additional test would be most helpful
A. 24 hour holter monitor
B. Carotid doppler studies
C. EEG
D. Radiograph of chest and hips
E. Brain CT imaging
F. Head-up tilt testing
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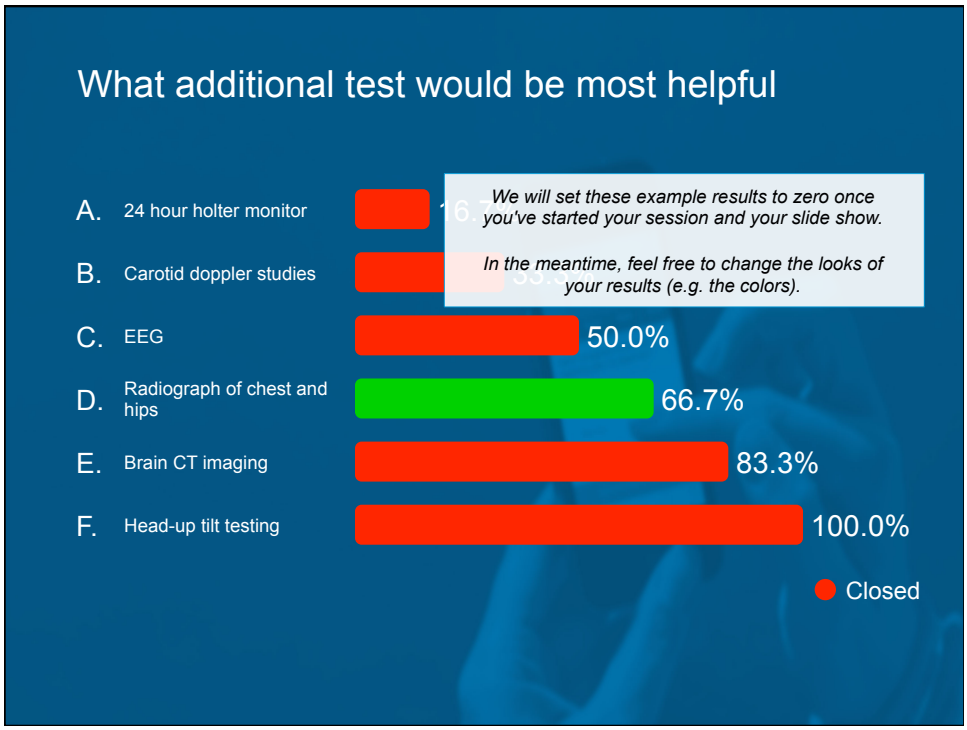
What additional test would be most helpful
A. 24 hour holter monitor
B. Carotid doppler studies
C. EEG 50.0%
D. Radiograph of chest and hips 66.7%
E. Brain CT imaging 83.3%
F. Head-up tilt testing 100.0%
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What additional test would be most helpful?

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1. 24 hour Holter monitor
2. Carotid doppler studies
3. EEG
4. Radiograph of chest and hips
5. Brain CT imaging
6. Head-up tilt testing

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What is the most important initial step in managing Rose's fall?

A. Reduction of HCTZ and CNS medications
B. Hydration and treatment of UTI
C. Treatment of injury and pain
D. Osteoporosis treatment
E. Counseling for "fear of falling"
F. Recommendation for use of hip protector

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What is the most important initial step in managing Rose's fall?

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What additional referral would be most useful for Rose

A. Ophthalmology consult
B. PT consult and strengthening exercises
C. Home safety assessment by OT
D. Neurology conusult
E. Cardiology consult

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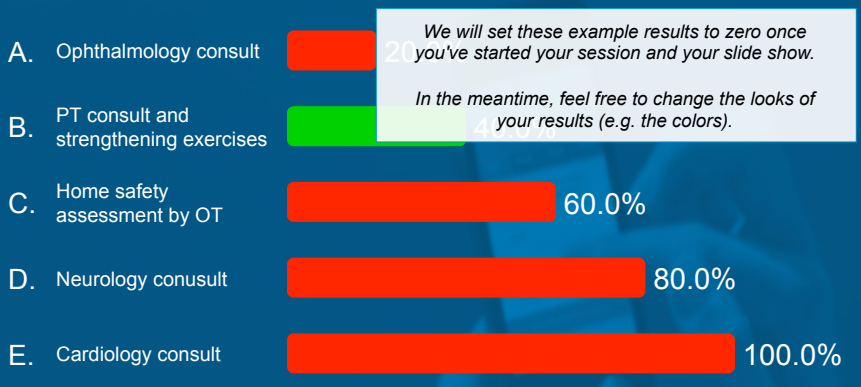

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What additional referral would be most useful for Rose?

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3. Home safety assessment by OT
4. Neurology consult
5. Cardiology consult

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Summary

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- Falls are a significant cause of morbidity and mortality in the elderly
- Falls in the elderly are multifactorial
- Multidisciplinary intervention approaches provide the best evidence for prevention and management.

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Assessment and Management in Primary Care Falls and Balance Problems in the Elderly - Part 2

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Detectable gait abnormalities are present in...

A. <10% of adults age 65 and over
B. 21-40% of adults age 65 and over
C. 41-50% of adults age 65 and over
D. 21-40% of adults age 85 and over
E. 41-50% of adults age 85 and over

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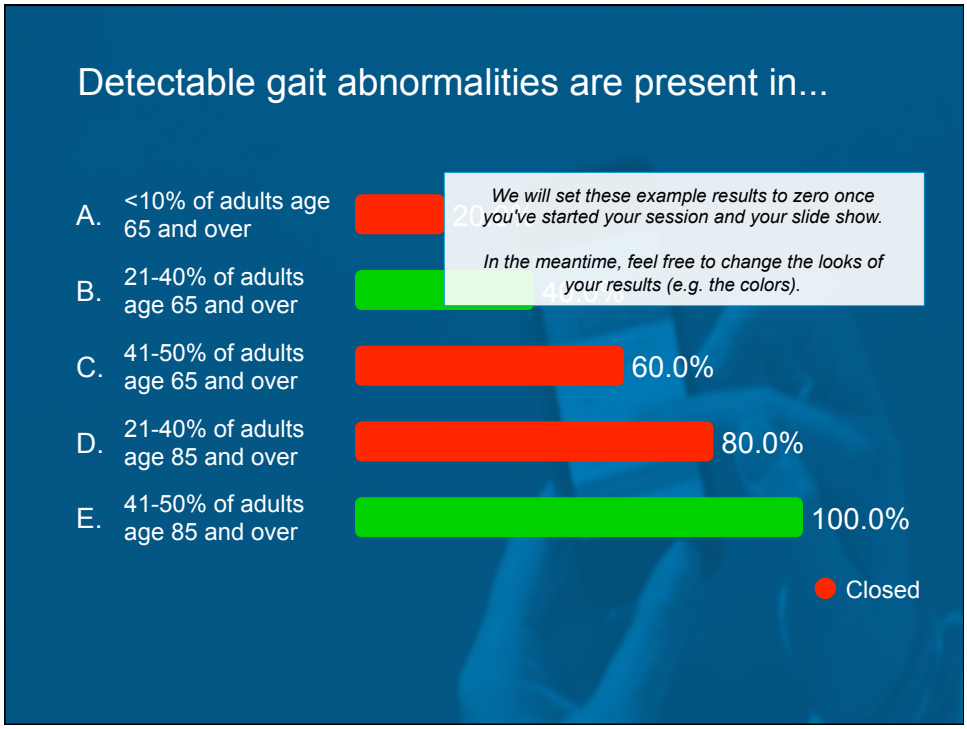

Detectable gait abnormalities are present in...

52

1. <10% of adults age 65 and over
2. 21 – 40% of adults age 65 and over
3. 41 – 50% of adults age 65 and over
4. 21 - 40% of adults age 85 and over
5. 41 - 50% of adults age 85 and over

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Which of these statements is true for adults age 75 and older?

A. 10% need assistance to walk across a room
B. 20% cannot climb stairs without help
C. >20% need personal assistance with ADLs
D. 40% cannot walk a half-mile
E. All of the above

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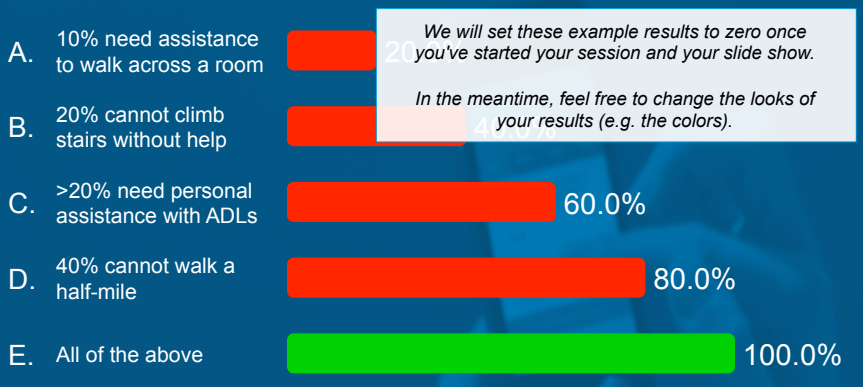

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Which of these statements is true for adults age 75 and older?

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4. 40% cannot walk a half-mile
5. All of the above

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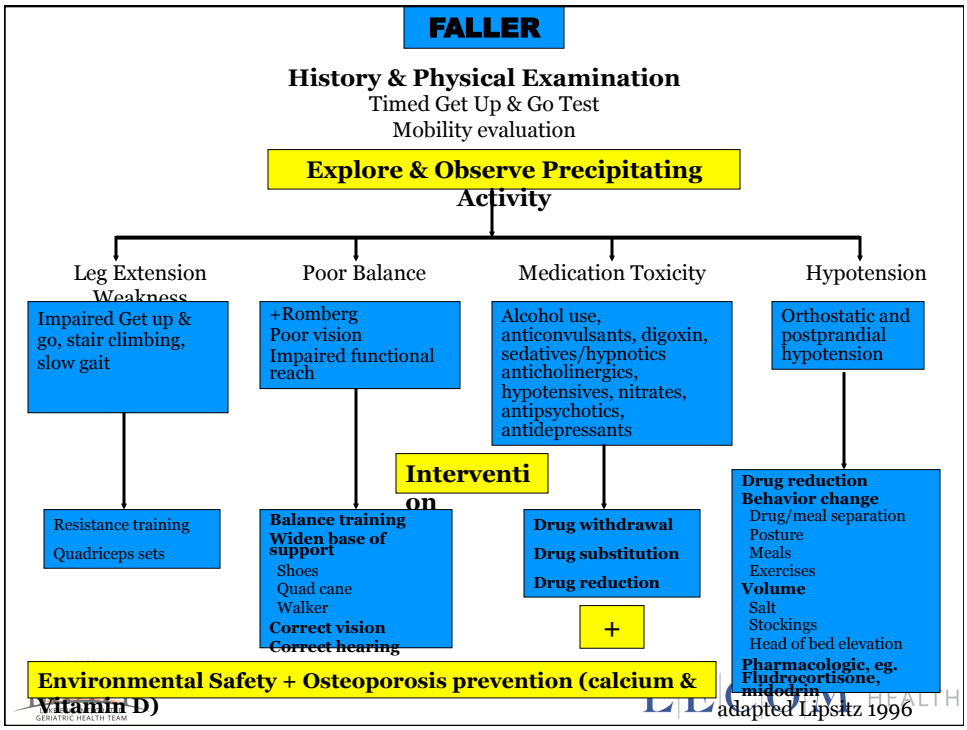

Demonstration of Romberg's test

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- Test for proprioception primarily to differentiate sensory ataxia (central and peripheral) from cerebellar ataxia
- Sharpened Romberg's may be helpful in the elderly

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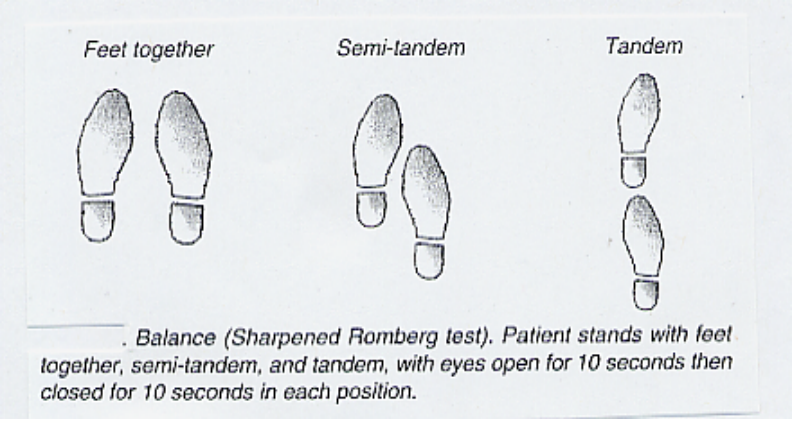
Sharpened Romberg's

59



. Balance (Sharpened Romberg test). Patient stands with feet together, semi-tandem, and tandem, with eyes open for 10 seconds then closed for 10 seconds in each position.

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Demonstration of single leg stance test

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- Best balance measure for any individual
- If one can stay on one leg for 10 seconds, there are usually no significant balance problems

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Bohannon 1984, Janda 1996

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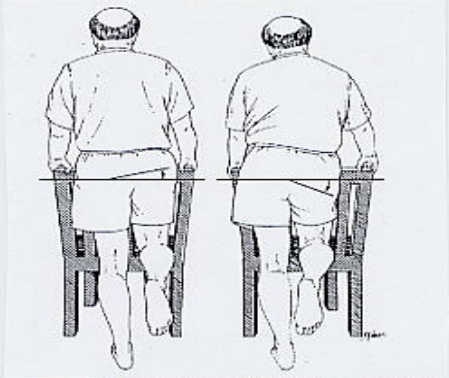
Modified Single leg Stance

62



Hip abductors. Patient stands behind back of chair and—while using fingertips for light support—slowly lifts one leg for 5 seconds. Repeat for other leg. Pelvis drop on non-weight-bearing side indicates muscle weakness.

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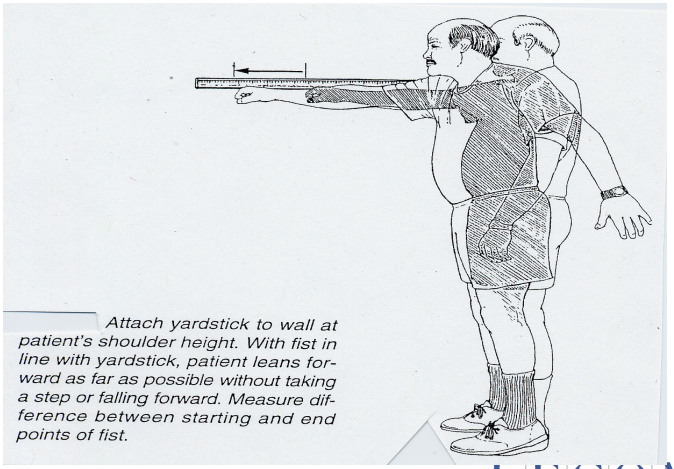
Functional Reach Test

- Measures forward and lateral balance; Sensitive to change over time
- Simple to administer
  - Arm extension with 90 degrees of shoulder flexion while patient is upright and leaning forward or sideways
- Results
  - < 6 inches related to falls
  - Minimal fall risk if >10 inches of reach

Duncan 1990

Functional Reach test

64



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Model of Balance Dysfunction

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- **Age-related physiologic changes**
  - Depth perception, contrast sensitivity, reaction time, muscle mass, wide base, stride length
- **Usual aging impairments**
  - Vision, Vestibular dysfunction, neuropathy
- **Presence of acute and chronic diseases**
  - CVA/TIA, BP postural drop, arrhythmia, OA, Parkinson's, dementia

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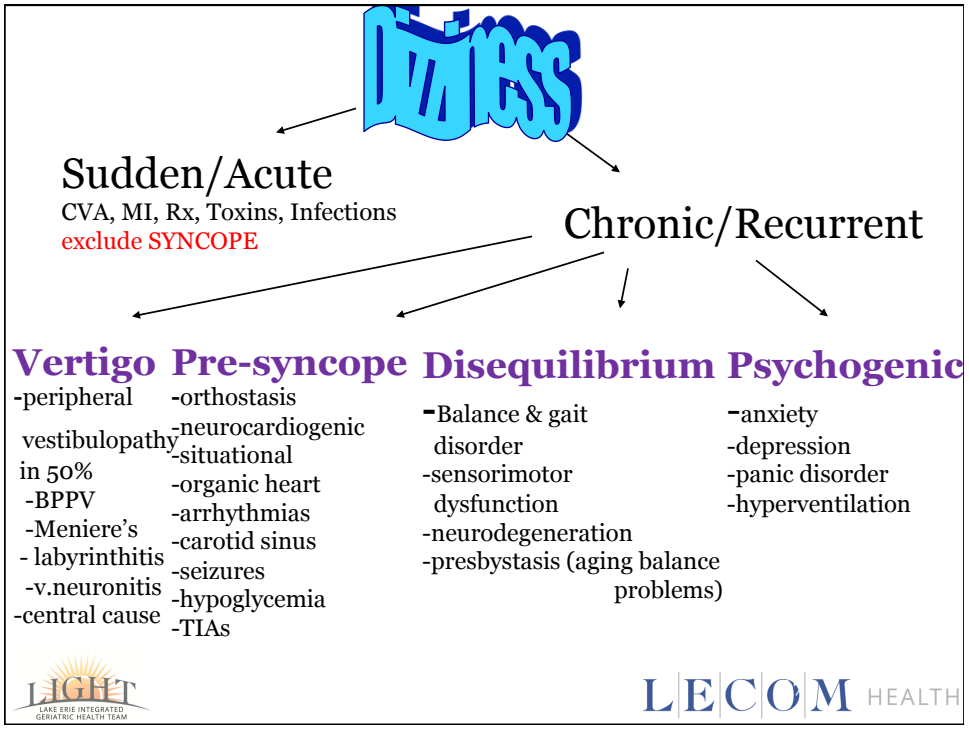

Case study 2

68

- Bill, a 73-years man got up after a restful night, ate a heavy breakfast and then fell in the bathroom
- He reports passing out briefly
- Past history of CAD, HF, OA, and early cataracts.
- Episodes of similar nature in the past in other places, sometimes with dizziness and mostly in the mid-morning.
- He is ambulatory and independent but has increasingly felt unsteady, losing balance while out shopping.

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Case Study 2

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- Medications: Captopril, Lasix, digoxin, calcium carbonate, multivitamin
- Examination: BP 106-110/70-75, pulse irregular, ankle edema, Kyphoscoliosis, absent ankle reflexes, wide gait, Romberg's unstable on closing eyes, Folstein 27/30
- Single leg stance – not possible, Functional Reach 5", Timed get up and go: 12 seconds
- EKG: atrial ectopics, rest blood and urine normal

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What is the most important risk factor for Bill's recent fall?

A. Visual impairment
B. Low toilet seat
C. Medication side effects
D. History of cardiovasculardisease
E. Recent meal

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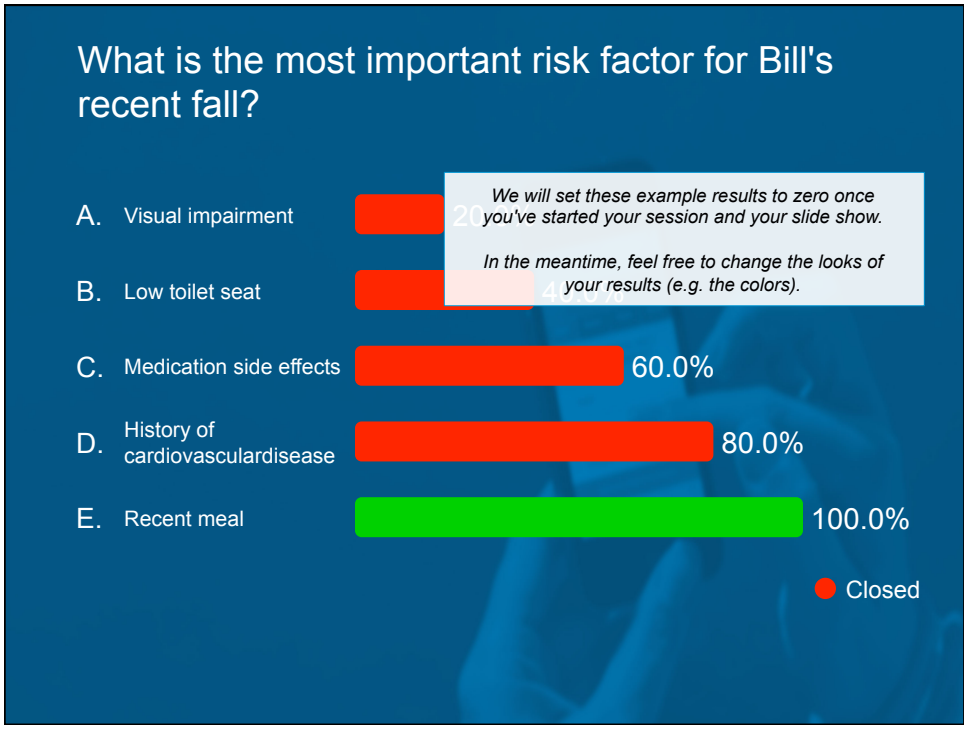

What is the most important risk factor for Bill's recent fall ?

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1. Visual impairment
2. Low toilet seat
3. Medication Side Effects
4. History of cardiovascular disease
5. Recent meal

What other risk factor(s) may be contributing to Bill's falls?

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Falls: Multifactorial Risk Factors

- Orthostasis
- Visual Impairment
- TIAs
- CAD/Arrhythmias
- Aging changes
- Medications side-effects
- Gait and balance disorder
- Misuse of alcohol
- Environment
- Seizures

What is Bill's most important physical examination finding related to his falling?

A. Result of Functional Reach test
B. Result of BP (sitting and standing)
C. Wide based gait changes
D. Romberg's test
E. Folstein min-mental status exam result

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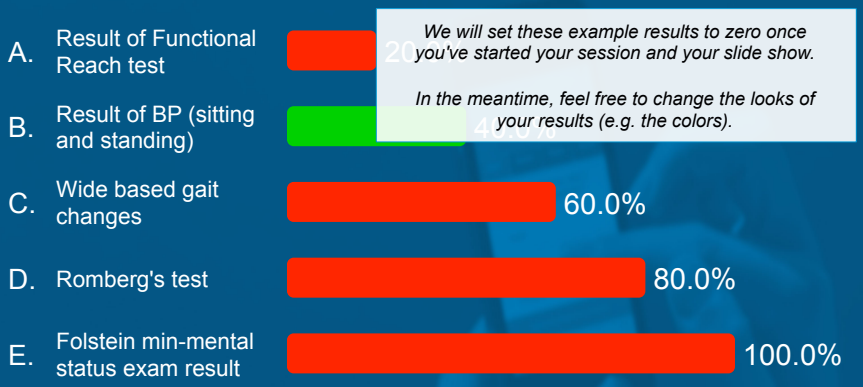
What is Bill's most important physical examination finding related to his falling?



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What is Bill's most important physical examination finding related to his falling?

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1. Result of Functional Reach test
2. Result of BP (sitting and standing)
3. Wide based gait changes
4. Romberg's test
5. Folstein mini-mental status exam result

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What additional test would be most helpful?

A. Digoxin levels
B. Carotid Doppler studies
C. Echocardiogram
D. Holter's 24 hour EKG tape
E. Cardiac Event (loop) recording

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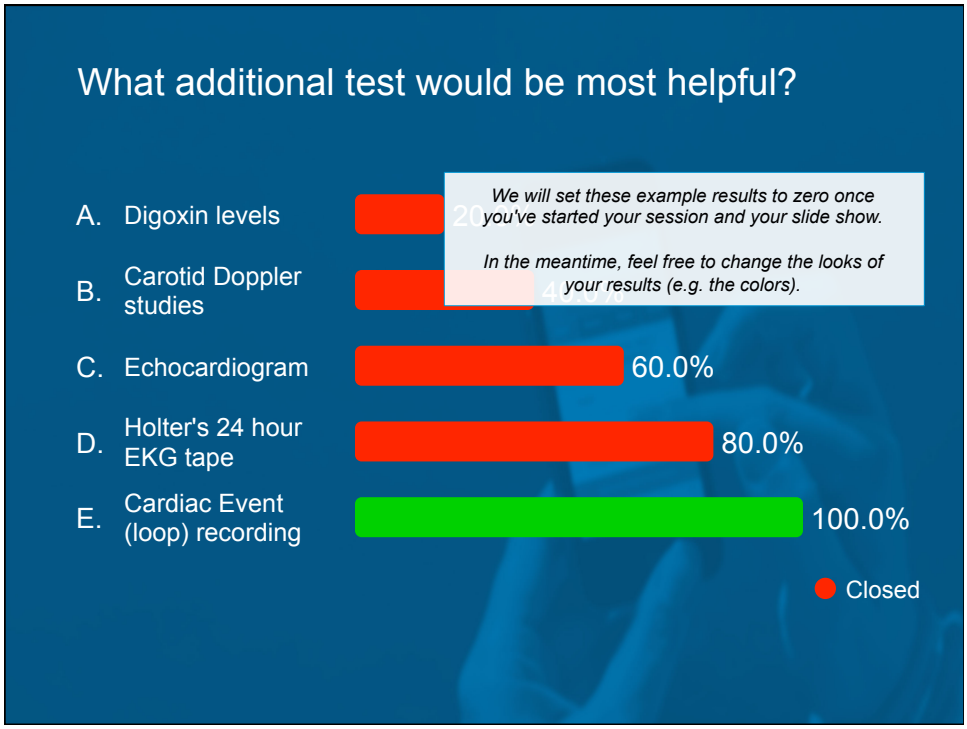

What additional test would be most helpful?

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3. Echocardiogram
4. Holter's 24-hour EKG tape
5. Cardiac Event (loop) recording

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What is Bill's most likely contributor for falls in your opinion?

A. Adverse drug effect and alcohol misue
B. Carotid sinus hypersensitivity
C. Postprandial hypotension
D. Transient ischemic attacks
E. Disequilibrium disorder

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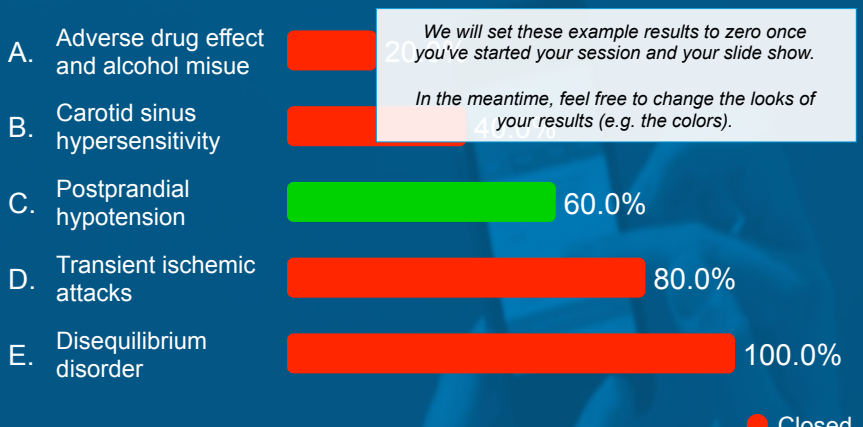
What is Bill's most likely contributor for falls in your opinion?



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What is Bill's most likely contributor for falls in your opinion?

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1. Adverse drug effect and alcohol misuse
2. Carotid sinus hypersensitivity
3. Postprandial hypotension
4. Transient ischemic attacks
5. Disequilibrium disorder

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What is the most important initial step in managing Bill's recurrent falls?

A. Medication review and dose adjustment
B. Small meals with increase in fluid and salt intake
C. Reduction in alchhol consumption
D. Use of support stocking
E. PT consult and balance exercises

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What is the most important initial step in managing Bill's recurrent falls?

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3. Reduction in alcohol consumption
4. Use of support stockings
5. PT consult and balance exercises

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Fall Mnemonic

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S Symptoms
P Previous falls
L Location
A Activity
T Time: time of day or night
T Trauma

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Fall Mnemonic

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I Inflammation of joints (or joint deformity)

H Hypotension (orthostatic blood pressure changes)
A Auditory and visual abnormalities
T Tremor (Parkinson's disease or other causes of tremor)
E Equilibrium (balance) problem

F Foot problems
A Arrhythmia, heart block or valvular disease
L Leg-length discrepancy
L Lack of conditioning (generalized weakness)
I Illness
N Nutrition (poor; weight loss)
G Gait disturbance

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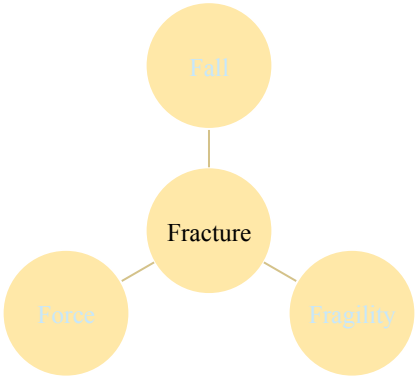
Fracture and fall dynamics



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Preventing Fractures and Injury

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- Osteoporosis
- Hip Protectors
- Use of alarms
- 'Breaking a fall' techniques
- Environment (indoor/outdoor) modification
- Shoe-wear
- Sitter, one-on-one attendance and supervision

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Hip Protector

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Summary

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- Falls are a significant cause of morbidity and mortality in the elderly
- Falls in the elderly are multifactorial
- Multidisciplinary intervention approaches provide the best evidence for prevention and management.

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