Dizziness in the Geriatric Patient

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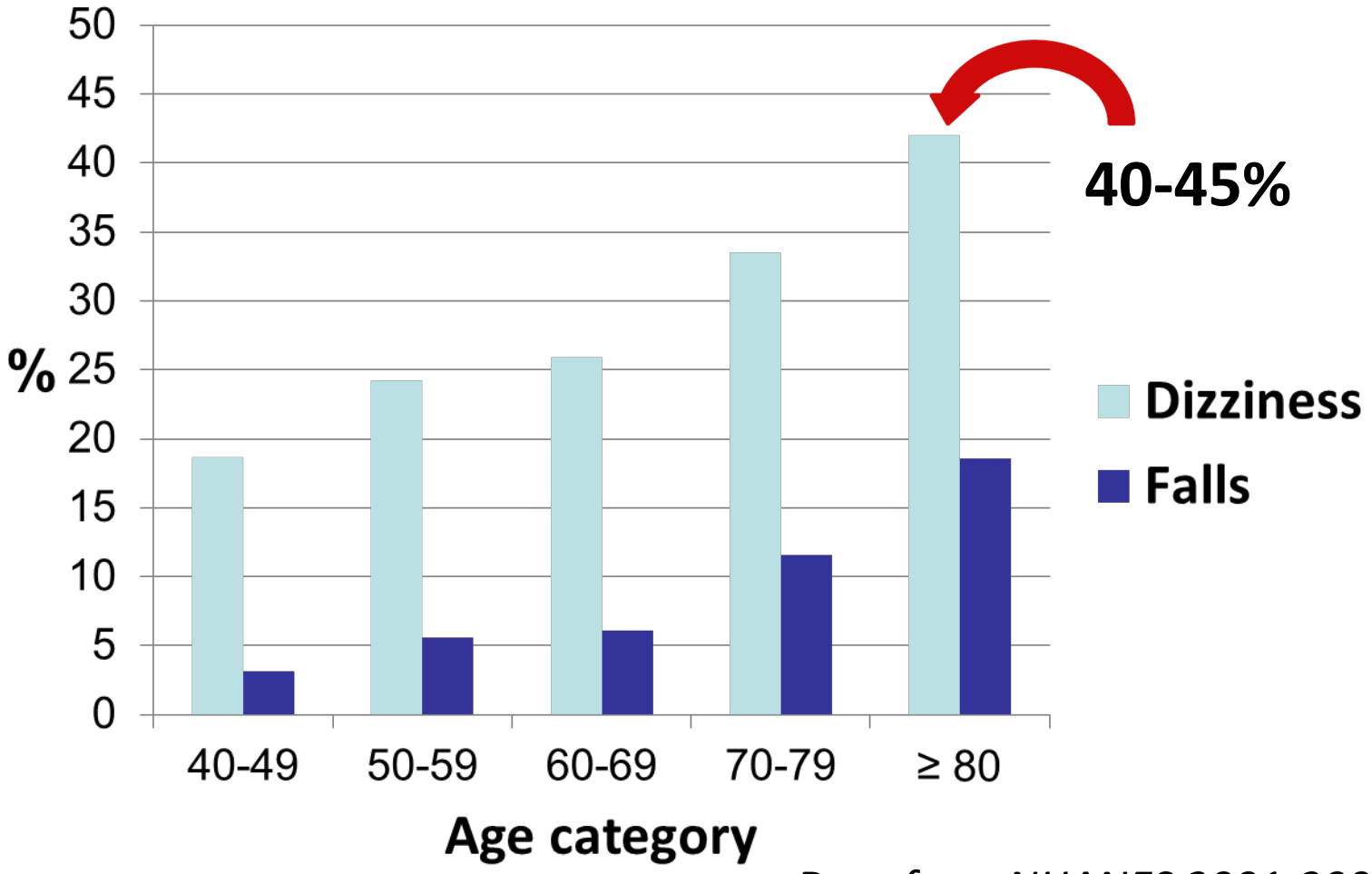
Outline

1. Magnitude and impact of dizziness, imbalance, and falls
2. Differential diagnosis and management of dizziness and imbalance
3. Falls prevention

Magnitude of the problem

Prevalence of dizziness and falls in the US population



Data from NHANES 2001-2003

Prevalence of balance impairment in US adults

Table 1. Prevalence of Vestibular Dysfunction in US Adults by Demographic and Cardiovascular Risk Characteristics, NHANES 2001-2004[a]

Characteristic	No. (%) of Participants[b]	Prevalence of Vestibular Dysfunction (95% CI), %[c]	*P* Value[d]
All participants	6785	35.4 (33.2-37.6)	. . .
Demographic Characteristics			
Sex			
Male	3326 (49.0)	34 (31.9-36.9)	.16
Female	3459 (51.0)	36 (33.6-39.1)	
Age, y			
40-49	1861 (27.4)	18.5 (15.4-21.7)	<.001
50-59	1336 (19.7)	33.0 (28.9-37.1)	
60-69	1482 (21.8)	49.4 (45.6-53.0)	
70-79	1187 (17.5)	68.7 (65.0-72.5)	
≥80	919 (13.5)	84.8 (81.3-88.4)	

Prevalence of balance dysfunction increases with age.

Agrawal Y, et al. Arch Intern Med. 2009.

Impact of dizziness and imbalance on daily activities

TABLE III.
Reported Functional Impacts of Balance Problems in the Elderly.

Impact of Balance Problem	No., Millions	SE, Millions	%	SE, %
Balance problem prevents doing things	1.88	0.14	27.4	1.8
Balance problem affects ability to exercise	1.14	0.11	61.2	3.5
Balance problem affects ability to go out for shopping	0.95	0.11	51.6	3.9
Balance problem affects ability to drive a motor vehicle	0.88	0.11	47.1	3.8
Balance problem affects ability to participate in social activities	0.85	0.11	45.8	4.0
Balance problem affects activities of daily living (bathing, dressing, eating, toilet)	0.48	0.08	25.7	3.5
Balance problem affects ability to ride in a car, plane, boat, or train	0.36	0.06	19.3	2.7

SE = standard error of the population estimate.

"Dizziness one of most influential symptoms affecting quality of life in older individuals"

Lin and Bhattacharyya. Laryngoscope. 2012.

Impact of dizziness and imbalance on health care utilization

TABLE I.
Type and Pattern of Health Care Sought for Dizziness or Balance.

Provider/Pattern	Weighted No., Thousands	SE, Thousands	%	SE %
Saw any health professional	3,439	158	50.0	1.7
Health provider seen				
General practitioner	2,930	139	85.6	1.9
Cardiologist or internist	1,038	96	30.3	2.4
Neurologist	818	81	23.9	2.0
Ear, nose, throat	576	63	16.8	1.6
Hospital or ER	817	87	11.8	1.2
Eye doctor	373	54	10.9	1.6
Nurse or nurse practitioner	255	62	7.4	1.7
Chiropractor	92	26	2.7	0.8
Osteopath	56	19	1.7	0.6
No. of heath care professionals seen				
1	1,353	93	40.6	2.3
2	778	76	23.4	2.2
3–4	713	87	21.4	2.1
5–9	341	62	10.2	1.7
10–14	81	34	2.4	1.0
≥15	66	20	2.0	0.6

ER = emergency room; SE = standard error of the population estimate.

TABLE V.
Type of Medications and Imaging Rates Used in the Setting of Dizziness or Balance Problem.

	Weighted No., Thousands	SE, Thousands	%	SE %
X-ray, MRI, or CT scan	2,004	111	56.7	2.1
Diuretics	1,287	73	36.5	2.0
Medication for anxiety	891	72	25.1	1.8
Meclizine	739	65	21.4	1.7
Motion sickness medication	350	51	9.9	1.4
Antibiotics injected in ear	67	13	1.9	0.4

CT = computed tomography; MRI = magnetic resonance imaging; SE = standard error of the population estimate.

Roberts and Bhattacharyya. Laryngoscope. 2013.

Balance impairment increases risk of falls

Table 3. Prevalence and Odds of Self-Reported Dizziness and History of Falls by Vestibular Dysfunction, NHANES 2001-2004[a]

	Self-Reported Dizziness[b]			History of Falls[c]		
	Prevalence (95% CI), %	Unadjusted OR (95% CI)	Adjusted OR[d] (95% CI)	Prevalence (95% CI)	Unadjusted OR (95% CI)	Adjusted OR[d] (95% CI)
Vestibular dysfunction[e]						
No	16.0 (13.8-18.1)	1 [Reference]	1 [Reference]	2.0 (1.2-2.9)	1 [Reference]	1 [Reference]
Yes	28.4 (25.7-31.1)	2.1 (1.8-2.5)	1.8 (1.5-2.2)	6.9 (5.6-8.3)	3.6 (2.3-5.4)	2.6 (1.6-4.1)

Balance impairment associated with increased odds of falling

Agrawal Y, et al. Disorders of balance and vestibular function in US adults: data from the National Health and Nutrition Examination Survey, 2001-2004. Arch Intern Med. May 25 2009;169(10):938-944.

Impact of falls

- > 1/3 community-dwelling adults >65yo fall each year
- 10% of falls result in major injuries such as hip fractures
- 10-fold increased risk of nursing home placement after fall with injury
- Costs estimated to exceed $34 billion annually in the US

Impact of dizziness and imbalance on mortality

TABLE II.
Adult Mortality Rates (Unadjusted) for Dizziness Compared to Four Leading Causes of Death in the United States.

Cause	No. Affected (Millions)	SE (Millions)	Mortality Rate (%)	SE (%)
Dizziness or balance problems	23.8	2.1	9.0	0.7
Cardiovascular disease	16.8	1.6	10.5	0.9
Cancer	16.8	1.8	11.6	0.9
Cerebrovascular disease	6.1	1.1	18.7	1.7
Diabetes mellitus	17.7	1.7	9.8	0.8

SE = standard error.

Dizziness associated with 1.7-fold increased in odds of mortality

Corrales and Bhattacharyya. Laryngoscope. 2016.

Dizziness and Balance Impairment

Most common etiologies for dizziness in older adults

Category	%	Examples
Vestibular disease	20-50%	Benign paroxysmal positional vertigo (BPPV), labyrinthitis, vestibular neuritis
Cardiovascular disease	10-30%	Arrhythmia, congestive heart failure, vasovagal conditions (e.g. carotid sinus hypersensitivity)
Systemic infection	10-20%	Systemic viral and bacterial infection
Psychiatric conditions	5-15%	Depression, anxiety, hyperventilation
Metabolic disturbances	5-10%	Hypoglycemia, hyperglycemia, electrolyte disturbances, thyrotoxicosis, anemia
Medications	5-10%	Anti-hypertensives, psychotropic medications

Sloane et al, Ann Int Med, 2001

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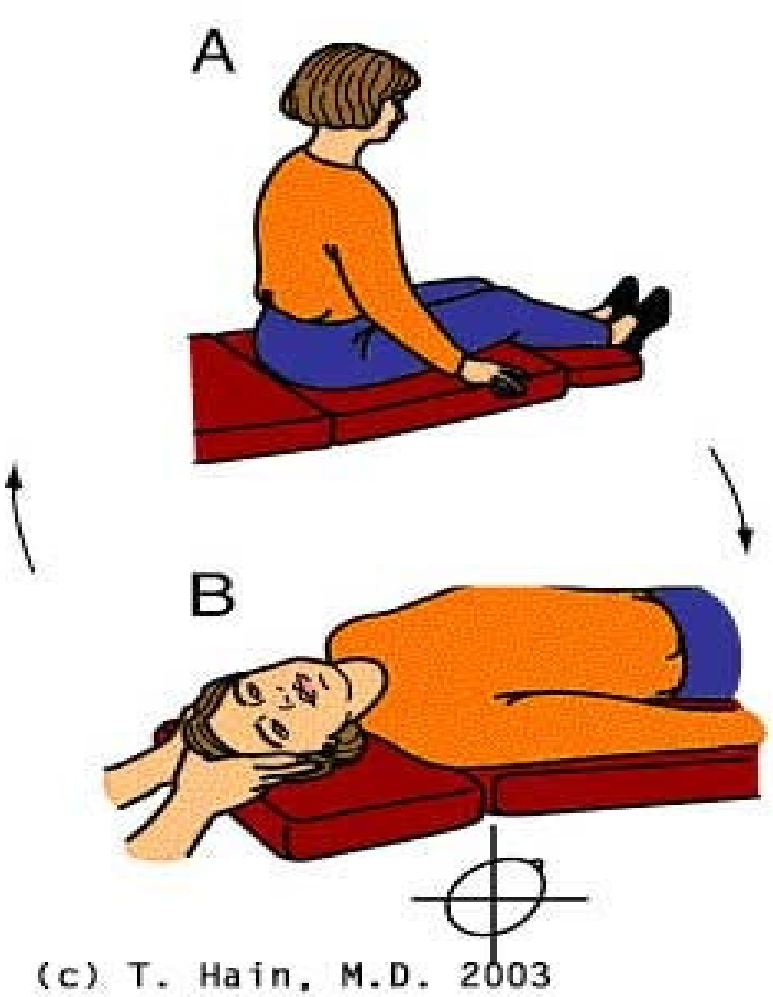
Vestibular disease

- Mostly diagnosed based on history
  - Duration of vertigo episodes (seconds, hours, days)
  - Provoked by movement?
  - Associated with hearing loss?
- Key physical exam maneuver:
  - Dix-Hallpike test to diagnose **BPPV** (benign paroxysmal positional vertigo)

Vestibular disease: BPPV (Benign paroxysmal positional vertigo)

- Lifetime incidence 10% by age 80
- Older adults do not always present with classic BPPV symptoms of brief episodes of rotatory vertigo
- A study of 100 patients in geriatrics clinic waiting rooms found that 9% had unrecognized BPPV (Oghalai et al 2000)

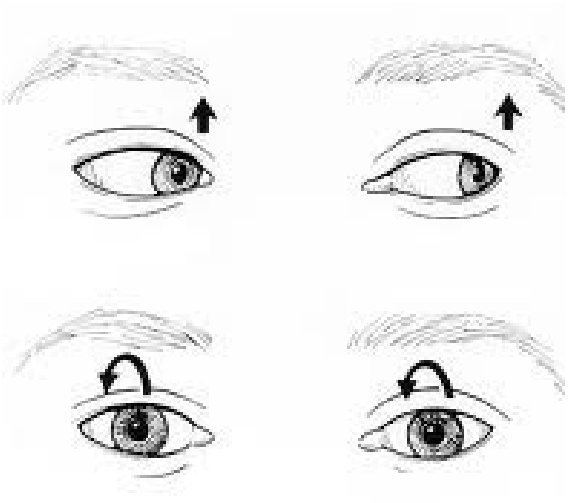
Dix-Hallpike maneuver



Video from Timothy Hain
dizziness-and-balance.com

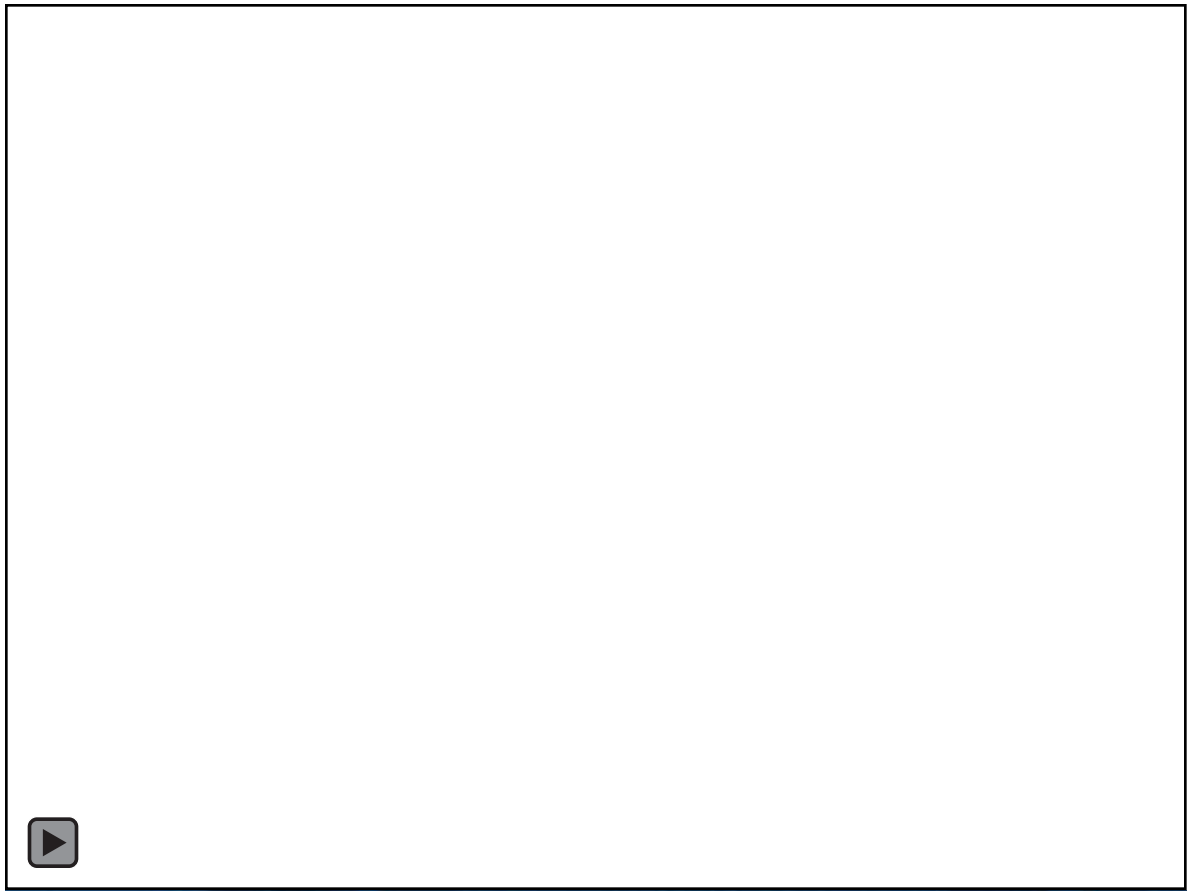
Vestibular disease: BPPV (Benign paroxysmal positional vertigo)

- Due to loose crystals in the semicircular canals, diagnosed with Dix-Hallpike maneuver



- See brief, upbeating, geotropic nystagmus that has a few second latency and lasts under a minute
- If see the nystagmus after right Dix-Hallpike perform right Epley, and vice versa

Epley maneuver



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Vestibular disease

- **Labyrinthitis**: inflammation of the cochlea and semicircular canals, presents with vertigo and hearing loss
- **Vestibular Neuritis**: inflammation of the vestibular nerve, no hearing loss
- Both thought to be **viral** in origin, possibly latent herpes virus reactivation
- Both treated with **oral steroids** (e.g. 14-day taper starting at 40-60mg), studies do not support benefit of antivirals
- Use medications like **Meclizine** judiciously, sparingly, should not be used long-term because prevent vestibular compensation
- **Early ambulation** in all peripheral vestibular diseases

Hearing loss and dizziness

- Brain seems to use auditory cues to help with spatial orientation, i.e. role of hearing in balance function
- Hearing loss associated with postural instability and falls (Lin and Ferrucci 2012)
- Hearing aids improve postural stability (Rumalla et al 2015)

Falls Prevention

Central Tenets

1. Fall risk is a **chronic condition**, like other geriatric syndromes (e.g. cognitive impairment, COPD), should be **monitored** on an **ongoing** basis
2. Patients who have fallen often **don't talk about it** (< 50%)
3. Fall risk can be **reduced ~30%** applying simple, evidence-based interventions

USPSTF Guidelines

- US Preventive Services Task Force:
  - Recommends exercise or physical therapy **and** vitamin D supplementation in community-dwelling adults ≥ 65 years at increased risk for falls (Grade B recommendation)
  - Does not recommend multifactorial risk assessment in **any** adult ≥ 65 years, but only in individual cases based on circumstances of prior falls, comorbid medical conditions, and patient values (Grade C recommendation)

AGS Guidelines

- American Geriatrics Society 2010:
  - Older persons who present for medical attention because of a fall, report recurrent falls in the past year, or report difficulties in walking or balance (with or without activity curtailment) should have a multifactorial fall risk assessment.

CDC STEADI Guidelines: Stopping Elderly Accidents, Deaths and Injuries

1. **Screen** for fall risk
   - History of falls
   - Gait and balance problem
   - Fear of falling
2. If screen positive, **multifactorial assessment** for most common risk factors
3. **Follow-up** with patient in 1 month

CDC STEADI Guidelines: Fall risk screening

1. **CDC screen for fall risk (YES to any):**
   - History of falls in the past year
   - Gait and balance problem
   - Fear of falling
2. Medicare Annual Wellness Visit
3. Physician Quality Reporting System

CDC STEADI Guidelines: Fall risk screening

1. CDC screen for fall risk (YES to any):
   - **History of ≥ 2 falls in the past year**
   - Gait and balance problem
   - **Fear of falling**
2. **Medicare Annual Wellness Visit**
3. Physician Quality Reporting System

CDC STEADI Guidelines: Fall risk screening

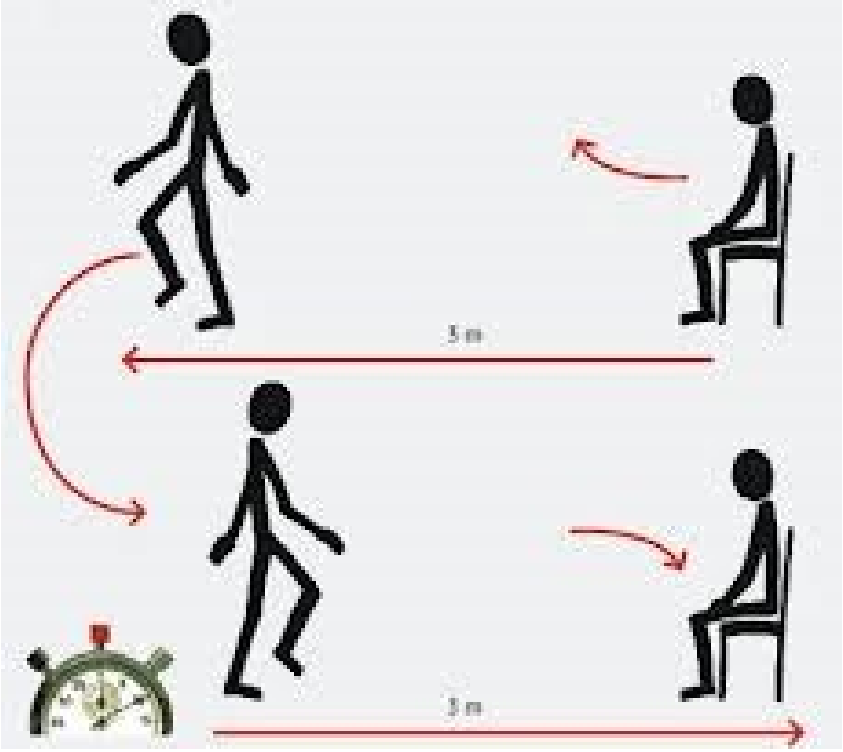
1. CDC screen for fall risk (YES to any):
   - **History of ≥ 2 falls in the past year**
   - **Gait and balance problem**
   - Fear of falling
2. Medicare Annual Wellness Visit
3. **Physician Quality Reporting System**

CDC STEADI Guidelines: Multifactorial risk assessment

- Most common risk factors (in order of importance):
  - Balance and gait, weakness
  - Multiple medications
  - Vision
  - Home hazards
  - Postural/orthostatic hypotension
  - Feet/footwear

Balance and Gait

- Most important risk factor
- **Timed Up and Go**:
  - Stand up from chair, walk 3m, turn 180°, walk 3m, sit back down
  - Efficient screening test
  - **≥ 12 seconds**: increased fall risk



Balance and Gait

- **Choosing Wisely:** Don't prescribe under-dosed strength training programs for older adults. Instead, match the frequency, intensity and duration of exercise to the individual's abilities and goals.
- ***EXERCISE!***
  - Progressive balance, strength and endurance
  - Outpatient PT
  - Community-based (e.g. Tai Chi)
  - Home-based (e.g. Otago, NIA Go4Life)

Balance and Gait

Go4Life from the National Institute on Aging at NIH

Search

Get Started | Try These Exercises | Go to *My Go4Life* | Get Free Stuff | Be a Partner

Balance

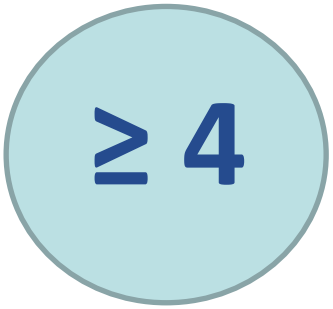
Stand on One Foot

Heel-to-Toe Walk

Balance Walk

Tai Chi

Medications



- **Polypharmacy**
  - Use of ≥ 4 prescription medications, regardless of which medications they are, increases fall risk
  - 44% of men and 57% of women age >65 in the US take ≥ 5 prescription medications (Kaufman JAMA 2002)

Medications

- Highest risk: psychotropic medications
  - **Sedatives/hypnotics** (sleeping aids, benzodiazepines, e.g. Valium, Xanax, Klonopin)
  - **Anti-psychotics** (for treatment of schizophrenia, e.g. Zyprexa, Seroquel)
  - **Anti-depressants**
  - **Narcotics** (e.g. Percocet, Oxycodone)
- High risk: anti-hypertensives (e.g. alpha, beta blockers, diuretics)
  - Increase risk of postural hypotension

Medications: AGS Beers criteria

TABLE 2: 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults Due to Drug-Disease or Drug-Syndrome Interactions That May Exacerbate the Disease or Syndrome

Disease or Syndrome	**Drug(s)**	**Recommendation**, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
History of falls or fractures	Anticonvulsants Antipsychotics Benzodiazepines Nonbenzodiazepine hypnotics ■ Eszopiclone ■ Zaleplon ■ Zolpidem TCAs/SSRIs	**Avoid unless safer alternatives are not available; avoid anticonvulsants except for seizure.** Ability to produce ataxia, impaired psychomotor function, syncope, and additional falls; shorter-acting benzodiazepines are not safer than long-acting ones. *QE = High; SR = Strong*

Medications

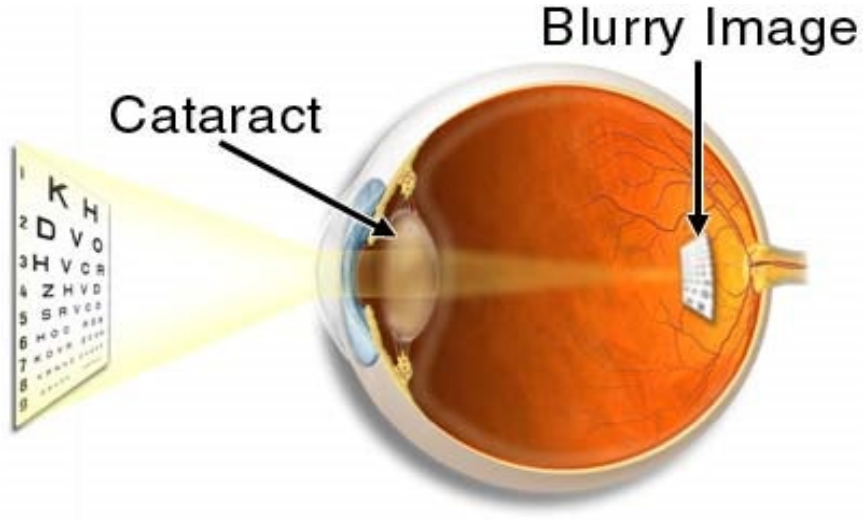
- **Trade-offs**
  - Diseases, e.g. heart failure, hypertension associated with poor health outcomes (e.g. heart attack, stroke), but the medications that treat them associated with fall risk
  - Patients need to weigh benefit of treating disease with risk of medications
  - ***Reduce dose or eliminate high-risk medications***

Vision

- Most common cause of low vision in the elderly:
  - **PRESBYOPIA**: age-related decline in near vision
- Other big 3 causes of age-related visual loss:
  1. Cataracts
  2. Glaucoma
  3. Macular Degeneration

Vision

- Advise not to walk while wearing reading glasses, bifocals
- Expedited first **cataract surgery** shown to significantly reduce fall risk
- Consider referral to optometrist/ ophthalmologist



Home Safety

- **Common home hazards**:
  - Poor lighting
  - Tripping hazards (e.g. throw rugs, telephone cords, cables)
  - Lack of handrails
  - Objects stored close to the ground or on high shelves

Home Safety

This checklist is based on the original version printed by the Centers for Disease Control and Prevention. Support for this version was provided by MetLife Foundation.

2005

CDC FOUNDATION

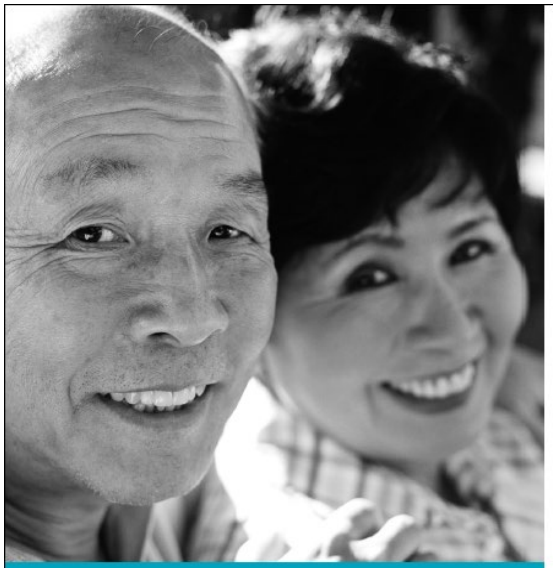
MetLife Foundation

Department of Health and Human Services
Centers for Disease Control and Prevention

Check for Safety

A Home Fall Prevention Checklist for Older Adults

Home Safety



"Last Saturday our son helped us move our furniture. Now all the rooms have clear paths."

FLOORS: Look at the floor in each room.

Q: When you walk through a room, do you have to walk around furniture?

☐ Ask someone to move the furniture so your path is clear.

Q: Do you have throw rugs on the floor?

☐ Remove the rugs or use double-sided tape or a non-slip backing so the rugs won't slip.

Q: Are there papers, books, towels, shoes, magazines, boxes, blankets, or other objects on the floor?

☐ Pick up things that are on the floor. Always keep objects off the floor.

Q: Do you have to walk over or around wires or cords (like lamp, telephone, or extension cords)?

☐ Coil or tape cords and wires next to the wall so you can't trip over them. If needed, have an electrician put in another outlet.

Home Safety

STAIRS AND STEPS:
Look at the stairs you use both inside and outside your home.

Q: Are there papers, shoes, books, or other objects on the stairs?

☐ Pick up things on the stairs. Always keep objects off stairs.

Q: Are some steps broken or uneven?

☐ Fix loose or uneven steps.

Q: Are you missing a light over the stairway?

☐ Have an electrician put in an overhead light at the top and bottom of the stairs.

Q: Do you have only one light switch for your stairs (only at the top or at the bottom of the stairs)?

☐ Have an electrician put in a light switch at the top and bottom of the stairs. You can get light switches that glow.

Q: Has the stairway light bulb burned out?

☐ Have a friend or family member change the light bulb.

Q: Is the carpet on the steps loose or torn?

☐ Make sure the carpet is firmly attached to every step, or remove the carpet and attach non-slip rubber treads to the stairs.

Q: Are the handrails loose or broken? Is there a handrail on only one side of the stairs?

☐ Fix loose handrails or put in new ones. Make sure handrails are on both sides of the stairs and are as long as the stairs.

Photo courtesy of Jake Pauls

Home Safety

KITCHEN: Look at your kitchen and eating area.

Q: Are the things you use often on high shelves?

☐ Move items in your cabinets. Keep things you use often on the lower shelves (about waist level).

Q: Is your step stool unsteady?

☐ If you must use a step stool, get one with a bar to hold on to. Never use a chair as a step stool.

BATHROOMS: Look at all your bathrooms.

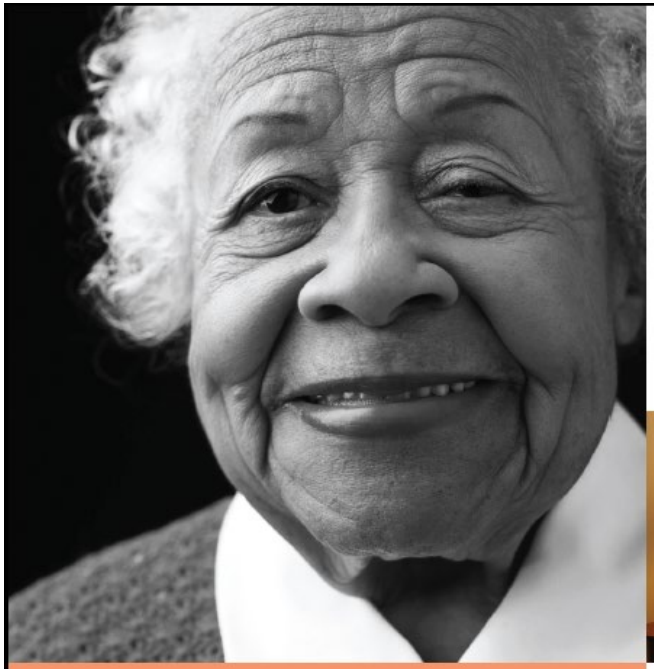
Q: Is the tub or shower floor slippery?

☐ Put a non-slip rubber mat or self-stick strips on the floor of the tub or shower.

Q: Do you need some support when you get in and out of the tub or up from the toilet?

☐ Have a carpenter put grab bars inside the tub and next to the toilet.

Home Safety



"I put a lamp on each side of my bed. Now it's easy to find the light if I wake up at night."

BEDROOMS: Look at all your bedrooms.

Q: Is the light near the bed hard to reach?

☐ Place a lamp close to the bed where it's easy to reach.

Q: Is the path from your bed to the bathroom dark?

☐ Put in a night-light so you can see where you're walking. Some night-lights go on by themselves after dark.

Postural/orthostatic hypotension

- **Dx:**
  - Have patient lie down 5 minutes
  - Measure BP, HR
  - Have patient stand
  - Repeat BP and HR at 1 and 3 minutes
  - *↓ systolic BP ≥ 20mmHg or diastolic BP ≥ 10mmHg or dizziness/ lightheadedness abnormal*
- **Tx:**
  - Decrease dose anti-hypertensive
  - Patients should change positions slowly, stay seated if dizzy
  - Adequate hydration, regular toileting
  - Refer if suspect cardiac disease

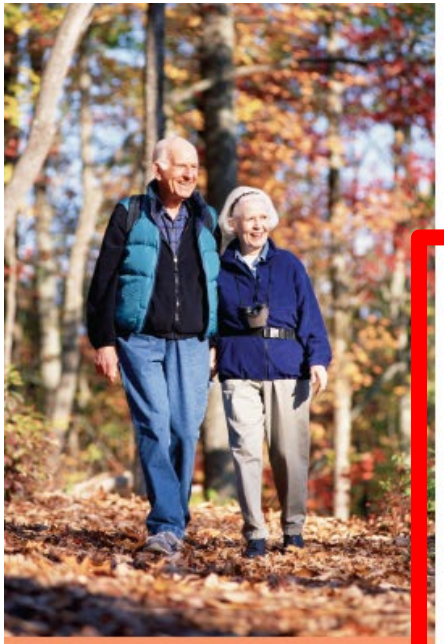
Feet/footwear

- **Dx:**
  - Foot abnormalities e.g. orthopedic problems, contractures, weakness/foot drop, poor distal peripheral sensation can increase risk of falls
- **Tx:**
  - Regular footcare
  - Podiatry referral
  - Safe footwear recommendations
  - Consider assistive device (with PT/OT)

Vitamin D supplementation

- ***USPSTF, CDC recommend Vitamin D supplementation (800 IU/day)***
- Increased bone density thought to reduce risk of **fall-related fractures**
- Vitamin D may also improve muscle strength, which could reduce falls
- Evidence still **equivocal**

CDC recommendations to patients



"We feel stronger when we walk frequently. And we have a more positive outlook."

Many falls can be prevented. By making some changes, you can lower your chances of falling.

Four things YOU can do to prevent falls:

1. Begin a regular exercise program
2. Have your health care provider review your medicines
3. Have your vision checked
4. Make your home safer

What YOU Can Do

To Prevent Falls

CDC FOUNDATION
MetLife Foundation

Department of Health and Human Services
Centers for Disease Control and Prevention

For more information, contact:
Centers for Disease Control and Prevention
770-488-1506
www.cdc.gov/injury

CDC FOUNDATION
MetLife Foundation

Central Tenets

1. Fall risk is a **chronic condition**, like other geriatric syndromes (e.g. cognitive impairment, COPD), should be **monitored** on an **ongoing** basis
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THANK YOU!