Prevention of Falls

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Objectives

- Discuss the importance of addressing falls
- Discuss risk factors and risk assessment
- Discuss the difference between community dwelling elderly vs. “the frail elderly”
- Discuss the current data on therapeutic interventions
- Review case studies

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Incidence

- 30-40% of community-dwelling people over the age of 65 years fall each year
  - This increases up to 50% for those 80 years and older
- Approximately 50% of individuals in the long-term care setting fall yearly
- Almost 60% of those with a history of a fall in the previous year will have a subsequent fall

- Up to Date 2015

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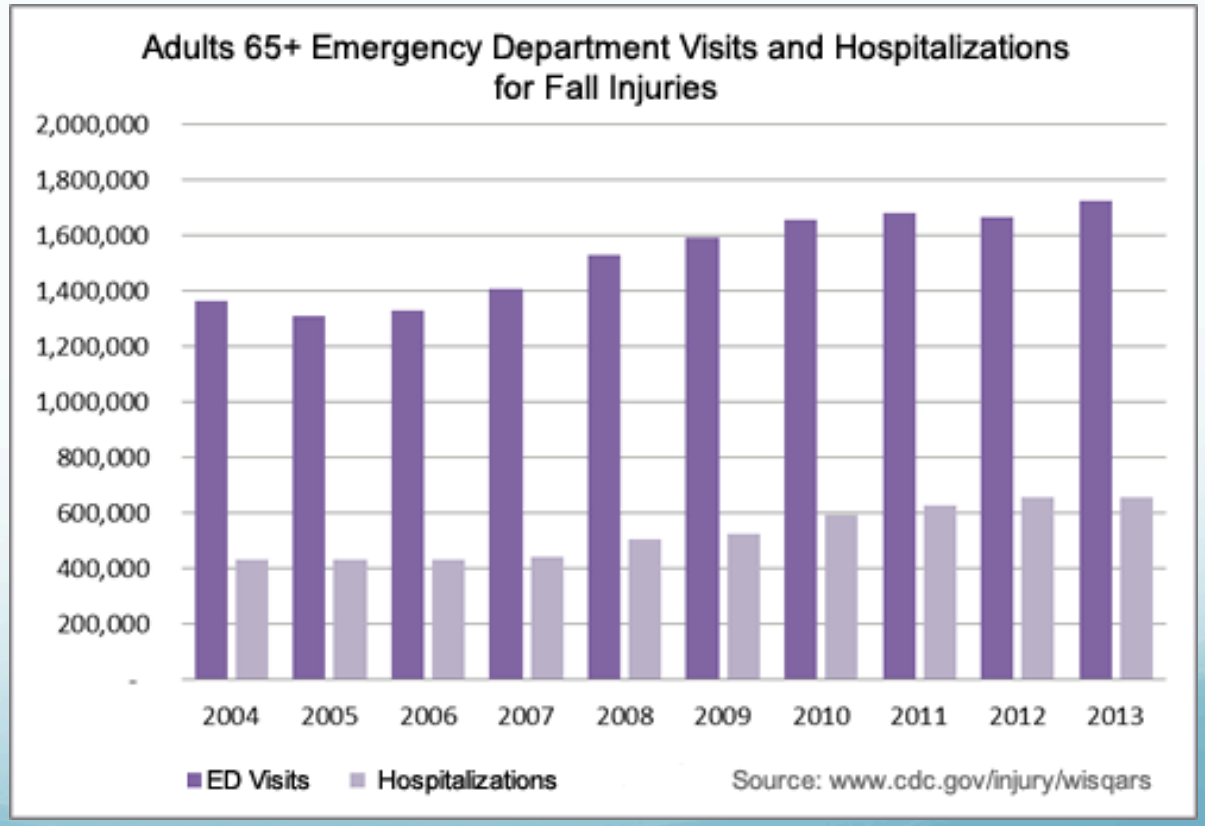
Cost

2013: the direct medical costs of older adult falls was estimated $34 billion



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Morbidity

- Fractures (older adults)
  - Spine, hip, forearm, leg, ankle, pelvis, upper arm, and hand.
  - Hip fractures
    - tends to cause more problems than other broken bones
- Traumatic brain injuries (TBI)
  - Falls are most common cause
  - About one-half of fatal falls among older adults are due to TBI
- Fear of falling

- Sources: CDC and NOF

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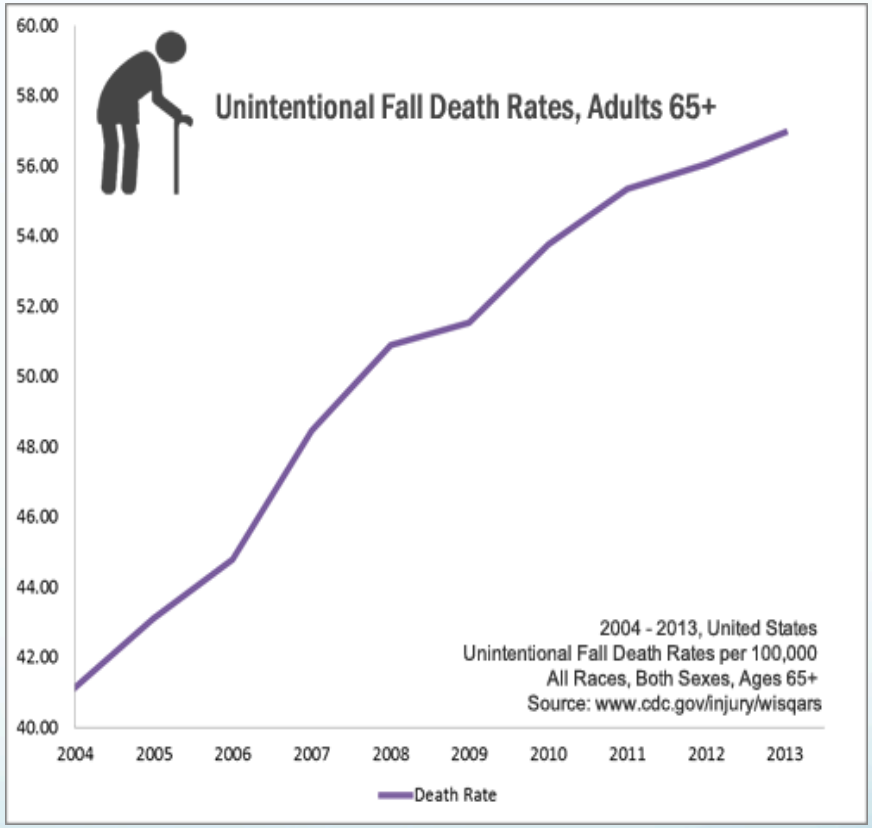
Mortality

- In 2013, about 25,500 older adults died from unintentional fall injuries.



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Risk Factors

- Past history of a fall
- Lower extremity weakness
- Age
- Female gender
- Cognitive impairment
- Balance problems
- Psychotropic drug use
- Arthritis
- History of stroke
- Orthostatic hypotension
- Dizziness
- Anemia

- Fall associated with syncope
- History of previous fall with injury
- Decreased executive function

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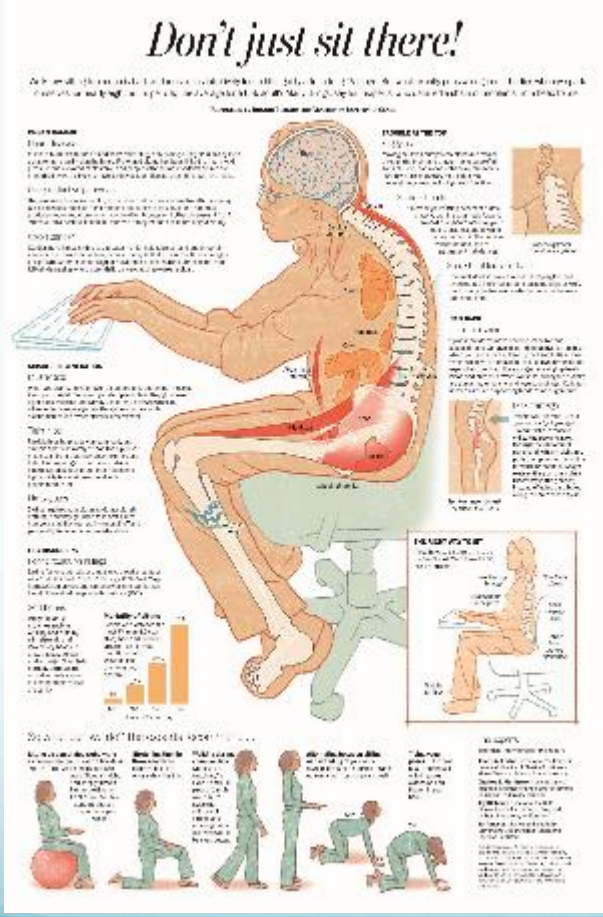
Sedentary Behavior



- Every additional hour adults over age 60 spend sitting increases by 50% their risk of being disabled for activities of daily living such as bathing, dressing and walking, says the study's lead author
  - Dorothy Dunlop, a professor of medicine at Northwestern University Feinberg School of Medicine.
- strong relationship between daily sedentary time and development of physical frailty distinct from insufficient moderate activity.
  - Song J et al Am J Pub Health 2015

Multifactorial problem = Multidisciplinary intervention

- Functional history is key
  - Prior function vs. current function
  - Home environment
  - Family support
  - Psycho-social factors
- Establish prognosis (Rehab Potential
- Set goal directed interventions
  - Therapy (PT/OT)
  - Assistive device
  - Education
  - Home exercise program

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Considerations during the Physiatric Evaluation

- Musculoskeletal system
- Neurologic system (central vs. peripheral)
- Vestibular system
- Medication review
- Vitamin D
- Other* (co-morbidities)
  - i.e. heart problem, stroke history, COPD, Dementia

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Musculoskeletal system

Changes associated with aging

- Bone density loss (Osteoporosis)
- Loss of muscle mass
- Degenerative joint disease (Osteoarthritis)
- Thinning tendons, ligaments

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Gait

- Changes with Aging
  - Reduced walking speed and stride length
  - Reduced overall lower extremity strength
  - Reduced pelvic girdle balance and alignment
  - Reduced ankle control
- Pathologic Gait
  - Deformity
  - Muscle weakness
  - Impaired control
  - Pain

- PM&R Principles, DeLisa 4th ed

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Nervous system

- Central (CNS)
- Peripheral (PNS)

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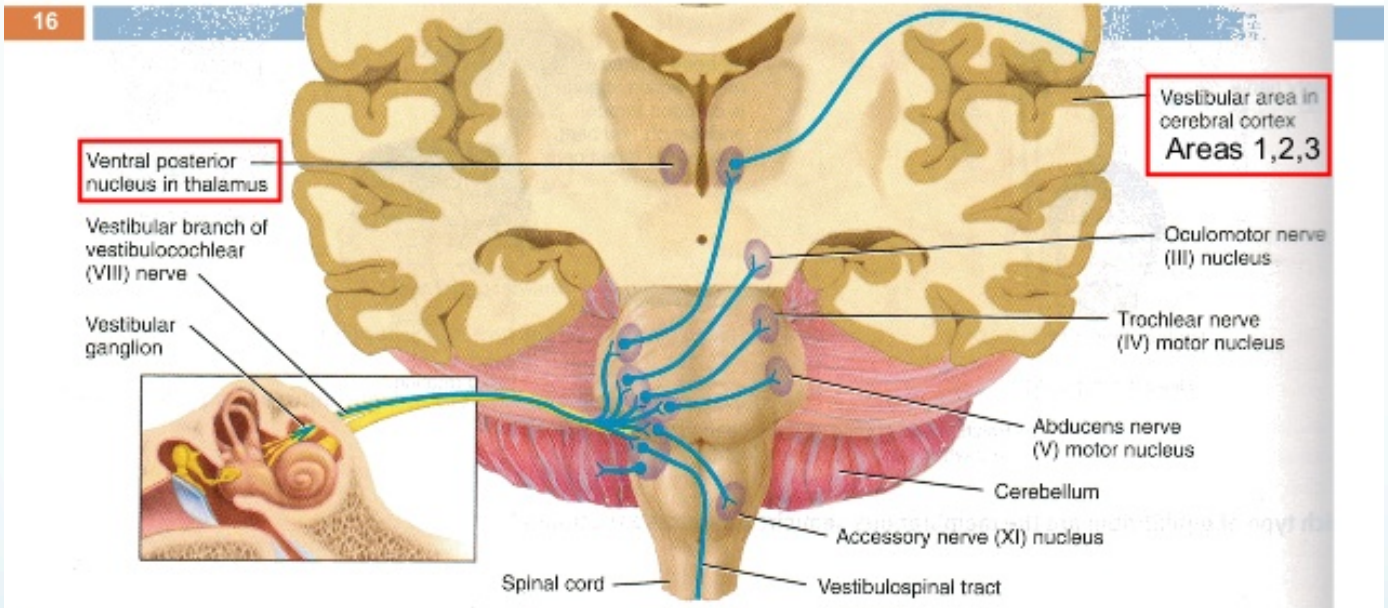
Central and Peripheral

Vestibular Pathways



- 4.<u>ventral posterior nucleus of thalamus</u> and <u>vestibular area in cerebral cortex</u> (part of primary somatosensory cortex)
  - Conscious awareness of the position and movement of head

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"When evidence is not enough: the challenge of implementing fall prevention strategies." Fixen D et al J Safety Res 2011

- The model suggests that vitamin D supplementation and medication review are cost-effective interventions that reduce falls, provide health benefits and reduce health care costs in older adults living in RACFs.

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Medications

- Medications
  - Drugs that affect the brain (CNS): neuroleptics, benzodiazepines, and antidepressants
  - Anti-hypertensives: vasodilators

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Vit D

- Vitamin D
  - Supplemental vitamin D with daily doses of 800 to 1,000 IU consistently demonstrated beneficial effects on strength and balance. An effect on gait was not demonstrated, although further evaluation is recommended.
    - **"Effect of Vitamin D Supplementation on Muscle Strength, Gait and Balance in Older Adults: A Systematic Review and Meta-analysis"** Muir S. et al J Am Geriatr Soc. 2011

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Exercise interventions

6 categories:

- Gait and balance training
- Strength training
- Flexibility
- Movement (such as Tai Chi or dance)
- General physical activity
- Endurance

"Interventions for preventing falls in older people in care facilities and hospitals." Cameron ID et al. Cochrane Review 2012

- Exercise
  - subacute hospital: appears effective
  - care facilities: effectiveness uncertain
- Multifactorial interventions
  - hospital: reduces falls
  - care facilities: possible benefits
- Vit D
  - effective

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"Exercise for reducing fear of falling in older people living in the community."
Cochrane Database Syst Rev 2014

- Exercise interventions in community-dwelling older people probably reduce fear of falling to a limited extent immediately after the intervention, without increasing the risk or frequency of falls.
- There is insufficient evidence to determine whether exercise interventions reduce fear of falling beyond the end of the intervention or their effect on other outcomes.

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Yoga and Tai Chi

- Yoga may have a beneficial effect on balance, but variable study design and poor reporting quality obscure the results.
  - **"A systematic review of yoga for balance in a healthy population."** Jeter PE et al J Altern Compl Med 2014
- Modified Sun style tai chi did not have an impact on impairment, functional limitations, or disability in preclinically disabled older people when delivered for 24 weeks.
  - **"Impact of tai chi on impairment, functional limitation, and disability among preclinically disabled older people: a randomized controlled trial."** Day et al Arch of PM&R 2011

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Exercise

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Take Home Points

- Vit D and Medication review
  - Helpful in prevention for patients in care facilities (Cochrane Rev 2014)
- Interventions individually tailored to target risk factors and impairments are more effective than those applied as a standard package (UptoDate 2015)
- Interventions that promote reductions in sedentary behaviors in addition to increases in physical activity may help decrease physical frailty onset. (Song J et al Am J Pub Health 2015)

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