

# Balance and Falls in the Elderly

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# Healthcare Costs

- 3 Trillion for Healthcare in 2015
- Medicare - 20% of all Healthcare costs
- Cancer 36.8 Billion
- Falls 31.3 Billion



# What is a Fall?

- An event which results in a person coming to rest inadvertently on the ground, floor or other lower level surface (WHO)

# Fall Statistics

- Fall related deaths in those >65 have steadily increased from 2005 to 2011.
- 2012 - 25,000 fatal falls cost 616.5 million
- 3.2 million non-fatal falls cost 30.3 billion
  - Women fall more > men
  - Avg. cost of fall \$9400.00
  - 85 and older - 1/3 of 30.3 billion

# Who Falls?

- 30% of community dwellers >65
- 50%+ of nursing home patients
- 75% of slips/trips/falls unreported
- 25-89% of hospital adverse events
- 10-20% of fallers fall repeatedly



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# Risk Factors

## INTRINSIC

- Increasing age
- Previous fall in past 6 months
- Neurologic/Cardiovascular Dz.
- Osteoporosis/Osteopenia
- Motor or sensory impairment
- Gait and balance impairment
- Incontinence
- Cognitive Deficit/Depression
- Visual Impairment
- Orthostatic Hypotension

## EXTRINSIC

- Medications: Psychotropics, Benzodiazepines, Diuretics, Cardiovascular
- Fall Risk Increasing Drugs – FRID (Polypharmacy)
- Environmental Factors
- Footwear
- Inappropriate Assistive Device or no assistive device

# Risk factors for Falls

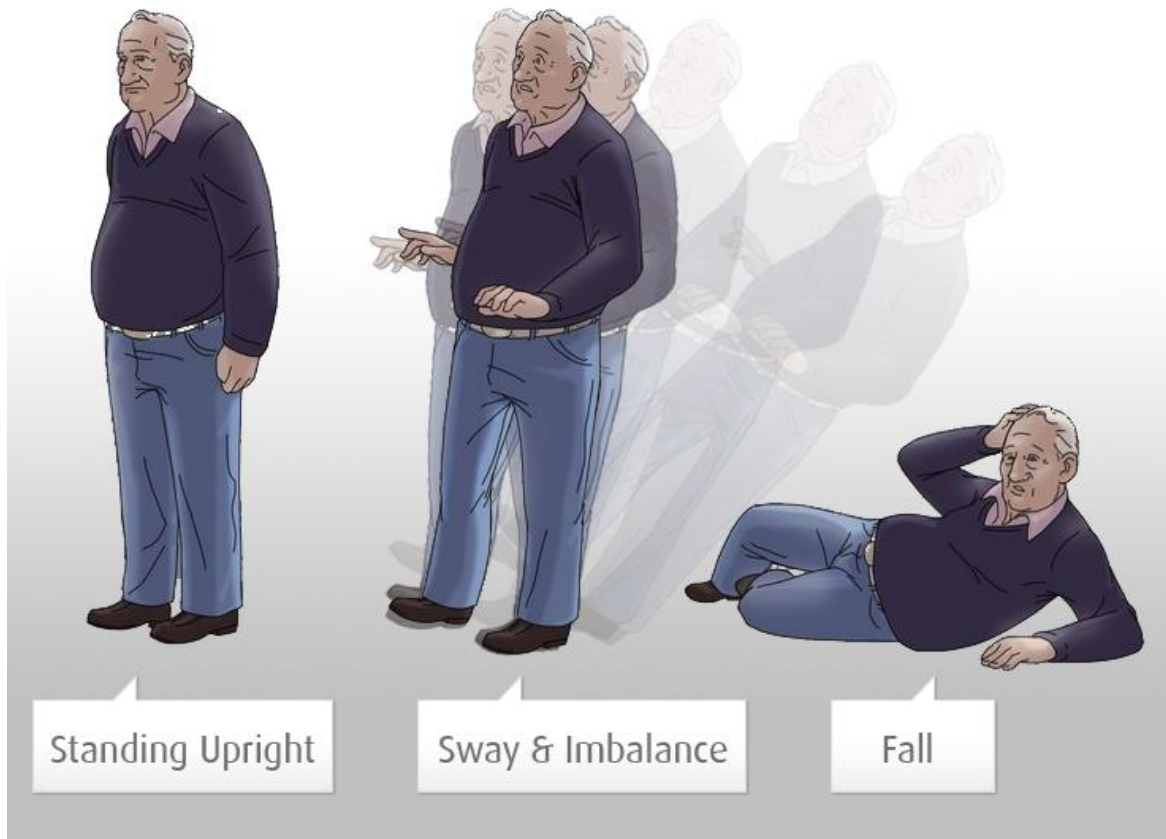




# Etiology of Falls

- Fall related injuries result from combination of factors:
  - Muscle weakness
  - History of falls
  - Gait deficit
  - Balance deficit
  - Dizziness
  - Improper use of assistive device
- Multi-factorial due to medically complex older patients





# Fall Related Injuries

- Hip Fracture – 90% fall related
- Occur in 65 and older population
- Poor Outcomes
- 25% mortality rate within one year



# Other Fall Related Injuries

- Spinal Cord Injury
- Traumatic Brain Injury
- Wrist Fracture
- ER Visits

# Intervention for Falls

- Special Report from CDC - Sept 2016
- Stopping Elderly Accidents Death and Injury (STEADI)
- CDC Website – [www.cdc.gov](http://www.cdc.gov)

# Prevention Management

- Fall related injury prevention versus fall prevention.
  - Individualized assessment
- May require multi-disciplinary approach and input

# Individualized Approach

- Screen/ Assess; further re-assess
- Identify individual risk factors
- Reduce risk factors
  - Environment and behavioral
  - Improve what can be improved
- Patient must recognize the dangers
- Teach safe behaviors
- Increase level of assistance

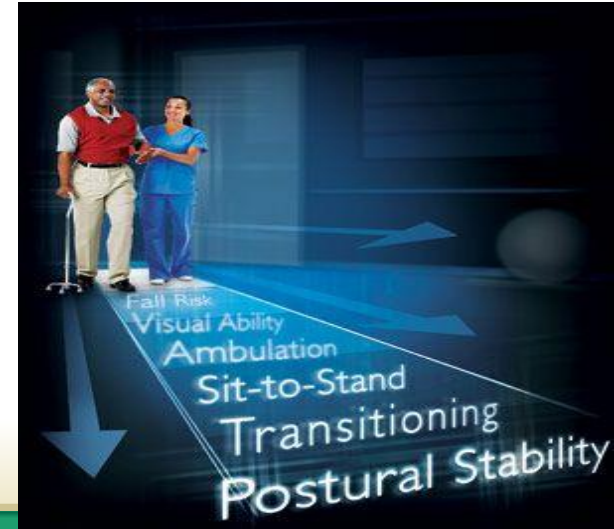
# Fall Risk Assessment

- Gait Speed (10 Meter Walk Test)
- Timed Up and Go
- 30 Second Sit to Stand
- 4 Stage Balance Test

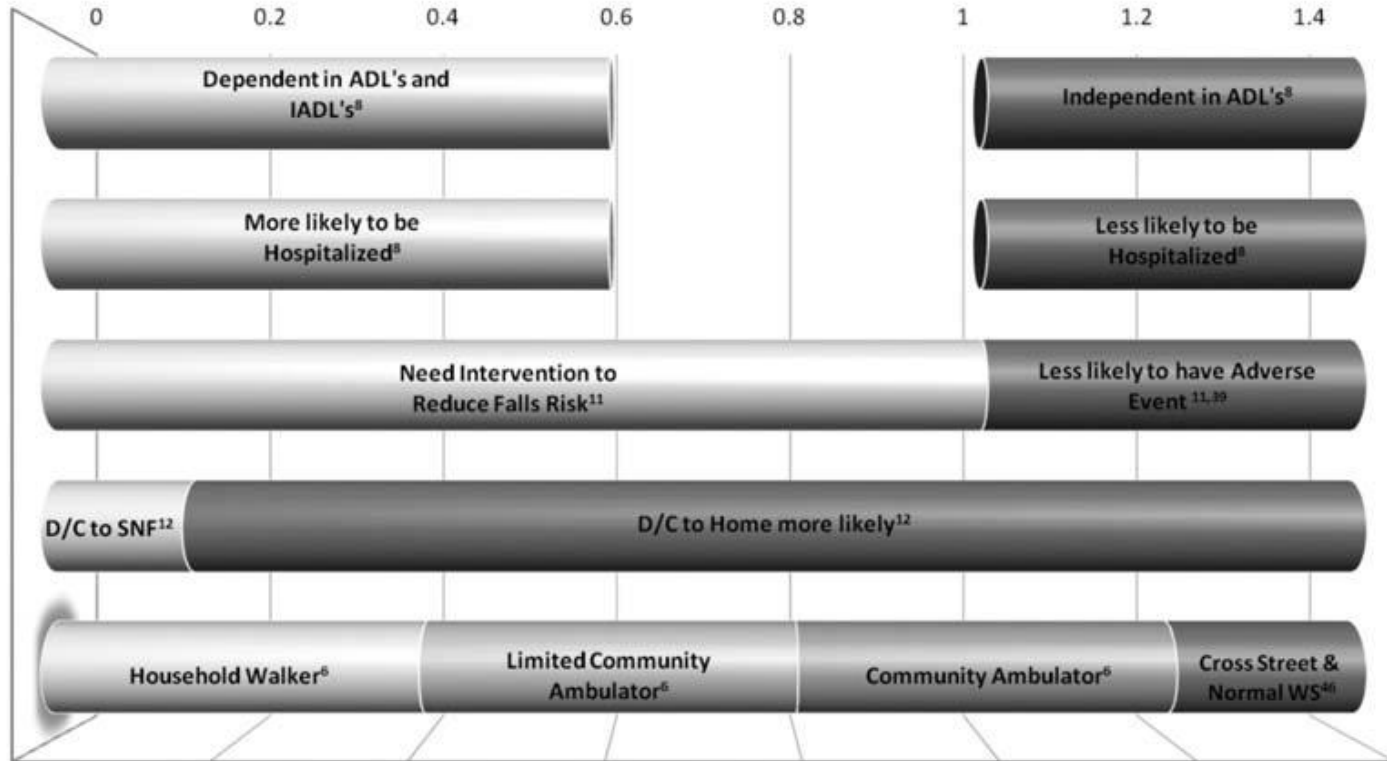


# 10 Meter Walk Test

- Walking speed – the 6<sup>th</sup> Vital Sign (Fritz and Lusardi, 2008)
  - 2.2 mph= 1.0m/sec – community ambulator
  - Less than (1.0 mph=0.447 m/sec.) fall risk rises *exponentially*
- Gait velocity strong predictor of fall risk
- Faster to administer than TUGT



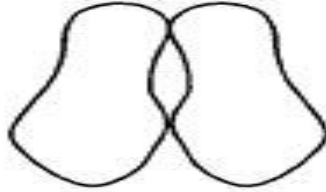
# Walking Speed [meter per second (m/s)]



Fritz & Lusardi, 2009

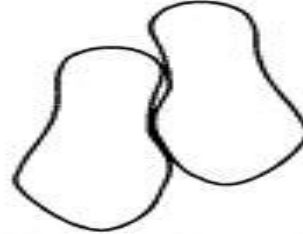
# 4 Stage Balance Test

## 1. Feet together stand



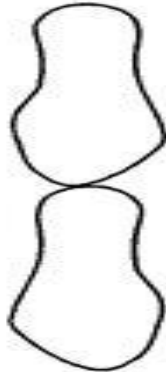
- Hold for 10 seconds

## 2. Semi-tandem stand



- The person chooses which foot is placed in front
- Hold for 10 seconds

## 3. Tandem stand



- The person chooses which foot is placed in front
- Hold for 10 seconds

## 4. One leg stand



- The person chooses which leg to stand on
- Timing starts as soon as the person raises one foot off the ground
- We chose to extend the maximum length of time of the one leg stand test from 10 seconds to 30 seconds to lessen the ceiling effects of this test

# Test Cut-off Scores for Fall Risk

- Timed up and Go (TUG) -  $>13.5$  sec
- 30 Sec Sit to Stand – 15x
- 4 Stage Balance Test – 10 sec for each position

# Physical Therapy

- Assess for fall risks
- Develop plan and strategies to avoid falls and decrease fall risks
- Educate individuals and the society about fall prevention



# Physical Therapy

Should be individualized and include:

- Exercise – stretching and strengthening
- Balance Training
- Gait Training, weight bearing exercise
- Home evaluation
- Footwear assessment
- Teach safety and fall recovery
- Improve Falls Self-efficacy





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# Evidence

- 59 Systematic Reviews
- 1460 articles
- 8 databases
- Recent study on non-pharmaceutical interventions for fall prevention

(Rimland et al., 2016)



# Results

- Multi-factorial approach with strength training and balance interventions most effective PT interventions for fall reduction.

# References

1. Avin, K. G., Hanke, T. A., Kirk-Sanche, N., McDonough, C. M., Shubert, T. E., Hardage, J., & Hartley, G. (2015). Management of Falls in Community- Dwelling Older Adults: Clinical Guidance Statement From the Academy of Geriatric Physical Therapy of the American Physical Therapy Association. *Physical Therapy*, 95(6), 815-834
2. Burns, E. R., Stevens, J. A., & Lee, R. (2016). Special Report from the CDC: The direct costs of fatal and non-fatal falls among older adults — United States. *Journal Of Safety Research*, 5899-103. doi:10.1016/j.jsr.2016.05.001.
3. Montero-Odasso, M., Muir, S. W., Gopaul, K., Annweiler, C., & Beauchet, O. (2011). Gait Velocity Versus the Timed Up and Go Test: Which One to Use for the Prediction of Falls and Other Adverse Health Outcomes in Primary Care?. *Journal Of The American Geriatrics Society*, 59(11), 2191-2192.
4. Rimland, J. M., Abraha, I., Dell'Aquila, G., Cruz-Jentoft, A., Soiza, R., Gudmusson, A., & ... Cherubini, A. (2016). Effectiveness of Non-Pharmacological Interventions to Prevent Falls in Older People: A Systematic Overview. The SENATOR Project ONTOP Series. *Plos ONE*, (8), doi:10.1371/journal.pone.0161579.