Breaking Falls II:
True Stories about How Falls Break People

ROLLIN M. WRIGHT, MD, MPH, MS
UNIVERSITY OF PITTSBURGH SOM/UPMC
DIVISION OF GERIATRIC MEDICINE
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Overview

Defining the fall

After the fall

Before the fall

Poll Everywhere (Anonymous) Audience Response

- Use your smart phone
- 3 ways to enter your response
  1. Type URL in web browser: **Pollev.com/pittdom**
  2. Text message:
     - ❑ Type message first:
     - ❑ Then type to: **22333**
  3. Download free Poll Everywhere App from your smart phone app store.
     - ❑ Join a presentation. Insert username: **pittdom**

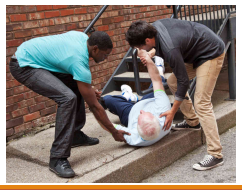
Which occurs more commonly in adults over 65 years old in the US?

Heart attacks

Falls

Learning Objective

To implement strategies to prevent and/or reduce risk of falls in all of my patients over the age of 65.



Case: Your Mother Fell

A call from your spouse about your 90-mother

Fell wearing 1.5 inch heels, walking down ramp at church

Pitched forward hitting face on exit door handle

Taken to ED

What kind of fall did your mother have?

This person is nothing like my mother. She wouldn't fall.

Non-injurious mechanical fall

Injurious mechanical fall

Injurious low trauma fall

Defining a Fall

"Mechanical" fall

Low-trauma or ground level fall

High-trauma fall

Injurious v. non-injurious falls

"Mechanical" v. "Non-Mechanical" Falls

- **Mechanical Fall**:
  - Due to extrinsic factors (i.e. environment)
  - "Exonerates" clinicians from looking for other factors
- **Non-mechanical Fall:**
  - Due to risk factors intrinsic to faller
  - Identify which are modifiable
- Most falls = combination of both
- Outcomes no different
- Conclusion: **stop using "mechanical fall"!**

Sri-On et al, AJEM, 2016, http://dx.doi.org/10.1016/j.ajem.2015.08.005

Low v. High Trauma Falls

- **Definition of a Fall**: Unintentional descent to the ground or from a higher to a lower level
- **Low-impact, low trauma fall**
  - From standing height (< 2 m)
  - Predominantly older (>61) people
  - Women > men
  - Comorbidities, chronic conditions
  - 50% hospitalizations
- **High-impact fall**
  - From >2m height

© Can Stock Photo - csp4654232

Kennedy et al, Arthritis, 2001 Oct;51(4):717-24; Berry and Miller, Curr Osteoporos Rep. 2008 Dec; 6(4): 149–154.

Injurious (v. Non-Injurious) Falls

- Fall resulting in any physically apparent injury
  - Soft tissue (bruising, laceration)
  - Fracture
  - Internal injury, bleeding (hemopneumothorax, intracranial bleed)
- Fall that leads to reduced physical function (from soreness to fracture)
- Fall that leads to evaluation by a clinician
- Rate injury according to severity of harm imposed

Your Mother in the ED

EXAM

Head and right knee pain

Heart rate 115, irregular

BP 116/58

Laceration over left eye required suture

Facial ecchymoses

Effusion right knee

Unable to bear weight on right leg

STUDIES

C-spine cleared, no fracture

CT brain: no skull fracture, no SDH or ICH

XR right LE: soft tissue swelling, no fracture

Admitted for observation, telemetry, pain control

What is the severity of injury or harm?

- No injury because there is no SDH/ICH or fracture.
- Minor injury/harm because of minor contusions (face, limb) and minor laceration
- Moderate harm because suturing required
- Major harm because of head trauma and hospital admission

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Classify Falls by Level of Harm or Injury*

Category	Action Required	Common Injuries
No harm	None	
Minor harm	Apply ice or dressing, clean a wound, elevate a limb	Pain, bruise, abrasion, minor sprain
Moderate harm	Suturing, steri-strips/skin glue, splinting	Deeper lacerations, sprained ankle or wrist
Major harm	Surgery, casting, traction, consultation for neurologic or internal injury, transfusion	Basilar skull or neck fracture, subdural hematoma, rib fracture, liver laceration, other internal injury, coagulopathy
Death	(from injuries caused by the fall, not by another condition or physiologic event that led to the fall)	

*At 24h after the fall or at time of hospital discharge.
National Quality Forum, 2015.

Which of the following statements about falls among adults over 65 is NOT true?

- Falls are the leading cause of injury AND death by traumatic injury.
- Falls account for $50 million in costs to insurers and $12 million in out-of-pocket costs to payers
- 1 in 4 people over 65 fall each year
- 1 in 5 falls in people over 65 results in fracture or head injury

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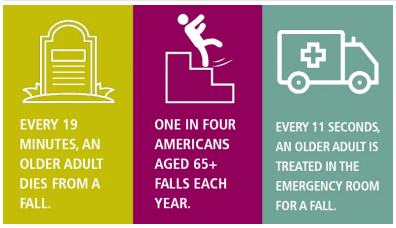
Which of the following statements about falls *among adults over 65* is NOT true?

$50 billion is spent on non-fatal fall injuries and $754 million is spent on fatal falls.
-cost to Medicare: $29 billion
-cost to Medicaid: $9 billion
-cost to individual payers: $12 billion

https://www.cdc.gov/homeandrecreationalsafety/falls/fallcost.html

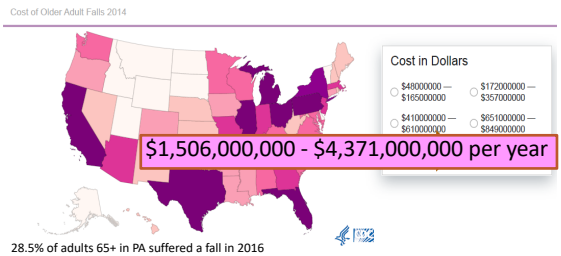
Facts About Falls



- 3 million ED visits/year
- 800,000 hospitalizations/year
- 1:5 results in fracture and/or head injury
- 285,000 hip fractures/year
- $50,000,000,000/year (2015)
- **#1 cause of injury and death from injury**

[source]; CDC, [source], accessed 2/10/2020.

Falls Among Older Pennsylvanians



28.5% of adults 65+ in PA suffered a fall in 2016
In PA: 59 deaths/100,000 falls in 2016

https://www.cdc.gov/homeandrecreationalsafety/falls/index.html

Additional History

PMH

Atrial fibrillation
OA knees and hands
Chronic pain (knees)
HTN
Macular degeneration OS
Anxiety
Post-herpetic neuralgia
Fell 4 mo ago

MEDICATIONS

Warfarin
Digoxin
Carvedilol
APAP
AREDs
Citalopram
alprazolam prn (not taking)
Donepezil
Gabapentin, recently started

Social History

Lives with your sister x 3 yrs

Widowed x 30 years

Retired teacher

Reads

Watches the Weather Channel

Season tickets to ballet

Church social groups

Uses cane or walker

Does not drive

Which of the following are your mother's top 2 risk factors for a fall?

- Wearing low heels on a ramp and balance problem
- Gait/balance problems and polypharmacy
- Polypharmacy and a history of falls
- A history of falls and orthostasis
- Wearing low heels and cognitive impairment

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Risk Factor	Odds Ratio for Any Falls (95% CI)		Prevalence Measure	Underlying Impairment Leading to Falls
Gait problems	**2.06**	(1.82-2.33)	Slow Gait speed	Difficulty with obstacles, stairs
Balance Impairment	**1.98**	(1.60-2.46)	Balance problem (modified Romberg)	Sensory impairment, delayed reaction time, weakness
Medication			≥ 5 prescription medications	Sedation, confusion, orthostasis, hypotension
polypharmacy	**1.75**	(1.27-2.41)		
antipsychotics	**2.30**	(1.24-4.26)		
antidepressants	**1.48**	(1.24-1.77)		
benzodiazepines	1.40	(1.18-1.6)		
loop diuretics	1.36	(1.17-1.57)		
Environment				
physical disability	**1.56**	(1.22-1.99)	ADL difficulty	
instrumental disability	**1.46**	(1.20-1.77)	IADL difficulty	
home hazard	1.15	(0.97-1.36)	≥home hazards	
Orthostatic hypotension	**1.50**	(1.15-1.97)	Orthostatic BPs	Transient cerebral hypoperfusion
Depressive symptoms	**1.49**	(1.24-1.79)	Depressive disorders	Decreased mental processing, psychomotor slowing
Visual Impairment	**1.35**	(1.18-1.54)	Functional visual impairment	Impaired depth perception, contrast
Cognitive Impairment	**1.32**	(1.18-1.49)	Dementia	Impaired planning, reasoning

Ganz and Latham, NEJM, feb2020. https://www.nejm.org/doi/full/10.1056/NEJMcp1901331

Physiology of a Fall

Stance: narrow, wide, normal (center of gravity)

Balance, position in space, posture

Gait, gait speed

Frailty: change in body, i.e. musculoskeletal, composition
- Wt loss, slow gait, weak, fatigue, sedentary/low energy expense
- OR 1.38 (95% CI 1.02-1.88)

Trajectory and injury

Ensrud KE et al, J Gerontol A Biol Sci Med Sci(2007) 62 (7): 744-751.

Top 10 Medication Classes that Increase Risk of Falls

CNS-ACTIVE MEDS

Anticonvulsants (gabapentin, levetiracetam)

Antipsychotics, other anti-dopaminergic meds (metoclopramide)

Antidepressants (Tri-Cyclics, SSRIs)

Sedative hypnotics/anxiolytics (sleepers and benzos)

Opiates

NON-CNS-ACTIVE

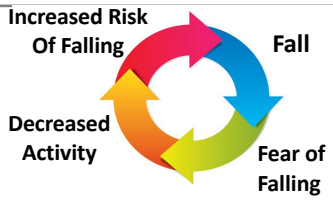
Anti-hypertensives

Cardiac medications (diuretic, digoxin, amiodarone)

Antihistamines (diphenhydramine, hydroxyzine)

Anticholinergics (muscle relaxers, bladder agents)

A Vicious Cycle



Why do falls matter?

Predict bad outcomes

- Permanent injury
- Incomplete recovery of mobility, independence

Signals (multi-) organ system compromise

Loss of physiologic reserve

Loss of independence, function

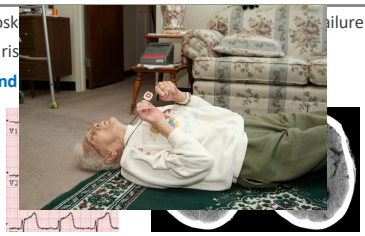
Mortality

A Sentinel Event

A musculosk ailure

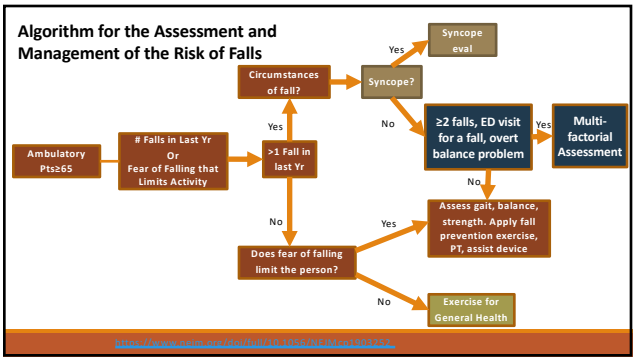
Increased ris

Prevent and



According to the US Preventive Services Task Force (USPSTF), which of the following interventions is most likely to prevent your mom from having a future fall?

- Deprescribing anti-cholinergic and anti-hypertensive medications
- Starting calcium and vitamin D supplementation
- Exercise classes 3 times a week
- Home, environmental safety modifications
- Multifactorial intervention including all of the above



Screen for Fall Risk in the Office

- **Ask**
  - **# of Falls** in the last year?
  - **Fear of falling** that limits activity?
- **Assess**
  - **Gait Speed**: predicts mortality
    - Meters/second
    - Too slow (≤ 0.6m/sec) or too fast (≥ 1.3m/sec)
    - Average 0.8 m/sec
  - **Timed Up and Go**: predicts risk of falling
    - > 14 seconds = high risk of falling

(Studenski S et al, JAMA, 2010; STEADI Initiative

Assess Modifiable Risk Factors that Influence Risk of Falling

1. Fear of falling interfering with activities
2. Average daily activity level or routine exercise
3. Gait and balance
4. Pain with walking
5. Standing blood pressure, orthostatics
6. Yearly cognitive function assessment
7. Foot, footwear exam
8. Medication review (anticholinergic)

Primary Care Interventions to Reduce Fall Risk, Risk of Injurious Fall

Deprescribe meds, reduce doses

Increase activity level, endurance

Treat pain

Keep hydrated, fed (weight loss is bad)

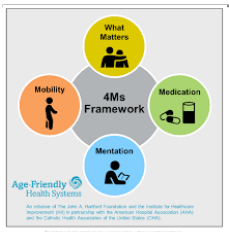
Physical therapy/Exercise for strength, balance, gait training

Optimize cognition (meds, sleep, mood, stress)

Assistive device

Osteoporosis treatment

Falls and the 4 Ms



1. What Matters: prevent falls, injuries
2. Medications: eliminate or decrease high risk meds
3. Mentation: optimize sleep, mood, clarity of thinking
4. Mobility: to stay fit and independent

Summary

A fall is a sentinel event that signals musculoskeletal compromise and risk of decreased function, increased dependence, and mortality.

All falls in older people are multifactorial.

PCPs must routinely screen for, identify, and reduce modifiable risk factors for falls

Thank you!

rmw27@pitt.edu