

Fall prevention initiatives across the continuum: Why falls matter and how initiatives work

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Objectives

Participants will:

- Identify fall incidence and populations at greater risk for injury and death due to falls.
- Understand common mechanisms of falls
- Update knowledge of best practices in fall risk assessment and interventions across settings.
- Evaluate fall prevention and management initiatives for applications in rehab settings.

Falls Matter

Overview why falls matter

- Expensive — estimate range up to \$50 billion (Florence et al., 2018)
- Continued increase in reported numbers
- Restricts participation, health, and QOL
- Preventable
- Rehab professionals uniquely situated to address
- Require multifactorial approach

FALLS AMONG OLDER ADULTS ARE

COSTLY

\$50 Billion Annually

\$29 Billion Medicare
\$12 Billion Private/Out-of-Pocket
\$9 Billion Medicaid


COMMON

1 in 4 Older adults (65+) falls each year

PREVENTABLE

Clinicians can use **STEADI** to prevent falls & reduce costs

Florence CS, Bergen G, Atherly A, Burns ER, Stevens JA, Drake C. Medical Costs of Fatal and Nonfatal Falls in Older Adults. *Journal of the American Geriatrics Society*, March 2018.

 U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

The infographic features a dark teal background with white and orange text. It includes an illustration of a stethoscope and a yellow diamond-shaped warning sign with a black exclamation mark. At the bottom, there are logos for the CDC and the U.S. Department of Health and Human Services.

Fall Incidence and Risk of Falling

Falls leading cause of nonfatal injury in kids 0-4 years

Common Injury:

<1 year—head injuries

2 year—femur fracture

4year—humeral fracture

Highest risk:

Young

Male

Medicaid

- < 1 year old falls from:
 - Caregiver arms
 - Bed
 - Furniture
 - Baby carriers on raised surface
- 1-3 years falls from
 - Furniture
 - Stairs
- Older (median 49 months) from:
 - playground

Mechanisms of Falls Causing Injury--Extrinsic

- Activity
 - Walking most common—all age and gender except young men (vigorous activity)
 - Then Vigorous (decreased with age)
 - Then stairs (Niino, Tsuzuku, Ando, & Shimokata, 2000)
 - Women—walking then stairs (Timsina et al., 2017)
- Initiating event
 - Slips, trips and LOB most common
 - Young-middle age adults-slips>trips
 - Older adults trips>slips
 - LOB increased with age
 - Females tripped>men
- Indoor falls increase with age (women more)
[Timsina et al., 2017]
- Meds-
 - Psychotropic, antipsychotic, and antidepressants (Zhao & Kim, 2015)
 - Greater # meds=great fall risk (Gale, Cooper, & Sayer, 2016)

Mechanisms of Falls Causing Injury--Intrinsic

- Decreased sensation
- Decreased balance

Community Dwelling Adults Reporting Fall

- After 35, ↑ proportion and rate ↑ with age^a
- Women higher than men^{a,b}

a=Verma et al., 2016; b=Timsina et al., 2017

Ages	% reporting fall last 12 months ^a	% reporting fall injury last 3 months ^a	% fallers reporting injury last 3 months ^b	
			Male	Female
All	11.9		38.2	61.8
18-44	10.66	.7	17.8	19.6
45-64	11.4	1.1	11.8	20.9
65+	16.4	2.0	8.5	21.3

18)

%	60+--%
	5
	2.5

Dizziness

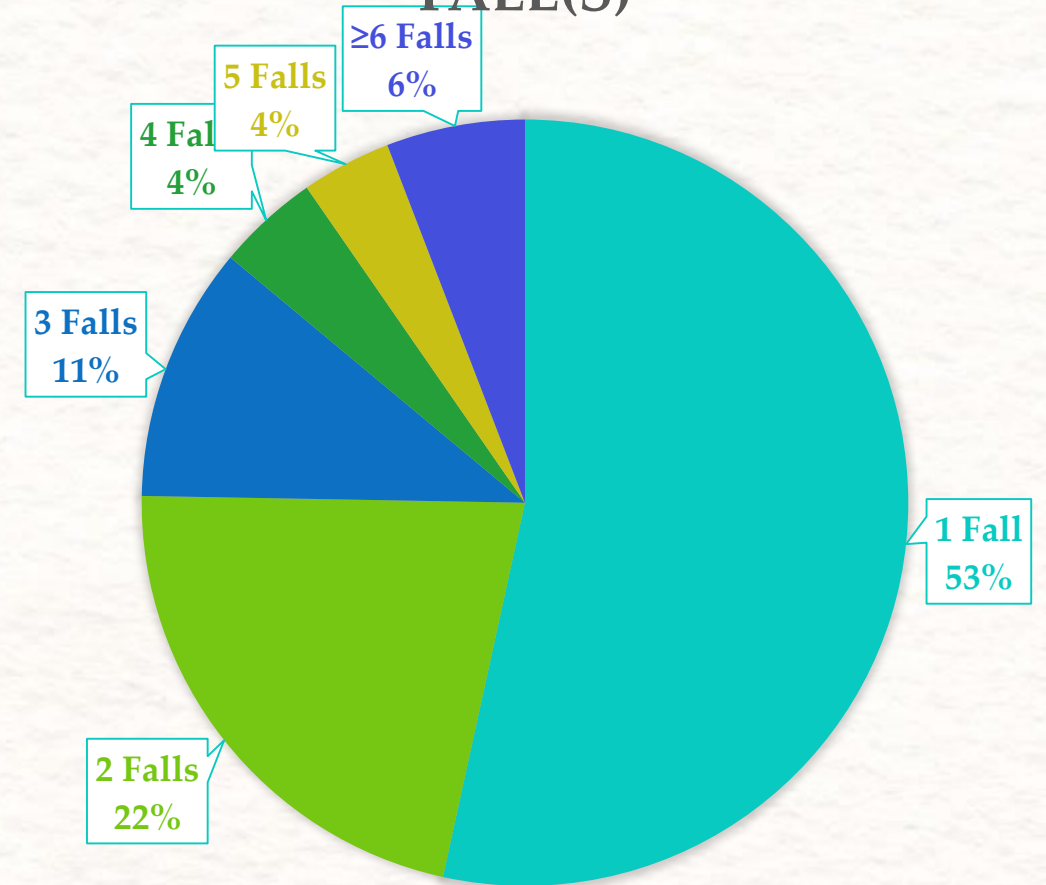
1.5

(Niino, Tsuzuku, Ando, & Shimokata, 2000; Timsina et al., 2017)

High prevalence in older adults

- 23.9% fell in 2011
- Almost 1/2 fallers had >1 fall
- 59.6 unintentional fall deaths per 100,000 in 2015 (Florence et al., 2018)
- Only about 1/2 tell their doctor/healthcare provider
(Fact sheet Falls are a major threat to pt. Retrieved from <https://www.cdc.gov/steady/pdf/STEADI-FactSheet-MajorThreat-508.pdf>)

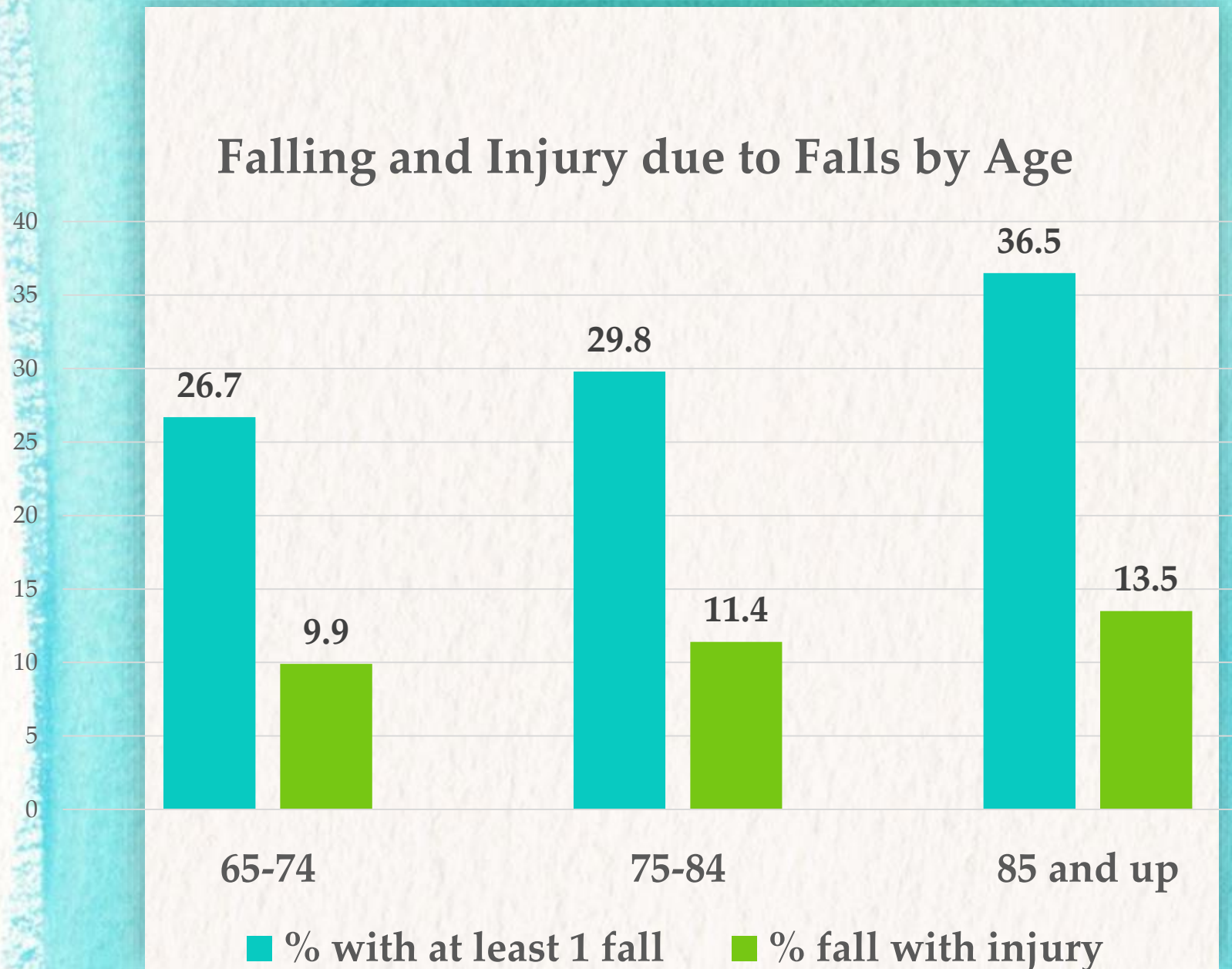
% OLDER ADULTS REPORTING FALL(S)



In 2014,
29 % OA
reported fall

38% of those
were injured
in fall

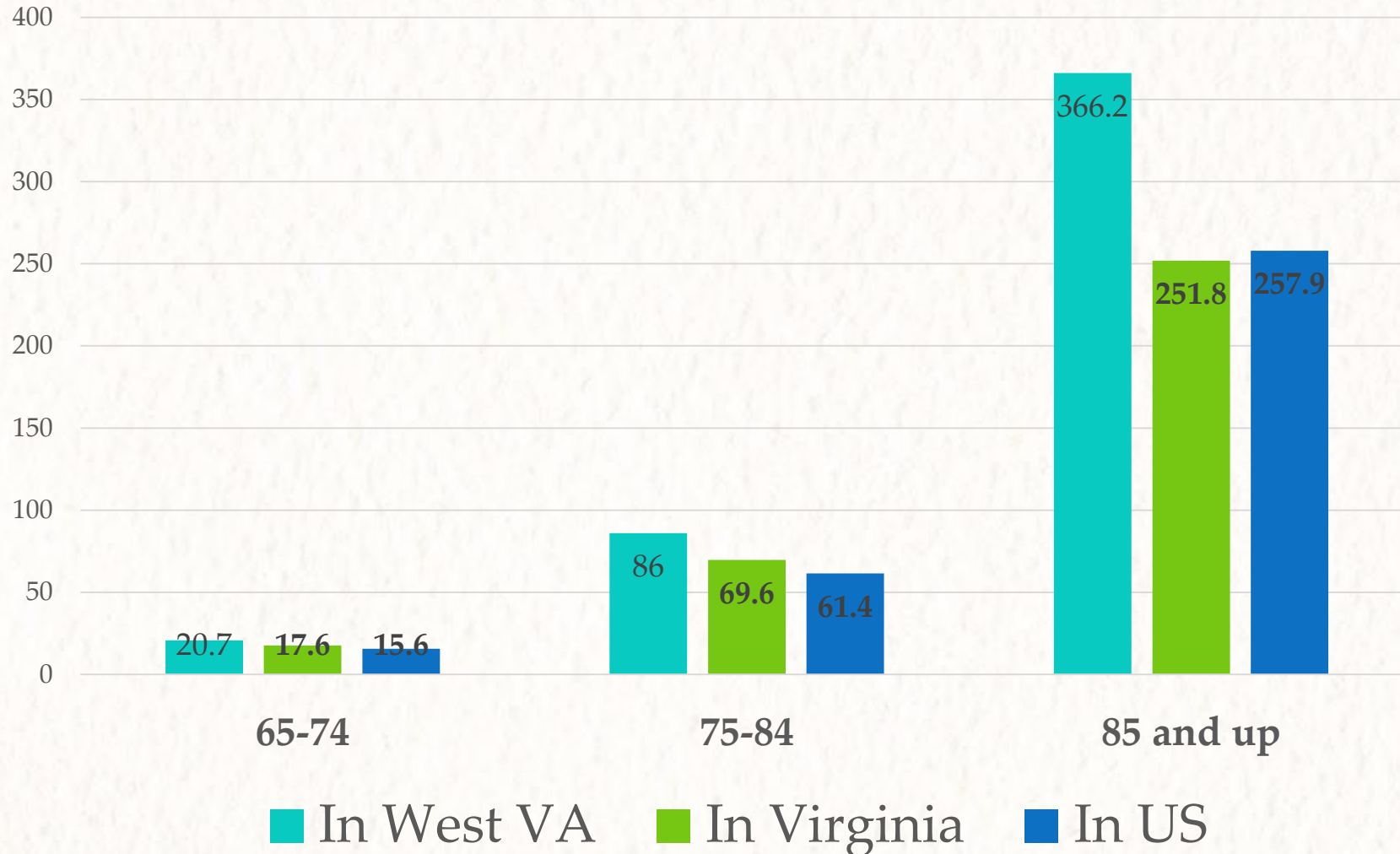
Bergen, Stevens, & Burns 2016



Falls and injury due to falls higher in:

- Older Age
- Low income
- Female Gender
- Conditions
 - Incontinence (women)
 - Frailty (women)- (Gale, Cooper, & Aihie Sayer, 2016)
 - Depression
 - Diabetes
 - Osteoporosis
 - Stroke
 - COPD/emphysema, asthma
 - MS
 - Parkinson's
 - Cognitive issues

Death rates due to falls per 100,000 people



FALLS are the leading cause of injury-related death for 65 and older

West VA and VA data retrieved from CDC WONDER; US data from Burns & Kakara (2018)

Long term issues after hospitalization

- **For admitted older adults**-higher fall risk, previous falls, unsafe gait associated with higher post d/c fall-related injury (Mojitabe, Alinaghizadeh, & Rydwick, 2018)
- **Fall risk** at admission associated with poorer outcomes at 1 year
 - Higher mortality rates
 - Functional decline (Buurman et al., 2011)

Fall injuries and 30 day readmission

From 8,000,000 initial Medicare admissions

- Overall readmissions-14.4%
 - Readmit with prior fall 12.9%
- Readmit due to fall-related injuries
 - 3rd ranked reason for readmit—5.1%
 - Those with fall at initial,
 - Older and more likely to have cognitive issue
 - 2nd highest ranked reason for readmit
 - If d/c home/hh, falls leading reason
- “targeting at-risk hospitalized older adults, particularly those discharged to home or home health care is an underexplored, cost effective mechanism with potential to reduce readmissions and improve patient care.” (p.1)

High Cost of Falls--Dollars

- Overall spending--\$50 billion
- Fatal falls cost \$754 million
- Nonfatal falls cost \$49 billion
- Need to work on prevention

Service	Spending nonfatal
Medicare	28.9
Medicaid	8.7
Hospital	12.9
Physician	10.8
Other (facilities, rehab, dme)	29.2

Lifetime cost of
fall-related
injury

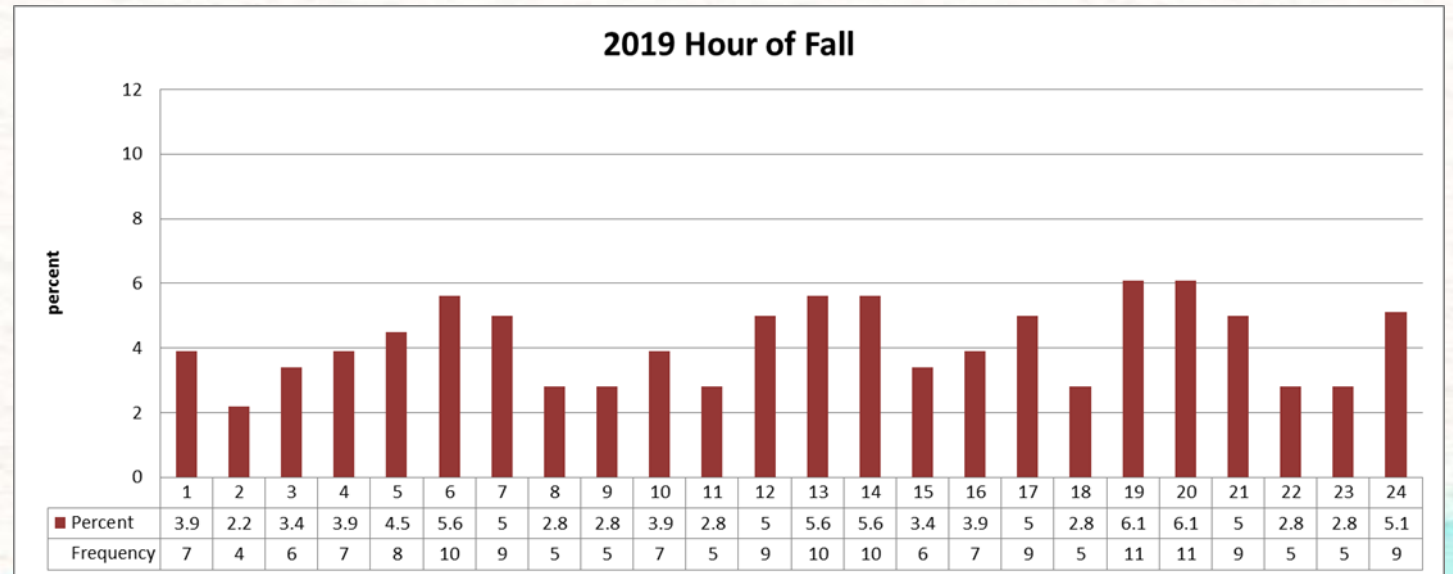
Age	Lifetime cost/per person
Average all ages	\$471
65-74	\$731
75+	\$1186

Restricting activity and fear of falling

- More concern if already have issues with IADLs, outdoor mobility (Patil, Uusi-Rasi, Kannus, Karinkanta, & Sievanen, 2014)
- Fear of falling higher in older adults (Niino, et al., 2000)
- Activity avoidance — associated with FOF but also with falls, higher age and fair/poor health (Zijlstra et al., 2007)
- Other researchers found FOF predicted falls and avoidance less important
- Falls can lead to increased fear, activity limitation, decreased function and frailty (Hadjistavropoulos et al., 2007)

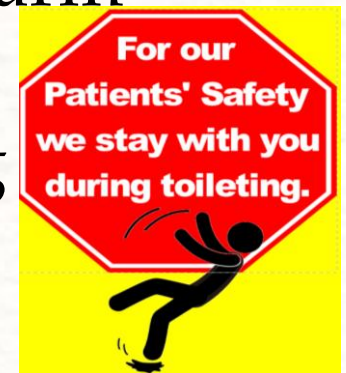
PIC Falls Report January-September 2019

- Downward trend January-July for Safety Sitter and Telesitter use
- Improved use of sitters August and September
- ↑ 3% in total falls as compared to last year
- ↑ 6% in injuries as compared to last year
- Recently id'd spike in falls at shift change and lunch
- Fewer falls related to BR/BSC—still 31% of falls
- What can rehab do?



Hospital Current Strategies to Decrease In- hospital Fall Rate

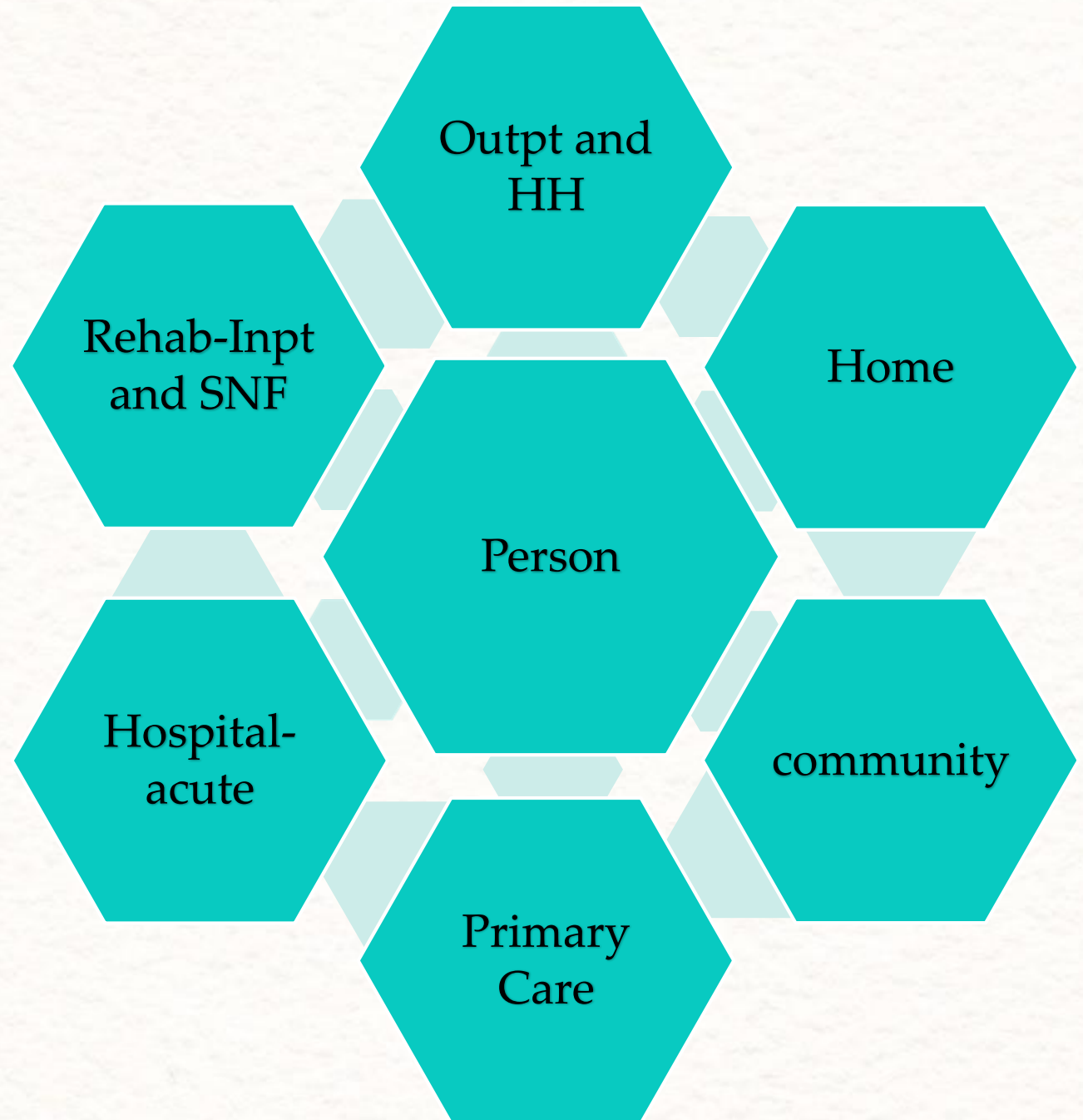
- Yellow bands, slippers
- Safety Sitters
- Telesitters
- Fall committee
- CME yearly for nurses-falls
- Refurbished bed and chair alarms
- Trials of other—like toilet alarm
- Annual id fall risk activity
- Supervision during toileting
- Signage on doors
- Presentations such as this



Evidence-based
Interventions to
Address Falls Across
the Continuum

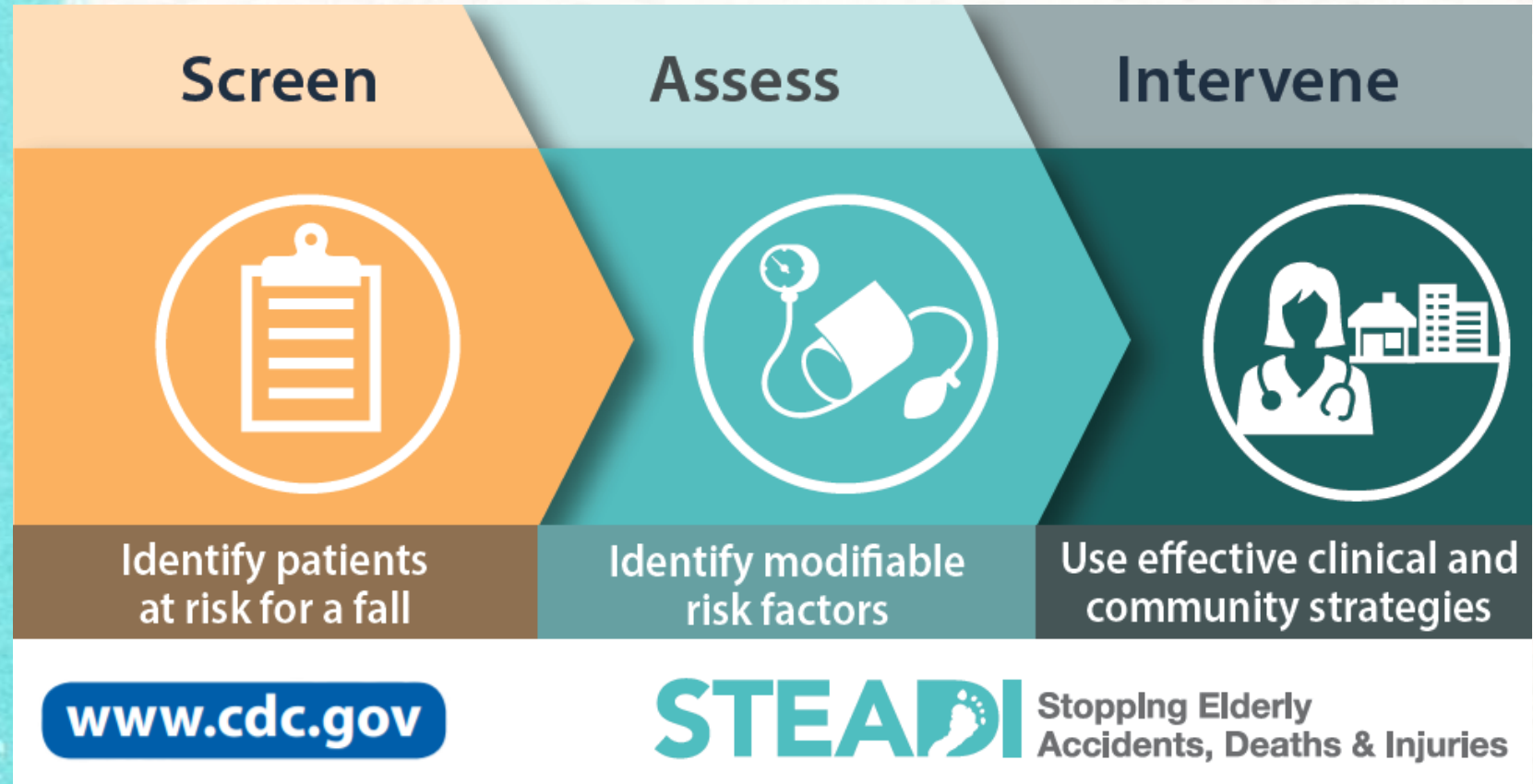
Rehab professionals and fall prevention

- Multiple risk factors mean need multiple interventions
- Address fall risk factors not just injury
- Connect beyond your setting



STEADI as a guide

- Screen for fall risk
- Assess modifiable risk factors
- Intervene
- Follow up
- Get pt and families engaged



STEADI outcomes

- 2-year study of hospital using STEADI
 - LOS ↓ from 7.9 to 5 days
 - D/C home ↑ from 47% to 63%
 - Fall pts re-hospitalized after a fall ↓ from 1.5 to .6%
- 3 year data collection of STEADI and fall prevention plan in primary care
 - Older adults id'd with fall risk with fp plan less likely than to be treated for fall (ED or hospitalization)
 - Similar to Not at Risk group (Johnston, et al, 2018)

STEADI Algorithm

STEADI Algorithm for fall risk screening, assessment, and intervention

STEADI Algorithm for Fall Risk Screening, Assessment, and Intervention among Community-Dwelling Adults 65 years and older

START HERE

1 SCREEN for fall risk yearly, or any time patient presents with an acute fall.

Available Fall Risk Screening Tools:

• **Stay Independent: a 12-question tool** [at risk if score ≥ 4]
 - **Important:** If score < 4 , ask if patient fell in the past year (If **YES** → patient is at risk)

• **Three key questions** for patients [at risk if **YES** to any question]
 - Feels unsteady when standing or walking?
 - Worries about falling?
 - Has fallen in past year?
 » If **YES** ask, "How many times?" "Were you injured?"

SCREENED **NOT** AT RISK

PREVENT future risk by recommending effective prevention strategies.

- Educate patient on fall prevention
- Assess vitamin D intake
 - If deficient, recommend daily vitamin D supplement
- Refer to community exercise or fall prevention program
- Reassess yearly, or any time patient presents with an acute fall

SCREENED AT RISK

2 ASSESS patient's modifiable risk factors and fall history.

Common ways to assess fall risk factors are listed below:

- Evaluate gait, strength, & balance
 Common assessments:
 - Timed Up & Go
 - 4-Stage Balance Test
 - 30-Second Chair Stand
- Identify medications that increase fall risk (e.g., Beers Criteria)
- Ask about potential home hazards (e.g., throw rugs, slippery tub floor)
- Measure orthostatic blood pressure (Lying and standing positions)
- Check visual acuity
 Common assessment tool:
 - Snellen eye test
- Assess feet/footwear
- Assess vitamin D intake
- Identify comorbidities (e.g., depression, osteoporosis)

3 INTERVENE to reduce identified risk factors using effective strategies.

Reduce identified fall risk

- Discuss patient and provider health goals
 - Develop an individualized patient care plan (see below)
- Below are common interventions used to reduce fall risk:

Poor gait, strength, & balance observed

- Refer for physical therapy
- Refer to evidence-based exercise or fall prevention program (e.g., Tai Chi)

Medication(s) likely to increase fall risk

- Optimize medications by stopping, switching, or reducing dosage of medications that increase fall risk

Home hazards likely

- Refer to occupational therapist to evaluate home safety

Orthostatic hypotension observed

- Stop, switch, or reduce the dose of medications that increase fall risk
- Educate about importance of exercises (e.g., foot pumps)
- Establish appropriate blood pressure goal
- Encourage adequate hydration
- Consider compression stockings

Visual impairment observed

- Refer to ophthalmologist/optometrist
- Stop, switch, or reduce the dose of medication affecting vision (e.g., anticholinergics)
- Consider benefits of cataract surgery
- Provide education on depth perception and single vs. multifocal lenses

Feet/footwear issues identified

- Provide education on shoe fit, traction, insoles, and heel height
- Refer to podiatrist

Vitamin D deficiency observed or likely

- Recommend daily vitamin D supplement

Comorbidities documented

- Optimize treatment of conditions identified
- Be mindful of medications that increase fall risk

FOLLOW UP with patient in 30-90 days.

Discuss ways to improve patient receptiveness to the care plan and address barrier(s)



Centers for Disease Control and Prevention
 National Center for Injury Prevention and Control

STEADI SCREEN



- Yes to any of 3 questions
 - Fallen
 - Unsteady
 - Worry about falls
- 12 item Stay Independent Brochure
 - Score of 4 or more—may be at increased fall risk
 - Help id intervention focus
 - Can use for Wellness appt

ASSESS

Best practices for fall risk assessments- STEADI recommended tools

- Hx falls
- Balance, strength and gait
 - Timed Up and Go
 - 4 Stage Balance Test
 - 30 Second Chair Stand
- Home safety/hazards
- Medications
- Vision
- Orthostatic BP
- Feet/footwear
- Vitamin D intake



FACT SHEET
Medications Linked to Falls

Review medications with all patients 65 and older. Medication management can reduce interactions and side effects that may lead to falls.

STOP medications when possible.
SWITCH to safer alternatives.
REDUCE medications to the lowest effective dose.

Check for psychoactive medications, such as:

- ▶ Anticonvulsants
- ▶ Antidepressants*
- ▶ Antipsychotics
- ▶ Benzodiazepines
- ▶ Opioids
- ▶ Sedatives-hypnotics*

Review prescription drugs, over-the-counter medications, and herbal supplements. Some can cause dizziness, sedation, confusion, blurred vision, or orthostatic hypotension. These include:

- ▶ Anticholinergics
- ▶ Antihistamines
- ▶ Medications affecting blood pressure
- ▶ Muscle relaxants

Develop a patient plan that includes medication changes, and a monitoring plan for potential side effects. Implement other strategies, including non-pharmacologic options to manage conditions, address patient barriers, and reduce fall risk.

Visit the [American Geriatrics Society Beers Criteria](#) for more information on medications linked to falls.
CDC STEADI facts and resources can help you screen, assess, and intervene to reduce your patient's fall risk. For more information, visit [www.cdc.gov/steadi](#).

*Antidepressants include TCAs and SSRIs. Sedative-hypnotics include eszopiclone, zolpidem, and zaleplon.

 Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

 STEADI® Stopping Elderly Accidents, Deaths & Injuries.

2017



Id modifiable risk factors

Other fall risk assessments

- Berg
- Functional Reach
- Morse fall scale
- Assess context
 - STEADI checklist
 - More formal assessments in home
 - SAFER-Home
 - HomeFast
 - Westmead Home Safety Assessment
- Fear of Falling/Balance Confidence-
Measures include FES, MFES, FES-I,
separate questions

Falls are Preventable.



Speak up.



Keep moving.



Check your eyes.



Make your home safer.

www.cdc.gov

STEADI Stopping Elderly
Accidents, Deaths & Injuries

[Stop Elderly Accidents, Deaths and Injuries--STEADI Toolkit](#)

Best practices in fall prevention interventions

- Use multifactorial interventions
- Decrease fear of falling
- Address activity restriction
- Improve confidence
- Strength/Balance/Gait training
- Address home environment

Environmental interventions

- Awareness
- Home modifications
- As an isolated intervention
 - Few RCTs-results mixed- (Guirquis-Blake, et al., 2018)
 - One smaller RCT
 - OT-led same day assess and intervention, phone follow up
 - reduced falls but NOT FOF (Pighills, Torgerson, Sheldon, Drummond, & Bland, 2011)
 - Professional to id issues and pay/connect for repairs
- Often part of successful studies (Elliott & Leland, 2018)

Exercise, strength, and balance interventions

- Exercise —
 - AHRQ reviewed as single intervention (included balance, gait, and strength too)
 - RCTS recruited most commonly by function/mobility limitation
 - Usually group settings
 - Evidence of reduction in falls, # people falling, and injury but NOT mortality (Guirguis-Blake et al., 2018)
 - Can reduce falls by up to 30%
 - Not necessarily walking
- Balance training
 - Stepping programs and reactive programs (Okubo, Schoene, Lord, 2017; Okubo, Brodie, Sturnieks, Hicks, & Lord, 2019)
 - Addresses reaction time, gait, balance, recovery
 - Not strength-based
 - Decreased falls and improved reactions but at what risk?
- Strength and power training —
 - Strength as part of multifactorial intervention (Horlings, Van Engelen, Allum, & Bloem, 2008).
 - Consider power (high velocity resistance) training (Orr et al., 2006)
- PT Clinical Guidance Statement does not specify assessments nor interventions — (Alvin et al., 2015)

Interventions to decrease fear and build confidence

- Fear of falling
 - Does FOF=decreased SE?
 - Exercise might decrease FOF –but doesn't increase risk (Kendrick et al., 2014)
 - If fear not realistic appraisal, address fear (Hadjistavropoulos et al., 2007)
- Improve fall-related self-efficacy
 - Community program like MOB/VLL –
 - improve FSE
 - mediate FOF/FM (Yoshikawa & Smith, 2019)
 - Client success builds confidence
 - Believe can manage and prevent falls
 - Use action plans and group effects

Best practices in fall prevention interventions-- Community

- Tai chi for health:
 - Reduces falls, improves balance — (Song et al., 2015)
 - Those with low fall risk — Tai chi for 3 months can increase balance
 - Higher frequency, bigger effect sizes, more prevention (Huang, Yun-Hui, Yu-He, & Chang-Sheng, 2017)
 - High risk, smaller effect sizes
 - Ex: Parkinson's (Liu et al., 2019)
 - ROI — 509! And net benefit was \$529 (Song et al., 2015)
- Otago
 - OA 65+- net benefit \$122 and ROI 36%
 - OA 80+--net benefit was \$429 and ROI was 127\$ (Song et al., 2015)
 - Low frequency PT in home — improved functional mobility and balance (Shubert, Smith, Jiang, & Ory, 2018)

Community interventions continued:

- Stepping On
 - 7 sessions-reduce falls and improve confidence
 - Control risk and apply safer strategies (Clemson, Cumming, Kendig, Swann, Heard & Taylor, 2004)
 - Net benefit of \$134.37 and an ROI of 64% (Song et al., 2015)
- Matter of Balance/Volunteer Lay Leader
 - 8 sessions, can be lay led
 - Education and exercise
 - Help decrease FOF/improve fall-related SE, increase activity (Alexander, Sartor-Glittenberg, Bordenave, & Bordenave, 2015; Smith, Jiang, & Ory, 2012).
- Great resource guide: [CDC-implementing community based fall prevention programs](#)

Best practice considerations

- Prioritize choices — Start small — Examine outcomes (Eckstrom, Parker, Shakya, & Lee, 2019)
- Use an expanded team approach — create your connections!
- Reinforce tx via phone/in person follow up
- Connect into home and into community
- How can STEADI work for your area?

Evaluating Fall Prevention Initiatives

- Use resources:
- AHRQ 2018 Systematic review of fall prevention interventions (Guirquis-Blake, et al., 2018)
- Professional guidelines (PT: Avin et al., 2015)
- STEADI recommendations: [Coordinated Care Plan to Prevent Older Adult Falls \(2019\)](#)
- Create your own program to fit your needs
- Do your own evaluations—use CDC evaluation guideline: [CDC STEADI-Evaluation Guide for Older Adult Clinical Fall Prevention Programs](#)

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