

Evidence-based Strategies to Decrease Falls in Valley Health System

Kay Graham, PhD, OTR/L
Brenau University

Objectives

Participants will:

- Relate common fall risk factors (internal and external) to mechanisms of falls specifically in hospital settings.
- Update knowledge of best practices in fall risk assessment and interventions in the acute setting.
- Select fall prevention and management initiatives for application in the Valley Health Hospital System.

Fall Incidence and Risk of Falling

Community Dwelling Adults Reporting Fall

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

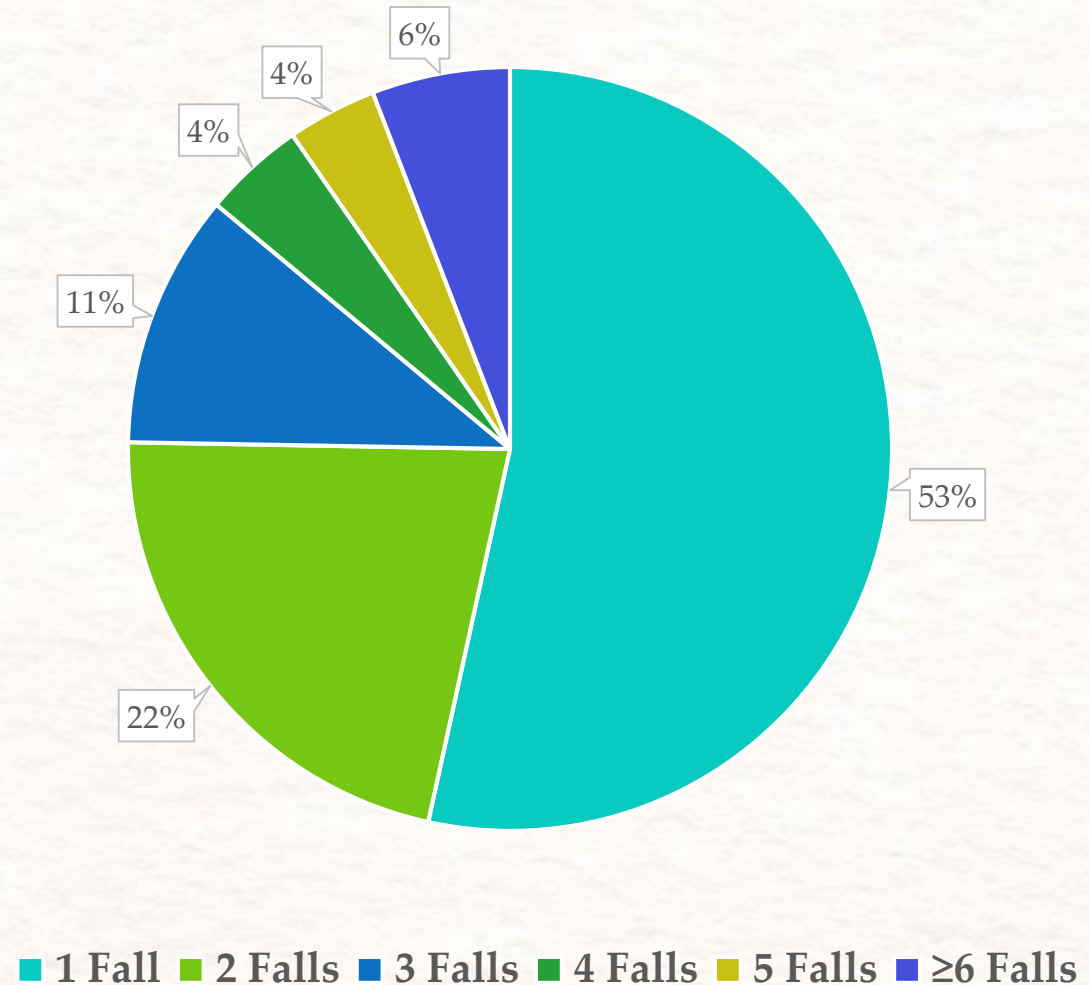
| Ages | % reporting fall last 12 months ^a | % reporting fall injury last 3 months ^a | % fallers reporting injury last 3 months ^b | |
|-------|--|--|---|--------|
| | | | Male | Female |
| All | 11.9 | | 38.2 | 61.8 |
| 18-44 | 10.66 | .7 | 17.8 | 19.6 |
| 45-64 | 11.4 | 1.1 | 11.8 | 20.9 |
| 65+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

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

High prevalence in older adults

- 23.9% fell in 2011
- Almost ½ fallers had >1 fall
- 59.6 unintentional fall deaths per 100,000 in 2015
- Only about ½ 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)



High Cost of Falls--Dollars

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

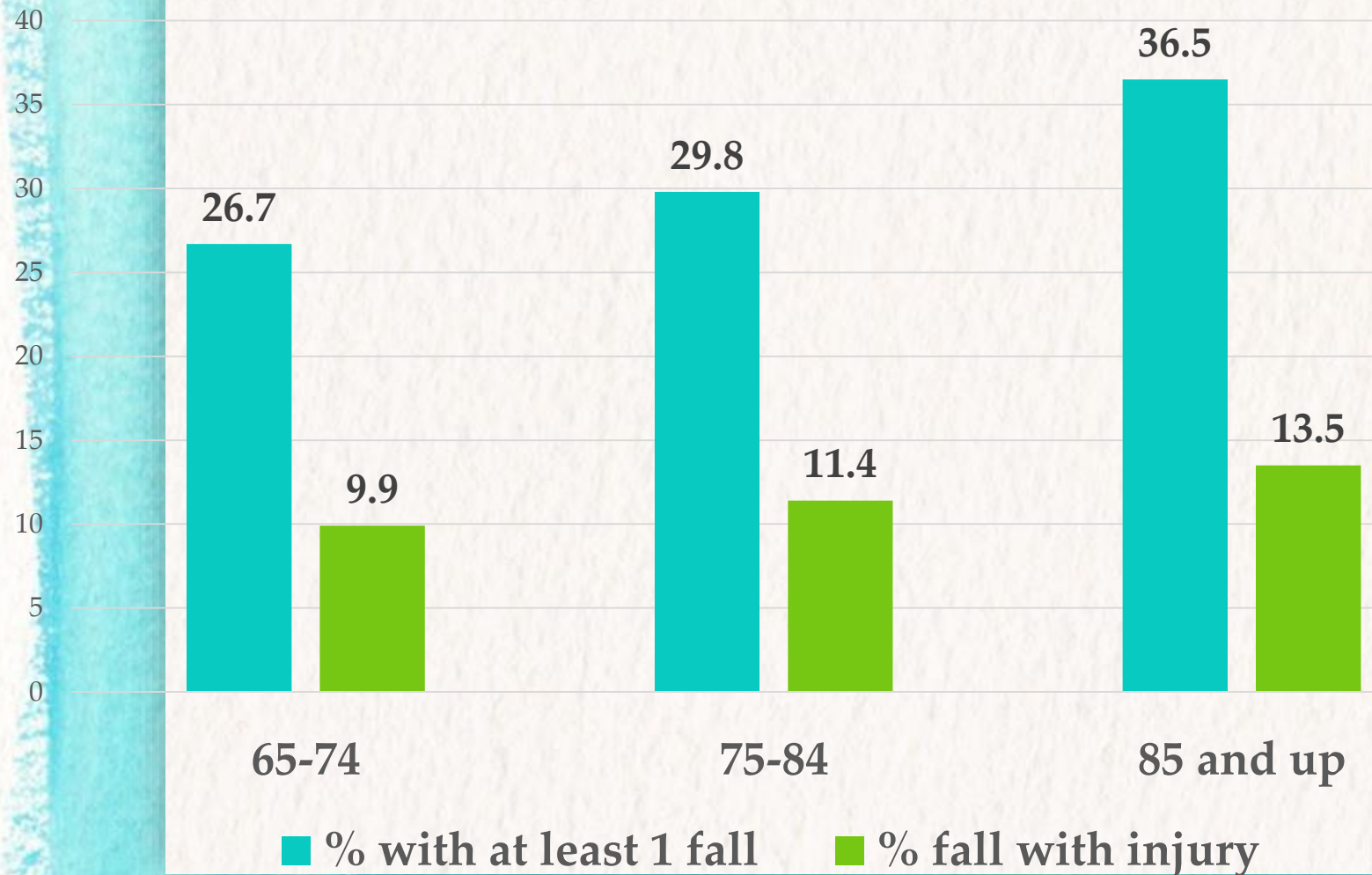
| Service | Spending nonfatal |
|--------------------------------|-------------------|
| Medicare | 28.9 |
| Medicaid | 8.7 |
| Hospital | 12.9 |
| Physician | 10.8 |
| Other (facilities, rehab, dme) | 29.2 |

Lifetime cost of
fall-related
injury

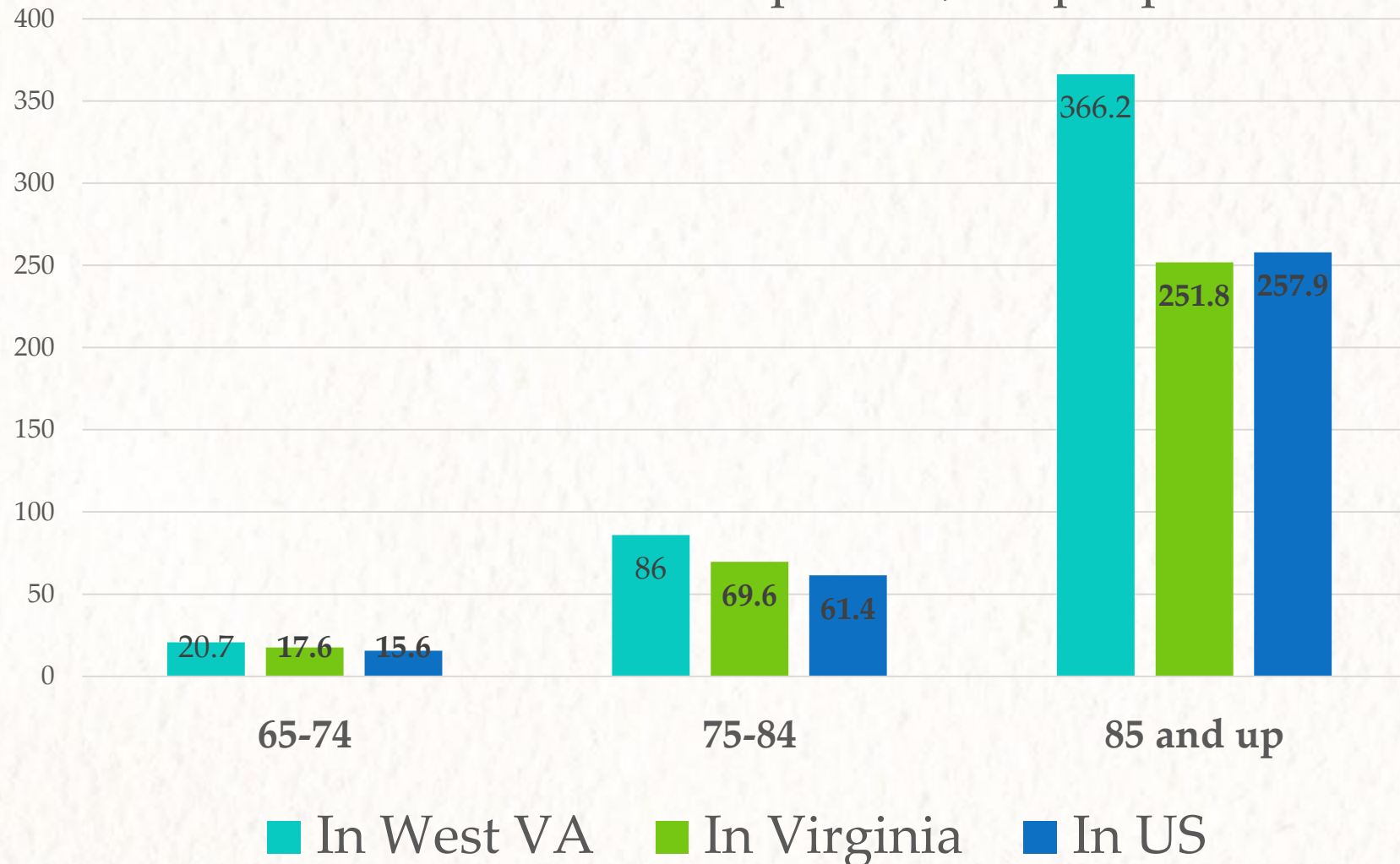
| Age | Lifetime cost/per person |
|------------------|--------------------------|
| Average all ages | \$471 |
| 65-74 | \$731 |
| 75+ | \$1186 |

In 2014,
29 % OA
reported fall
38% of those
were injured
in fall

Falling and Injury due to Falls by Age



Death rates due to falls per 100,000 people



Death rates
in 65+
increased
30% from
2007 to 2016

Fastest
growing
rate in 85+
4% per year

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)

Falls and injury due to falls higher in:

- Older Age
- Low income
- Female Gender
- Conditions that increase risk of falls
 - Incontinence (women)
 - Frailty (women)- (Gale, Cooper, & Aihie Sayer, 2016)
 - Depression
 - Diabetes
 - Osteoporosis
 - Stroke
 - COPD/emphysema, asthma
 - MS (Mazumder, Murchison, Bourdette, & Cameron)
 - Parkinson's
 - Cognitive issues

Mechanisms of Falls Causing Injury

- Activity
 - Walking most common – all age and gender except young men (vigorous activity)
 - Then Vigorous (decreased with age)
 - Then stairs
- 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)

Post hospital fall injuries and readmission

From 8,000,000 initial admissions

- Overall readmissions-14.4%
 - Readmissions if had prior fall 12.9%
- Readmission and fall-related injuries
 - 3rd ranked reason for readmit
 - Those with fall at initial,
 - 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)
Hoffman, Liu, Alexander, Tinetti, Braun & Minn (2019)

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)
- **Hip Fx (not specific to falls)** --at 6 months more than 2.5x mortality
 - Persists higher even after 8 years
 - Men higher mortality though women higher fractures
 - Higher mortality with chronic conditions (Katsoulis et al., 2017)

Mechanisms of Falls in Hospital Setting

Intrinsic Risk factors for in-hospital falls

- Advanced age
- Medical conditions-top three
 - Altered mental status (including dementia and delirium)
 - Impaired mobility/musculoskeletal issues
 - Stroke
- Nonmedical conditions
 - Longer LOS
 - Hx falls
 - Meds – psychotropic, antipsychotic, and antidepressants
- Gender-not conclusive
- Fall screening at admission=protective factor

Extrinsic Risk factors for in-hospital falls

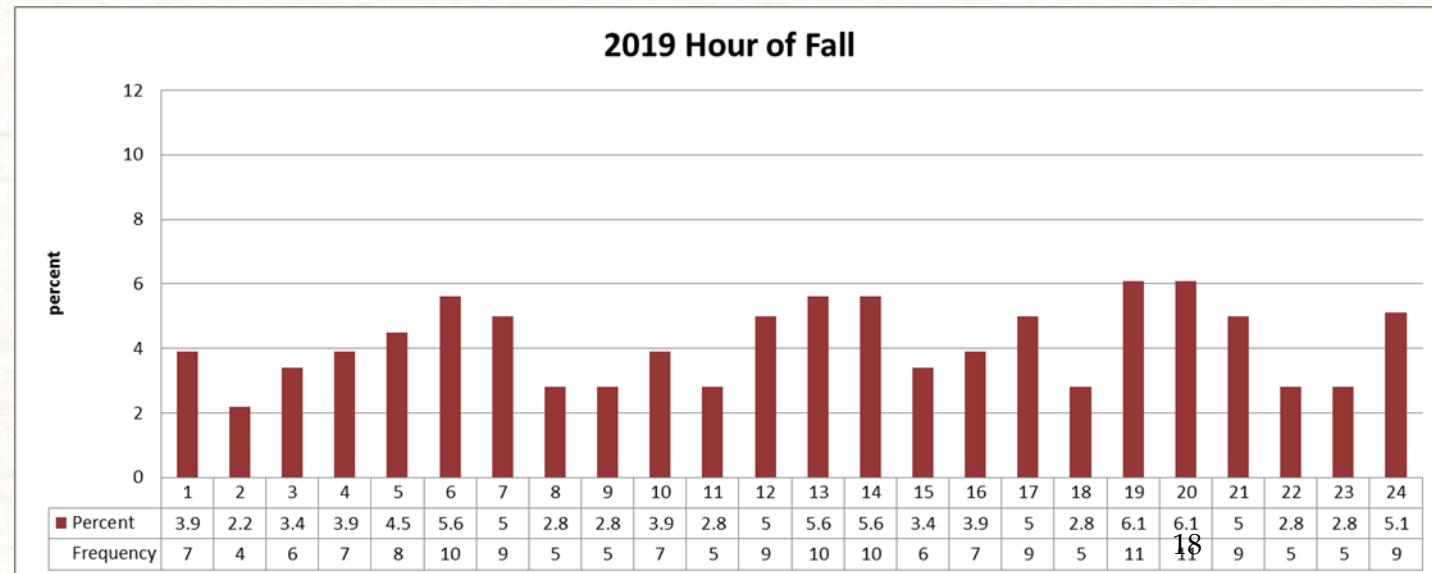
- Geriatric unit-highest fall incidence
- Followed by internal medicine and neuro units
- Shift change
- Evening and night
- 25-70% when walking or transferring
- 16-51% falling out of bed
- Most falls in room (62-77%)
 - -(11-68%) in Bathroom

Fall injuries while hospitalized

- Fall in hospital resulted in increase 8 day LOS compared to nonfallers
- Injury from inhospital fall, 4 day LOS increase from noninjured fall (Morelio, et al., 2015)
- Wide range in terms of injury incidence –from 7 to 72%
- Most injuries minor abrasions or moderate lacerations
- Major injuries from .5-29%
- Older adults
 - More likely major injury
 - Fx
 - Increased length of stay
 - Mortality (Zhao & Kim, 2015)
 - More likely to be placed in NH-13% compared to 6% (Corsinovi, et al., 2009)

Winchester Medical Center Falls Report January-September 2019

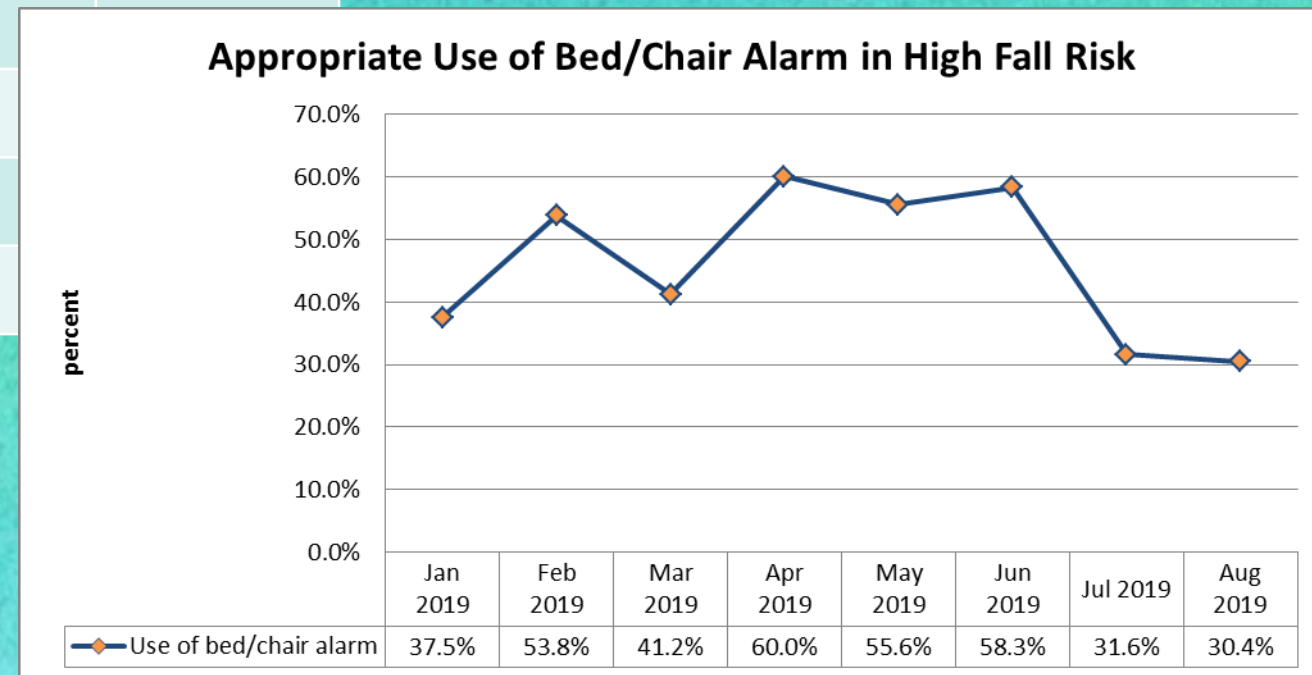
- Improved fall rate from 1.74 to 1.34 per 1000 adjusted patient days
- Downward trend January-July for Safety Sitter and Telesitter use
- Improved use of sitters August and September
- ↑ 3% in total falls as compared to last year
- ↑ 6% in injuries as compared to last year
- Recently id'd spike in falls at shift change and lunch
- Fewer falls related to BR/BSC — still 1/3 of falls



More WMC fall specifics

WMC continues to outperform quality benchmarks for both falls and injury due to falls

| | Thru August 2018 | Thru August 2019 | |
|------------------------|------------------|------------------|-------------|
| Total Falls | 248 | 256 | 3% increase |
| Total Injuries | 54 | 58 | 7% increase |
| Minor Injury | 44 | 47 | |
| Moderate Injury | 0 | 2 | |
| Major Injury | 9 | 9 | |
| Death | 1 | 0 | |



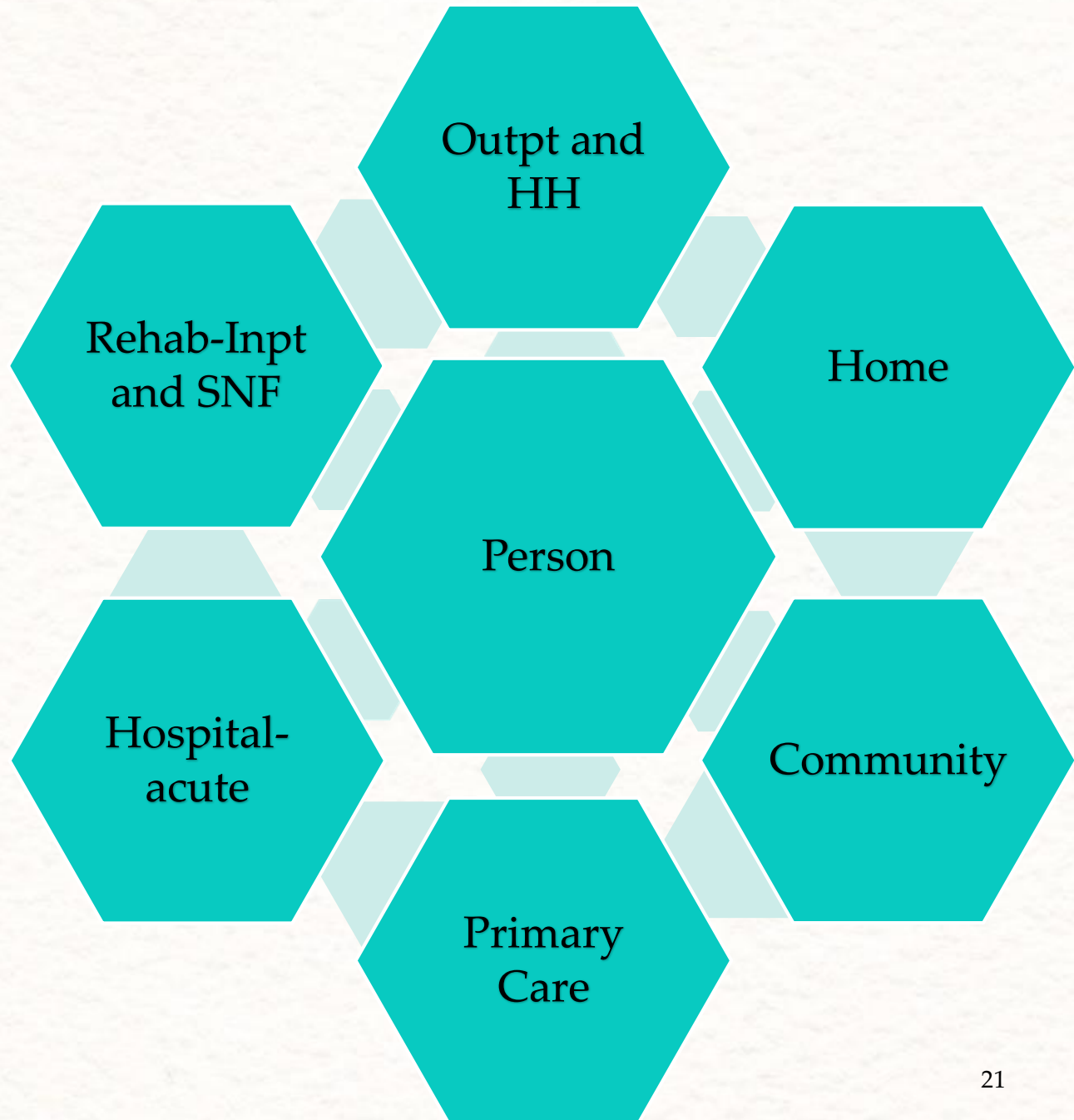
Goal: Zero falls with injury!
How can you help?

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
- Supervision during toileting
- Signage on doors
- Presentations such as this



Addressing falls
at all levels



Evidence-based Interventions to Address Falls Across the Continuum

Lessons learned from RCT multifactorial interventions

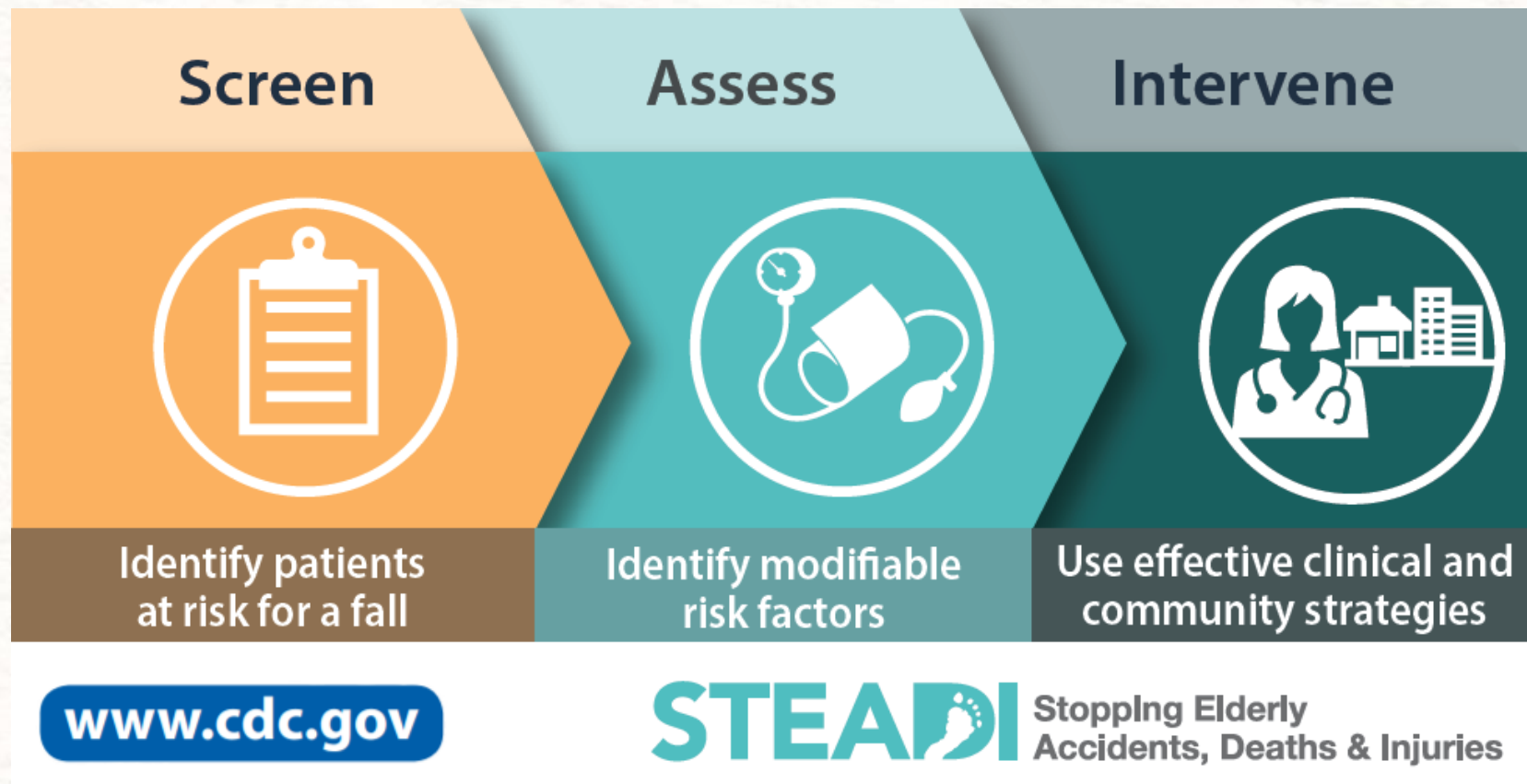
- Heterogeneous populations—much variation
- **Most consistent finding: “studies recruiting participants from emergency settings exhibited greater benefit related to the rate of falls than did participants in other settings” p. 21**
- All assessed for modifiable risk factors
- Most programs used nurse for initial assessment
- Specialty referrals (rehab, MD, etc followed)
- Some direct tx—
- Most in outpt
- Communication with PCP
- Majority had home visit(s)
 - OT and home modifications
 - PT for exercises

Single intervention- Exercise

- AHRQ reviewed as single intervention
- RCTS recruited most commonly by function/mobility limitation
- Usually group settings some with home HEP as well
- Duration varied-2 to 42 months-12 month common
- Included gait, balance
- Over half used resistance
- Evidence of reduction in falls and injury but NOT mortality (Guirguis-Blake et al., 2018)

Vitamin D

- Varied dosage
- 9 month to 5 year administration
- Mixed results



STEADI as a guide

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

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 \rightarrow 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



Id modifiable risk factors

- 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



STEADI ASSESS

Best practices
for fall risk
assessments-
STEADI
recommended
tools

Medication Review

Stop
Switch
Reduce

- Avoid psychoactive meds

Psychoactive meds

| | |
|-----------------|---------------------|
| Anticonvulsants | Benzodiazepines |
| Antidepressants | Opioids |
| Antipsychotics | Sedatives-hypnotics |

- Stop meds first choice
- Watch drugs causing dizziness, sedation, confusion, blurred vision or orthostatic hypotension

Other medications

| | |
|------------------|--------------------------|
| Anticholinergics | Medications affecting BP |
| Antihistamines | Muscle relaxants |

- Beers criteria—updated 2019
- STEADI handout: [Medications that increase fall risk](#)

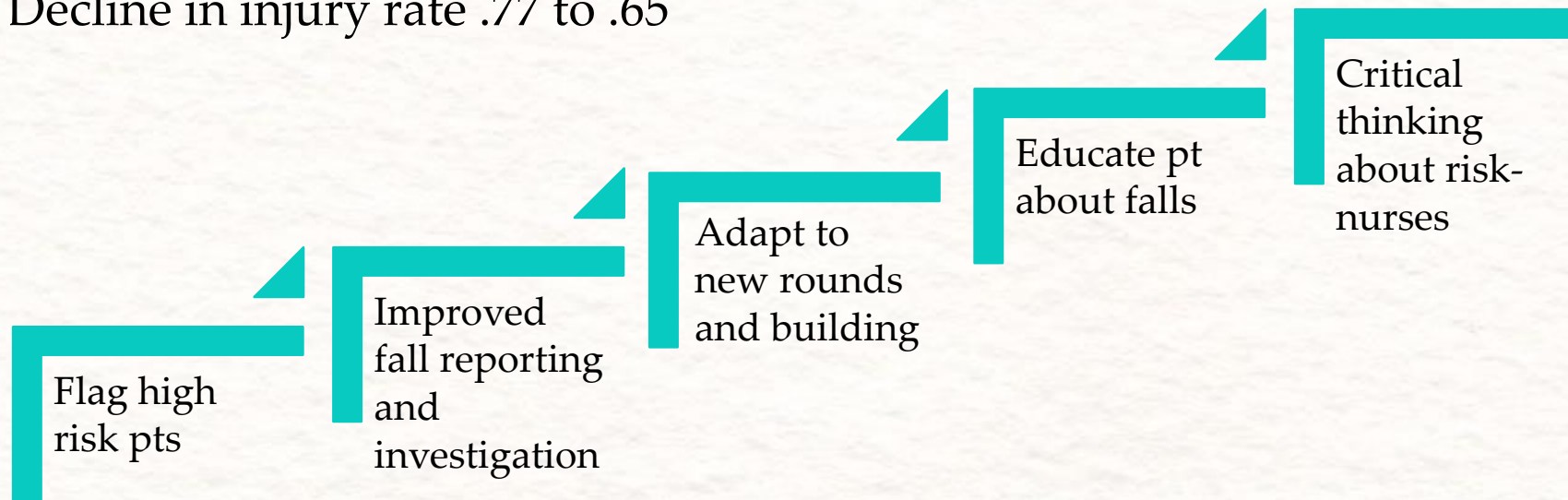
Hospital-based initiatives

- Important to fit program to facility issues and resources
- NOT one-size fits all
- Culture change: tailored education to staff after assessment of falls and issues-improved knowledge, attitudes and motivation (Lopez-Jeng & Eberth, 2019)
- STEADI implementation at hospital Trauma Center with older adults
 - Of those admitted-60% had injury from fall
 - Hospital LOS and d/c status:

| | Before STEADI | After STEADI | Year 2 |
|--|----------------------|---------------------|---------------|
| Length of stay | 7.9 days | 6.5 days | 5 days |
| D/C to home | 46.8% | 54.5% | 63.6 |
| Fallers returned with 2 nd fall | 1.5% | 0.6% | Not given |

Persistence pays off

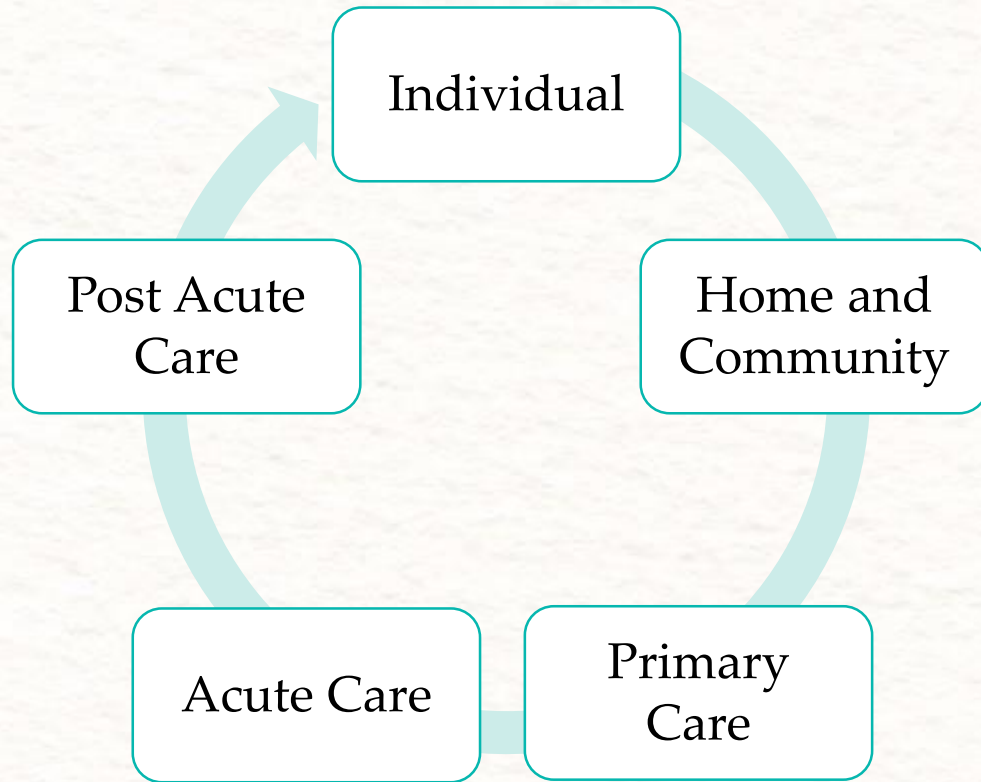
- Hospital incremental initiatives can chip away at fall issue
- One Medical center's journey
- 28% sustained decline in fall rate per 1000 patient days, from 3.07 to 2.22
- Decline in injury rate .77 to .65



Outcomes of fall prevention initiatives—Primary Care

- STEADI interventions offer great evidence based programs
- STEADI based fall plan of care implemented 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)

Falls addressed at all levels



- Annually
 - Required by Medicare Wellness visits/Welcome to Medicare
 - Quality measure-MACRA
 - Review for fall risk
 - Screen all
- After fall with medical tx
 - Assess for contributing risk factors
 - Start discussion about fp strategies
 - Work to avoid fear/activity limitations

Ensuring success of fall prevention initiatives

- Identify fp champions
- Everyone forms team
- Train regularly
- Ease of documentation (drop lists)
- Form to record screening results like Timed Up and Go
- Ensure referrals to
 - Rehab-PT and OT
 - Community programs
- Use STEADI resources for patients
 - [STEADI pt handouts](#)
 - Fall risk and Home safety self assessments
 - Handouts for reducing risk

Reimbursement and quality initiatives

- Ways to get reimbursed for fp activities
- Medicare annual wellness visit
- Eval and management codes
 - Specific to fall risk factors
 - For care coordination/referrals
 - Transitional management codes post hospital stay
- Incentive quality measures from MACRA

Eckstrom, Parker, Shakya, & Lee, 2019

Primary care

The Office Visit

- Screen pts ahead of time
 - Phone
 - Online questionnaire
 - If id'd at risk, extend visit or schedule additional
- Routine visits
 - Fill out fall risk questionnaire while wait
 - Clinic team assess at risk during visit or schedule additional
 - Care plan to address modifiable risk
- Bring into EHR/normal work flow
- EHR platforms with fp modules
 - EPIC[®] clinical platform
 - GE Centricity[™] Users Group Module
 - Evident[®] STEADI program (Eckstrom, Parker, Shakya, & Lee, 2019)
- Success keys—use EHR, proactive leadership/champions (Casey et al., 2018)

Suggested monitoring measures for fp program implementation

- # 65+ screened for fall risk
- # and % 65+ with identified fall risk
 - Scores on measures
- Referrals to rehab/medical professionals
- Referrals made to community programs
 - Tai Chi
 - Matter of Balance
 - Stepping On
- Changes to meds associated with falls

Recommendations

- Fully use EHR like EPIC to trigger fall questions, initiate community referrals
- Consider implementing referrals from Emergency Department for better outcomes
- Use variety of staff of screening and assessment—spread the load
- Refer patients into community programs
- Frequently review meds-consider Beers list
- Look for programs that work with your system
- Multifactorial and exercise strongest, consistent outcomes

References

- Bergen G, Stevens MR, Burns ER. Falls and fall injuries among adults aged ≥65 years — United States, 2014. *MMWR Morb Mortal Weekly Report* 2016;65:993–998. DOI: <http://dx.doi.org/10.15585/mmwr.mm6537a2>
- Burns E, & Kakara R. Deaths from falls among persons aged ≥65 Years — United States, 2007–2016. *MMWR Morb Mortal Weekly Report* 2018;67:509–514. DOI: [http://dx.doi.org/10.15585/mmwr.mm6718a1external icon](http://dx.doi.org/10.15585/mmwr.mm6718a1external%20icon)
- Buurman, B. M., Hoogerduijn, J. G., Haan, R. J. de, Abu-Hanna, A., Lagaay, A. M., Verhaar, H. J., ... Rooij, S. E. de. (2011). Geriatric conditions in acutely hospitalized older patients: Prevalence and one-year survival and functional decline. *PLOS ONE*, 6(11), e26951. <https://doi.org/10.1371/journal.pone.0026951>
- Casey, C. M., Parker, E. M., Winkler, G., Liu, X., Lambert, G. H., & Eckstrom, E. (2016). Lessons learned from implementing cdc's stadi falls prevention algorithm in primary care. *The Gerontologist*. May 09, 2018 <https://doi.org/10.1093/geront/gnw074>
- Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2017 on CDC WONDER Online Database, released December, 2018.
- Corsinovi, L., Bo, M., Aimonino, N. R., Marinello, R., Gariglio, F., Marchetto, C., ... & Molaschi, M. (2009). Predictors of falls and hospitalization outcomes in elderly patients admitted to an acute geriatric unit. *Archives Of Gerontology And Geriatrics*, 49(1), 142-145.
- Eckstrom, E., Parker, E.M., Shakya, I., Lee, R. (2019). *Coordinated care plan to prevent older adult falls*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Retrieved from <https://stacks.cdc.gov/view/cdc/78040>
- Florence, C. S., Bergen, G., Atherly, A., Burns, E., Stevens, J., & Drake, C. (2018). Medical costs of fatal and nonfatal falls in older adults: medical costs of falls. *Journal of the American Geriatrics Society*, 66(4), 693–698. <https://doi.org/10.1111/jgs.15304>
- Guirguis-Blake, J. M., Michael, Y. L., Perdue, L. A., Coppola, E. L., Beil, T. L., & Thompson, J. H. (2018). Interventions to prevent falls in community-dwelling older adults: A systematic review for the U.S. Preventive Services Task Force. Retrieved from <http://www.ncbi.nlm.nih.gov/books/NBK525700/>
- Hoffman, G. J., Liu, H., Alexander, N. B., Tinetti, M., Braun, T. M., & Min, L. C. (2019). Posthospital Fall Injuries and 30-Day Readmissions in Adults 65 Years and Older. *JAMA Network Open*, 2(5), e194276–e194276. <https://doi.org/10.1001/jamanetworkopen.2019.4276>
- Howland, J., Shankar, K. N., Peterson, E. W., & Taylor, A. A. (2015). Savings in acute care costs if all older adults treated for fall-related injuries completed matter of balance. *Injury Epidemiology; Heideberg*, 2(1), 1–7. <https://doi.org/http://dx.doi.org.ezproxy.brenau.edu/10.1186/s40621-015-0058-z>

- Johnston, Y. A., Bergen, G., Bauer, M., Parker, E. M., Wentworth, L., McFadden, M., ... Garnett, M. (2018). Implementation of the Stopping Elderly Accidents, Deaths, and Injuries Initiative in primary care: An outcome evaluation. *The Gerontologist*. <https://doi.org/10.1093/geront/gny101>
- Katsoulis, M., Benetou, V., Karapetyan, T., Feskanich, D., Grodstein, F., Pettersson-Kymmer, U., ... Trichopoulos, A. (2017). Excess mortality after hip fracture in elderly persons from Europe and the USA: the CHANCES project. *Journal of Internal Medicine*, 281(3), 300–310. <https://doi.org/10.1111/joim.12586>
- *Keep them STEADI: Preventing older adult falls in hospital-based settings*. (n.d.) National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Retrieved from: <https://www.cdc.gov/steady/stories/hospital.html>
- Lopez-Jeng, C., & Eberth, S. D. (2019). Improving hospital safety culture for falls prevention through interdisciplinary health education. *Health Promotion Practice*, 1524839919840337. <https://doi.org/10.1177/1524839919840337>
- Mojtaba, M., Alinaghizadeh, H., & Rydwik, E. (2018). Downton Fall Risk Index during hospitalisation is associated with fall-related injuries after discharge: A longitudinal observational study. *Journal of Physiotherapy*, 64(3), 172–177. <https://doi.org/10.1016/j.jphys.2018.05.005>
- Multiple Cause of Death Files, 1999-2017, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on Oct 1, 2019 11:04:55 PM
- Riggleman, K (2019, September). *2019 Patient Falls Performance Improvement Summary*. Performance Improvement Committee. Winchester Medical Center, Winchester, VA.
- Timsina, L. R., Willetts, J. L., Brennan, M. J., Marucci-Wellman, H., Lombardi, D. A., Courtney, T. K., & Verma, S. K. (2017). Circumstances of fall-related injuries by age and gender among community-dwelling adults in the United States. *PLoS One*; San Francisco, 12(5), e0176561. <https://doi.org/http://dx.doi.org.ezproxy.brenau.edu/10.1371/journal.pone.0176561>
- Verma, S. K., Willetts, J. L., Corns, H. L., Marucci-Wellman, H. R., Lombardi, D. A., & Courtney, T. K. (2016). Falls and fall-related injuries among community-dwelling adults in the United States. *PLOS ONE*, 11(3), e0150939. <https://doi.org/10.1371/journal.pone.0150939>
- Walsh, C. M., Liang, L.-J., Grogan, T., Coles, C., McNair, N., & Nuckols, T. K. (2018). Temporal trends in fall rates with the implementation of a multifaceted fall prevention program: Persistence pays off. *Joint Commission Journal on Quality and Patient Safety*, 44(2), 75–83. <https://doi.org/10.1016/j.jcjq.2017.08.009>
- Zhao, Y., & Kim, H. (2015). Older adult inpatient falls in acute care hospitals: Intrinsic, extrinsic, and environmental factors. *Journal of Gerontological Nursing*, 41(7), 29–33.