Fall Risk Reduction in Older Adults
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Objectives
• Review national fall statistics
• Understand fall risk factors in older adults and how to screen for fall risk
• Review best practices for fall risk reduction intervention
• Review some high tech interventions options for older adults with balance problems
• Become familiar evidence based community programs that reduce falls and fall risk

National Falls Statistics for Adults 65 and Older
• 1/3 of community dwelling older adults fall each year
• Less than ¾ of MC Beneficiaries who fell told their Primary Care Provider
• 1 in 5 falls results in serious injury such as fractures or a head injury
• More than 95% of hip fractures are caused by falls, usually falling sideways

(Centers for Disease Control and Prevention)
National Falls Statistics for Adults 65 and Older

- 50% of LTC Residents fall annually
- Over 2 million older adults are treated in the Emergency Room each year
- Every 29 minutes an older adult dies from a fall
- In 2013, the total cost for fall related injuries was $34 billion dollars, 78% covered by MC

Fall Risk Screening

Check Your Risk for Falling

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you fallen in the last month?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>Have you fallen in the last year?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>Are you afraid to leave your home alone?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>Do you have unsteady gait or unsteadiness when you walk?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>Do you walk at a slower pace than you did last year?</td>
<td>Yes/No</td>
<td>1</td>
</tr>
<tr>
<td>Do you have 2 or more points, yes/yes/yes?</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Total: ___________

CDC STEADI Toolkit – “Stay independent” brochure, www.cdc.gov/STEADI
Dartmouth Centers for Health and Aging
ACL Falls Grant

- Modified STEADI Health Care Provider Algorithm
  - Based on AGS/BGS guidelines
- Use for community based screens-train staff
- Partners include:
  - YMCA
  - Senior Centers
  - Recreation Centers
  - Health Clubs

Timed Up & Go

Instructions to the patient:
When I say "Go," I want you to:
1. Stand up from the chair
2. Walk to the line on the floor at your normal pace
3. Turn
4. Walk back to the chair at your normal pace
5. Sit down again

A Score of >12 seconds considered higher fall risk

30 Second Chair Stand Test

Instructions to the patient:
1. Sit in the middle of the chair.
2. Place your hands on the opposite shoulder creased at the wrists.
3. Keep your feet flat on the floor.
4. Keep your back straight and keep your arms against your chest.
5. On "Go," rise to a full standing position and then sit back down again.
6. Repeat this for 30 seconds.

Chair Stand—Below Average Scores

<table>
<thead>
<tr>
<th>Age</th>
<th>Men</th>
<th>Women</th>
</tr>
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<tbody>
<tr>
<td>40-64</td>
<td>&lt;14</td>
<td>&lt;12</td>
</tr>
<tr>
<td>65-69</td>
<td>&lt;12</td>
<td>&lt;11</td>
</tr>
<tr>
<td>70-79</td>
<td>&lt;12</td>
<td>&lt;10</td>
</tr>
<tr>
<td>&gt;79</td>
<td>&lt;11</td>
<td>&lt;10</td>
</tr>
<tr>
<td>80-89</td>
<td>&lt;10</td>
<td>&lt;9</td>
</tr>
<tr>
<td>&gt;89</td>
<td>&lt;9</td>
<td>&lt;8</td>
</tr>
<tr>
<td>&gt;90</td>
<td>&lt;7</td>
<td>&lt;6</td>
</tr>
</tbody>
</table>

(www.cdc.gov/STEADI)
**Gait Speed**

- Middle 2/3 of walkway measured
- "walk at a comfortable pace"
- Future incident mobility impairment: < 0.8 m/s
- < 1.0 m/s = higher fall risk
- MCID 0.10 m/s

**Gait Speed Key Cut-offs**

- **Red Flag**
  - < 0.6 m/s
  - Dependent in ADLs, more likely to be hospitalized, household walker, < 0.15 discharge to SNF

- **Yellow Flag**
  - 0.6-1.0 m/s
  - Need intervention to reduce falls, limited community ambulation

- **Green Flag**
  - > 1.0 m/s
  - Independent in ADLs, cross street safely (normal walking speed 1.2 m/s), less likely to have adverse event
Fall Risk Factors and Intervention to Reduce Fall Risk

- Intrinsic: 65+ Year Old (30% fall) Environmental Hazards-Indoor and Outdoor
- Previous Fall: 4 or more medications/psychoactive medications
- Muscle Weakness: Alcohol use
- Dizziness: Poorly fitting shoes
- Poor Vision
- Chronic Medical Conditions
- Fear of Falling: 8% Fall Risk with no risk factors, 78% with 4 or more (Tinetti 2003)
- Gait and Balance Problems

Risk Factors for Falls
(Highlighted = items we can change/improve)

- Somatosensory: Sensation from feet
- Vestibular: Inner Ear
- Vision
- Central Nervous System: Brain
- Motor Output: Muscles and Joints

Components of Balance
Obesity +/− Knee OA

- Decreased mobility and balance
- Increased Fall Risk
- Muscle loss: Sarcopenia
- Exercise Can Help
- Decreased physical activity
- Decreased strength: Dynapenia

Obesity, Fall Risk, Quality of Life

- Obese individuals have a 31% higher risk of having fallen previous 12 months
- Obese individuals 57% higher risk of believing nothing could be done to prevent falls
- Obese fallers 31% more likely to report suffering moderate or extreme pain than normal weight fallers
- Obese fallers 1.9 times more likely to sit for > 8 hours/day than healthy weight fallers

Mitchell RJ Aust NZ J Public Health 2014

Sarcopenic Obesity and Dynapenic Obesity: 5-Year Associations with Falls Risk in Middle-Aged and Older Adults

- 5 year prospective cohort, 674 obese community dwelling volunteers, 50-79 y.o.
- Dynapenic obesity but not sarcopenic obesity is predictive of increase falls risk scores
- Muscle function assessments may be useful for predicting falls risk in obese patients

Mitchell RJ Obesity 2014
Medicare Obesity Benefit

- Available currently – as of November 2011
- No standard way as to what to include in this benefit
- # of beneficiaries using the benefit:
  - 2012: 21,089
  - 2013: 36,999

- 15 minute targeted treatment
- Behavioral modification
- Group visits covered based on Medicare area
- Medicare Outcome is weight loss

Reducing Fall Risk

- Multifactorial Intervention for higher risk reduces fall risk by at least 30%

- Strength and Balance Exercises for everyone
  - Exercise can be a single effective means to reduce fall

Environmental Risk Factors

- Home Assessment (www.nhfallstaskforce.org)
  - Cords, carpets, clutter
  - Railings on stairs
  - Lighting at night

- Seasonal Hazards
  - Ice grips on canes
  - Studded shoe grips
  - Trekking pole/ ski pole
Medical Management- Primary Care Provider

- Medication Review
- Vitamin D Supplementation
- Intervention for disease management
  - Hypertension
  - Diabetes
  - Cardiac Issues

Vision

- Regular Visual exams
- Lighting at night
- Multifocal lenses can be increased fall risk in community dwelling older adults who have difficulty with balance (Sherrington, 2011)

Dizziness

- BPPV—loose crystals
  - Common in older adults
  - Easily treated
- Postural Hypotension
- Other vestibular (inner ear) disorders—refer for Vestibular Rehabilitation (PT)
- Medications and other medical conditions

Dizziness is NEVER normal!
Vestibular Rehabilitation

• Computerized Dynamic Posturography

• Help to identify and differentiate functional impairments for balance

• Vestibular rehabilitation uses exercise to challenge visual, somatosensory and vestibular systems

Neurocom SMART EquiTest®

Exercise!

MUST

• Be challenging and progressive

• Include Balance and Strengthening Exercises
  • Tai Ji Quan: Moving for Better Balance®

• 50 Total Hours needed to reduce fall risk (Shubert, 2011)

Exercise Compliance Older Adults

• Group and Resistance exercise predict higher attendance in sedentary older adults
• Facility based predicts higher completion

(Hong JY Journal of Physical Activity and Health, 2008)

• Center based achieved greater effects on physical activity behavior change
• To maintain effects gradual transition to less intensive program with remote supervision recommended to prevent relapse into sedentary behavior

(Bauman A J The Gerontologist, 2016)
Referral to Physical Therapy

- Mobility limitations – TUG, gait speed screen, AGS/STANDI question
  - Multicomponent exercise and goal setting
- Decreased strength – 30 second sit to stand screen
  - Progressive Resisted Exercises
  - Individualized Home Exercise Program
- Balance difficulties – TUG and 4 stage balance screen: AGS/STANDI questions
  - Balance Training
  - Vestibular Rehabilitation
  - Assistive device evaluation

ActiveStep® by Simbex
Surface Perturbation: “Slips and Trips”

- DHMC- Lebanon, NH
- VA – WRJ, VT
- Cheshire Medical Center, Keene NH
- Elliot Senior Health Center, Manchester, NH
- South Shore Neurologic, Long Island, NY
- University of Rhode Island
- VA Baltimore
- University of Maryland
- University of Delaware

Randomized ActiveStep® Clinical Evaluation (R.A.C.E.) Trial

Pilot Study:
- N=59
- Both groups with significant improved in TUG, Berg, DGI, 30 second sit to stand and ABC
- Trend toward fewer falls and even greater trend with injurious falls

Current Study:
- Multi-center RCT, n=507
- Significant reduction in fall with injury in ActiveStep group
Virtual Health Coach in individuals with Parkinson’s Disease


- Pilot Study 20 people, 1 month
- Interact with coach, wear pedometer and walk daily
- 100% Retention Rate, Daily walking adherence rate 85%
- Gait speed improved
- Mean satisfaction 5.6/7

Community Based Programs

Otago Exercise Program

- Fear of falling can lead to:
  - Decreased activity
  - Decreased strength
  - Increased falls

- A Matter of Balance
  - Award winning proven program
  - Manage concerns about falls
  - Increase activity levels

- view falls as controllable
- set goals for increasing activity
- make changes to reduce fall risks at home
- exercise to increase strength and balance
Tai Ji Quan: Moving for Better Balance®
(Tai Chi: Moving for Better Balance)

- Research based fall prevention program (RCT)
- 24 weeks
- 2x/week for 1 hour
- AoA Title IIIID Highest Tier
- Adapted from Yang style 24 form
- Integrates TJQ with
  - Movement therapy
  - Sensory motor challenge
  - Cognitive function

TJQMBB Shown to Reduce

- Fear of falling by 55%
- Risk of multiple falls by 55% in older adults
- Risk of multiple falls by 67% in people with Parkinson's disease

Interactive Map to Locate EBP in NH

- NH Falls Task Force Website: www.nhfallstaskforce.org
- All TJQMBB and MOB programs with contact information
- MOB
  - Nationwide-locate on website
- TJQMBB
  - CT and MA (MA also ACL Grant), some VT border towns
Otago Exercise program

- Series of 17 balance and strengthening exercise delivered in the home
- PT assesses, coaches and advances exercise for 6 months to one year
- Reduces falls by 35% in frail older adults
- CDC funded translation in US in 2011- PTs and PTAs only, delivered in the home or in outpatient clinic
  - Find Instructors on website
- Some UNC research-seeing results in as early as 8 weeks:
  - http://www.med.unc.edu/aging/cgec/exercise-program

Evidence-Based Programs Saving Money and Improving Lives

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<th>Otago Exercise Program</th>
<th>Tai Ji Quan: Moving for Better Balance</th>
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<tr>
<td>Reduces Fear of Falling</td>
<td>35% reduction in falls rates</td>
<td>55% reduction in falls rate</td>
</tr>
<tr>
<td>Increased physical activity in sedentary older adults</td>
<td>-$429 net benefit per participant</td>
<td>-$550 net benefit per participant</td>
</tr>
<tr>
<td>$500 savings in unplanned medical costs per Medicare beneficiary</td>
<td>127% Return on Investment (ROI)</td>
<td>500% Return on Investment (ROI)</td>
</tr>
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</table>

Net Benefit = Direct medical costs averted after subtracting intervention costs
ROI = Net benefit per participant divided by average cost of the program per participant; % return on dollar invested

(resources from Journal of Safety Research 2015, National Council on Aging 2015)

Resources

- STEADI Materials: www.cdc.gov/steadi/
  - “What You Can Do to Prevent Falls”
  - videos-performing balance screens
- NH Falls Task Force: www.nhfallsasktaskforce.org
  - Home Safety Assessment
  - Program locations and contact information
- Evidence Based Programs
  - www.TQMBB.org
  - www.mainehealth.org/mob
  - http://www.med.unc.edu/aging/cgec/exercise-program
Thank You!

Questions?