

# Preventing Falls in Adults with Disabilities and Chronic Health Conditions: What Works

American Association on Health & Disability

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# Goals and Objectives

- At the end of this webinar, attendees will be able to:
  1. Describe factors that put women at risk of falling.
  2. Explain proven steps, based on research studies (evidence), that people can take to prevent their own falls, falls of family members, or the falls of those for whom they provide care.
  3. Facilitate and empower their own self-management and the self-management of others in incorporating fall prevention techniques into their daily lives.
  4. Explain to others specific successful fall prevention techniques that apply to women with disabilities and chronic conditions to prevent falls.

# Evidence

- Anecdotal Reporting – Expert opinion
- Case Studies and Case Reports
- Case Controlled studies
- Cohort studies retrospective
- Cohort studies prospective
- Randomized clinical trials
- Systematic review

# Public Health Implications

- Falls among older adults & particularly older women with chronic conditions are a public health problem
  - cause fractures and traumatic brain injury, decreases quality of life, clots, increases mortality and morbidity, early death, and creates unnecessary pain, trauma, and costs to individuals and society as a whole.
- Most are preventable.

Centers for Disease Control and Prevention. (2012) Falls Among Older Adults: An Overview: <http://www.cdc.gov/HomeandRecreationalSafety/Falls/adultfalls.html>

- One in three adults 65+ fall every year.
- 2/3 of them will fall again within 6 mos
- 95% of hip fractures are caused by falls.
- 1 in 5 ppl w/ hip fractures die within a yr.
- Men are more likely to die from falls.
- Fractures 2X as high in women than men
- Falls-leading cause of death among 65+
  - Most common cause hospital admissions
  - Interfere with independent living
  - More likely to end up in LTC if you fall

- >70% of ER visits among persons 65+ in 2010 were related to falls.
- Injuries with the highest costs for patients treated in the ER and then admitted to the hospital:
  1. Falls (\$9.2 billion),
  2. Motor vehicle accidents (\$5.1 billion), and
  3. Poisoning (\$1.8 billion).\*
- \$30 billion - 2010 direct medical costs for falls; expected to be close to \$55 billion by 2020

\*AHRQ, Healthcare Cost and Utilization Project Statistical Brief #156: ***Causes of Injuries Treated in the Emergency Department, (2010.)*** <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb156.jsp>

# Who is at risk for falls?

- Women
- People who are older
- People who live alone
- Lack of Physical Activity
  - According to the Office on Women's Health, Quick Health Data Online, nationwide, between 18.4 and 51.2 % of women 18 and older report participating in *no* leisure physical activity.
- People who fallen before
- People with disabilities, gait & balance problems, & ambulatory or walking device and w/c users
- People with cognitive impairments, neurological impairments, dementia, intellectual disabilities, depression, who have had a stroke, Parkinson's disease, dizziness and vertigo, urinary incontinence, and other chronic conditions
- People who take multiple medications (anti-diabetes)



# These Meds Cause Blurry Vision

- **Anti-arrhythmia drugs**. May cause blurred vision, yellow vision or blue-green halos to appear around objects
- **Antimalarial drugs**. Treats lupus & rheumatoid arthritis & can cause blurred vision. Long-term use may cause irreversible retinal damage. Aralen and Plaquenil
- **Erectile dysfunction drugs**. Can cause temp problems like blurred vision, light sensitivity or blue-tinged.
- **Phenothiazines**. Treat schizophrenia, nausea, seizures, & pain can cause blurred vision, changes in color vision & difficulty seeing at night. Compazine, thorazine, mellaril.
- **Tamoxifen**. Breast cancer - leads to blurred vision, cataracts and changes to the retina and cornea (but rare)

(Johns Hopkins Alerts, 2013)

Older Adults?

# PWD & Chronic Conditions?

# People w/ Intellectual Disabilities

- Study of the prevalence of falls & risk factors for falls in 1,515 adults ( $\geq 18$  years) with ID using baseline data from the Longitudinal Health and Intellectual Disability Study.
- Nearly 25% of adults were reported to have had one or more falls in the past 12 months.
  - (Hsieh, Rimmer, & Heller, 2012)

# People w/ Intellectual Disabilities

- Prevalence of falls ↑ w/ advancing age.
- The following risk factors were found:
  - being female,
  - having arthritis,
  - having a seizure disorder,
  - taking more than 4 medications,
  - using walking aids, and
  - having difficulty lifting/carrying greater than 10 lb. (Hsieh, Rimmer, & Heller, 2012)

# People w/ Intellectual Disabilities

- Australian Study: 34% of the 114 participants (39) reported a fall in the previous 12 months.
- # similar for formal care & community dwellers
- Falls among people w/ ID occur at younger ages & are a significant cause of injury & hospitalization
- (Cox, Clemson, Stancliffe, et. al., 2010)

# People w/ Intellectual Disabilities

- Scottish Study: Prospective cohort study of 511 community-dwellers over 12 mo
- Found a higher rate of injuries & falls
- Incident fall injury was predicted by urinary incontinence
- Down syndrome reduced risk.
  - Other factors common to the gen. pop. not relevant (increasing age, taking multiple meds, fear of falling, etc)

(Finlayson, Morrison, Jackson, Mantry, & Cooper, 2010)

# People w/ Intellectual Disabilities

- Systematic review (7 articles met criteria)
- Up to 57% of ppl w/ ID experienced a fall.
  - Falling caused 50-62% of recorded injuries.
- Risk Factors may include age, impaired mobility, epilepsy & behavioral problems.
  - Paucity of evidence for intervention strategies
  - Lack of evidence for falls management
  - Reduce injuries by addressing environmental
  - Exercise for gait, balance & strength,
  - Medical management (Willgoss, Yohannes, & Mitchell, 2010)



# Hearing Loss

- 2017 adults 40 to 69 yrs underwent hearing tests & falls histories in the National Health & Nutritional Examination Survey (NHANES)
- People with a 25-decibel hearing loss, (mild) were nearly 3x more likely to have fallen.
  - Every additional 10-decibels of hearing loss ↑ the chances of falling by 1.4 fold.
  - Even when researchers accounted for other factors linked with falling, including age, sex, race, cardiovascular disease and vestibular function.

(Lin & Ferrucci 2012)

# Wheelchair Users & Falls

- 1994 study of community-dwelling users of manually propelled wheelchairs in Nova Scotia
- Mailed 2055 surveys. 511 people responded.
  - 57.4% reported completely tipping over or falling from their wheelchairs at least once
  - 66.0% reported having partially tipped.

(Kirby, Ackroyd-Stolarz , Brown, et. al. 1994)

- Of the tips,
  - 46.3% were forward in direction,
  - 29.5% backward and 24.2% sideways.
  - Many of the accidents occurred outdoors or on ramps
- 292 injuries were reported by 272 (47.1%) respondents.
  - Most (84.3%) were minor (e.g., abrasions, contusions, lacerations and sprains).
  - Of the 15.8% of injuries that were serious, the most common were fractures (10.6%) and concussions (2.7%).

(Kirby, Ackroyd-Stolarz , Brown, et. al. 1994)

■ Factors associated with an ↑ risk of accidents & injuries:

- younger age
- male gender
- paraplegia or spina bifida as the reason for wheelchair use
- having had a wheelchair prescribed
- some wheelchair features (lightweight, camber, adjustable rear-axle positions, a knapsack)
- daily use of a wheelchair, propelling the chair with both hands
- use of the wheelchair for recreation
- use of a sideways transfer (without a transfer board) and doing repairs themselves or having them done by the dealer

■ Factors associated with a ↓ risk of accidents & injuries:

- multiple sclerosis, stroke or arthritis as the reason for wheelchair use,
- attendant propulsion and
- the use of a one-person assist for transfers.

■ Bottom Line:

- Tips and falls are very common
- Serious injuries are not unusual
- There is a pattern of risk factors

(Kirby, Ackroyd-Stolarz , Brown, et. al. 1994)

- 1995 Kirby & Ackroyd-Stolarz analyzed 18 yrs of FDA data bases of reported adverse wheelchair event (N=615)
  - Scooters incidents: 52.8% Powered wheelchairs: 24.6% and Manual wheelchairs 22.6%,
  - Fractures most common injury from falls
  - Transfers involved in 24 records; sit>stand 65%; manual wheelchairs 56.5%; scooters 39.1%
  - 4 contributing factors, (some in combination)
    - 1-engineering (60.5%) 2-environmental (25.4%)
    - 3-occupant (9.6%), & 4-system (4.6%) (repairs; user training; improper w/c prescription
  - Forward tips: most common in incidents w/ manual or powered wheelchairs
  - Sideways tips most common in scooters.

(Kirby & Ackroyd-Stolarz, 1995)

# Few Home Modifications: Many Injurious Falls

- Analysis of the 1994–1995 National Health Interview Survey Disability Supplement and a follow-up in 6-18 mo
  - 525 community-dwelling w/c users
    - 37.9% fell at least once in the past 12 mos
    - 17.7% fall-related injury (46.7% of fallers)
    - presence of *any* indoor home modification was asso w/ a *lower* prevalence of injury from falls
    - Factors associated with *increased* odds of a fall-related injury included 1- the use of other mobility aids; 2-reliance on multiple helpers and 3-getting outside on a daily basis

Berg, Hines, & Allen, 2002

# Veterans w/ Spinal Cord Injuries

## ■ Wheelchair-related falls in community dwellers.

Prospective cohort studied 1 yr

- Of 659 subjects who completed the study,
    - 204 participants (31%) reported 553 fall events
    - 95 subjects (14%) were injured as a result of wheelchair falls.
  - 6 significant risk factors identified
    - pain in previous 2 months\*,
    - alcohol abuse,
    - greater motor function\*,
    - history of previous fall\*,
    - fewer SCI years, and
    - shorter length of wheelchair
- \*=factors that predict injurious falls (+ inaccessible home entrance)

(Nelson, Groer, Palacios, 2010)



- Study of Wheelchair Injuries treated in ERs
- Data analyzed from the National Electronic Injury Surveillance System (NEISS)
  - In 2003, 100,000+ w/c related injuries were treated in ERs in the US, 2X # reported in 1991.
  - Tips and falls accounted for 65–80% of injuries across all age groups of wheelchair users.
  - Most children's injuries occurred outside of homes and institutions/hospitals in environments with stairs, ramps, and curbs (57.3%).
  - Adult injuries were more likely to occur in homes, hospitals, and institutions (45–90%).
  - Leading cause of injuries for all were tips and falls.

(Xiang, Chany, & Smith, 2006)

- Potential risk factors in 4 categories:
  - Engineering factors
    - manual v powered wheelchair, wheelchair occupant restraint systems, anti-tips, and wheel locks,
  - Characteristics of wheelchair users
    - age, sex, and type of disability
  - Physical environment
    - uneven terrain, bathroom & home mod, and
  - Social environment
    - User's activities, inappropriate prescription by healthcare professionals, & inadequate maintenance of w/c .
- Interventions to modify any factor may reduce the risk of tips & falls, & therefore reduce the risk of wheelchair related injuries

(Xiang, Chany, & Smith, 2006)

# Chronic Conditions vs. Meds

- 4286 women aged 60-79 from British women's heart and health study.
  - The prevalence of falling ↑ w/ increasing # of simultaneously occurring chronic conditions.
  - Associated with an increased odds of falling:
    - Circulatory disease, chronic obstructive pulmonary disease, depression, & arthritis.
    - Chronic diseases may ↑ risk of falls through direct effects of condition & indirect effects, i.e. reduced physical activity

# MS & Falls

- Surveys of 1089 people from MS registry
  - 52.2% reported a fall in the past 6 mos.
  - Factors associated with ↑ risk of fall include
    - being male,
    - fear of falling,
    - variable or deteriorating MS status in the past yr,
    - never or occasional use of a wheelchair,
    - problems with balance or mobility,
    - poor concentration or forgetfulness, and
    - incontinence of bladder.

(Finlayson, Peterson, & Cho, 2006)

# MS & Falls

- British study Observational study 52.7% reported  $\geq$  two falls
  - Continence issues, previous falls history & use of prescribed medications were each associated with increased risk of being a "faller" (>2 falls)

(Gunn, Creanor, & Haas, et. al, 2013)

- VA Study showed injurious falls in *female* veterans *with* MS was 3X higher than in *female* veterans *without* MS
  - Not so with male vets w/ & w/o MS

(Cameron, Poel, Haselkorn, 2011)

# MS & Falls

- Systematic review & Meta-analysis:
  - Eighteen different risk factors were assessed within the 8 included studies.
  - Meta-analysis demonstrated an ↑ in fall risk associated with impairments of
    - balance and cognition,
    - progressive MS, and
    - use of a mobility aid.
  - Conclusion: Need more research

(Gunn, Newell, Bernhard, et. al 2013)

# Neuromuscular disorders

- People with and without neuromuscular disorder were followed over time.
- People with neuromuscular disorders fell more - 27% versus 5% of the controls.
- Falls caused injuries, fear of falling and reduced activities.

# Parkinson's

- People w/ Parkinson's disease fall.
  - Many factors associated with falls in the general population are associated with Parkinson's.
  - Fallers were more likely to be depressed and anxious than non-fallers.
  - More likely to have greater disease severity
  - Conclusion: disease-specific factors contribute to the increased risk
    - (Ashburn, Stack, Pickering, & Ward, 2001)
- Another study found these factors predictive of falls in people w/ Parkinson's:
  - Previous fall, loss of arm swing, each year of disease & dementia

(Wood, Bilclough, & Bowron, et al, 2002)



# Preventing Falls in Community Dwelling Elders

- Systematic review of 159 studies randomized controlled trials of almost 80 thousand participants
  - Cochrane Database of Systematic Reviews
- Interventions that reduced falls (They work?)
  - Group and home-based exercise programs, usually containing some balance & strength training exercises
  - Tai Chi
  - Multifactorial interventions assess an individual's risk of falling, and then carry out treatment or arrange referrals to reduce the identified risks. (reduces the # of falls among community dwellers)

# What Works: Home safety etc

- Interventions to improve home safety appear to be effective, especially in people at higher risk of falling and when carried out by occupational therapists.
- Anti-slip shoe devices worn in icy conditions can also reduce falls
- Taking vitamin D supplements does not appear to reduce falls in most community-dwelling older people, but may do so in those who have lower vitamin D levels in the blood before treatment. (at risk for osteoporosis)

Gillespie, Robertson, Gillespie, et. al., 2012

# What Works: Medication Issues

- Some medications increase the risk of falling.
- Three trials in this review failed to reduce the number of falls by reviewing and adjusting medications.
- A fourth trial involving family physicians and their patients in medication review was effective in reducing falls.
- Gradual withdrawal of a particular type of drug for improving sleep, reducing anxiety, and treating depression (psychotropic medication) has been shown to reduce falls.

# What Works: Medical Interventions

- Cataract surgery reduces falls in women having the operation on the first affected eye.
- Insertion of a pacemaker can reduce falls in people with frequent falls associated with carotid sinus hypersensitivity, a condition which causes sudden changes in heart rate and blood pressure.

# What Works: Foot Pain & Education

- In people with disabling foot pain, the addition of footwear assessment, customized insoles, and foot and ankle exercises to regular podiatry reduced the number of falls but not the number of people falling.
- The evidence relating to the provision of educational materials alone for preventing falls is inconclusive.

Gillespie, Robertson, Gillespie, et. al., 2012

# Evidence-based programs

## ■ A Matter of Balance:

- Program designed to reduce fear of falling & increase activity levels among older adults.
  - Must be age 60 or older, *ambulatory* and able to problem solve

## ■ Otago – Developed in New Zealand

- People who have
  - fallen in the past year or
  - have muscle weakness or balance problems
  - live in the community and *can walk with or without a walking aid*

# Evidence-based programs

- *Stepping On* is for older adults who:
  - Live in their home or independent apartment
  - Can walk *without* the help of another person
  - Do *not* use a walker, scooter or wheelchair most of the time indoors
  - Are cognitively intact
  - Understand the language being used by the *Stepping On* Leader

# What Can You or Caregivers Do to Prevent Falls

- Get moving – exercise and increase your activity
- View your pharmacist & Primary Care Providers (PPC) as members of *your* health care team
  - Discuss your medications with a pharmacist
  - Tell your primary care provider if you have fallen and discuss your meds with your PPC
- Ask for a referral for occupational therapy for home modifications & start by checking out your home with:
  - <http://www.cdc.gov/HomeandRecreationalSafety/Falls/CheckListForSafety.html>
- Get vision & hearing checked & glasses & hearing aides if needed



# If You Are a Wheelchair/ Scooter User

- You are an expert in how you transfer. Make sure everyone knows that.
- Lock the chair for transfers
- Turn off power chairs & scooters when not in use.
- Don't remove parts (anti-tip)
- Don't add things that throws the weight off
- Don't take risks.

Information for wheelchair users <http://members.cruzio.com/~yogi/whchair.htm>

# Exercise Program for PWD & CC

- National Center on Health, Physical Activity, and Disability <http://www.ncpad.org/#sthash.t27PzFyI.dpuf>
  - Personalized Exercise programs
- How do you Exercise in a Wheelchair?
  - David Lyons
  - <http://www.everydayhealth.com/columns/ms-fitness-challenge/wheelchair-workout/>

[oakgrovebarb](#) just earned a My Program badge.

[dcmerkle](#) from Towson, MD just earned a My Program badge.

### What others have said about the 14-Week program:

"I am a 62-year-old, T-5 paraplegic, female. This was just the exercise program I was looking for. I love the cardio workouts most of all! I am now moving and feeling so much better than before I started this program."

"I thought the program was very good, especially for those who are intimidated by starting a program. It allows you to work at your own pace and you can see your progress as you gradually increase in strength and endurance. I had given up on exercising because of fibromyalgia pain but have found that movement actually helps me to feel better and it challenges me at the level I am currently at."

"I have lived with MS for almost 30 years and the program provided me with the encouragement and incentive to get more active in accordance with my abilities."

### Welcome!

» Thank you for your interest in the NCPAD 14-Week Program. Please log in or register to view your personalized exercise and nutrition program.



[View Transcript](#)

If you have already registered for the program please log in. If you are a new user, please watch the video above, read the description of the program in the column to your right, and explore the site to learn more about the content of the NCPAD 14-Week Program. Then, register for the program to receive weekly exercise and nutrition resources and tips from the National Center on Physical Activity and Disability that will help keep you motivated to stay on track for your health and fitness goals. By registering, you will also gain exclusive access to exercise and nutrition experts who can provide you with personalized guidance along the way. Join us on a 14-week journey to a healthier you!

### Welcome

#### Welcome to NCPAD's 14-Week Program to a Healthier You!

What is the program?

- Description: A **free, personalized, web-based physical activity and nutrition program**
- Target Audience: People with mobility limitations, chronic health conditions and physical disabilities
- Goal: To help you get moving and making healthy nutrition choices
- Duration: 14 weeks

How does it work?

- You register for the program and tell us a little about yourself.
- We take the information you gave us and, to the best of our abilities, provide you with personalized resources and exercises that meet your individual needs over the course of 14 weeks.
- Because there is new material each week that builds on the previous weeks, the program

# How do you Exercise in a Wheelchair?

By David Lyons

Published Sep 6, 2013

## YOUR REACTION?

I LIKE IT

SO SO

INSPIRING

INTRIGUING

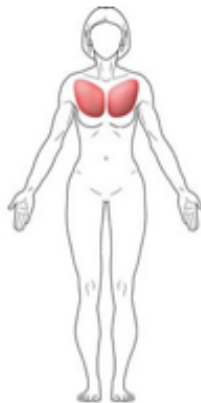
IMPORTANT



I must say it is challenging to train with MS, but it is even more of an effort when you are in a wheelchair with MS. I am here to tell those of you in wheelchairs... you can do it!

There are many upper body workouts that can be done from a wheelchair with weights and [exercise bands](#). I'm going to outline just one of these using bands that will allow you to be involved in a fitness regimen and help keep you in shape. **This is a beginner routine** and more exercises can be added once you are comfortable.

[Exercise Bands](#) can be purchased with different levels of resistance and typically come in a package that allows you to increase the resistance as your strength increases. Each movement will be performed for 3-4 sets. For muscle building, keep the repetitions from 8-10 and for toning from 12-15. Exhale on exertion and inhale at release. Always sit tall in your chair, and keep your abdominals tight.



## CHEST PRESS

Loop the band around the back of the wheelchair and grasp the handles of the band in each hand at chest level. Grasp the band handles back far enough so that you are able to feel the resistance. Next, press the bands forward until the arms are straight out in front of you. Do not lock the arms. You want to keep the tension throughout the movement and not relax in a locked position. Slowly return to the starting position.

## CHEST PULL

# Future Research & Promotion

## ■ PCORI & NIH partnership

- PCORI providing \$30 mill for research administered by NIA
  - LOI due October 13, 2013
  - Applications due November 13, 2013

## ■ National Council on Aging

- Falls Prevention Awareness Day  
September 22, 2013

# Questions?

- Contact information

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## *Evidence based Programs*

- A matter of balance: [http://www.mainehealth.org/mh\\_body.cfm?id=432](http://www.mainehealth.org/mh_body.cfm?id=432) Boston University
- *Otago Exercise Program Manual* [http://www.med.unc.edu/aging/cgec/exercise-program/FINALOEPMannual\\_v16\\_090911.pdf](http://www.med.unc.edu/aging/cgec/exercise-program/FINALOEPMannual_v16_090911.pdf)
- Stepping-on <https://wihealthyaging.org/stepping-on> Wisconsin Institute on Healthy Aging
- Information for Wheelchair Users: <http://members.cruzio.com/~yogi/whchair.htm>