

Strategies and Resources for Fall Prevention

John Stoukides MD

Chief, Division of Geriatrics and Palliative Medicine

Roger Williams Medical Center

Providence, R.I.

Goals

- Identify exercise and functional interventions for fall prevention in the elderly patient.
- Appraise available functional interventions for strengthening and fall prevention.
- Develop a fall prevention program for an older individual.
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Fall

- An unintentional change in position, occurring under circumstances in which normal homeostatic mechanisms would preserve postural stability
- Most falls in the elderly are pathologic rather than accidental
- Falling is a symptom not a diagnosis. It can be the manifestation of virtually any disease

Fall Prevention

Areas of Best Practices



- Clinical management
 - Risk assessment and follow-up
 - Medication management
 - Target intrinsic and extrinsic risk factors
- Balance and mobility, physical activity
- Environmental modification
- Education
- Multifactorial interventions
- Community programs

Clinical Management Best Practices

- For those who have fallen, a thorough medical assessment
- Over half of the emergency room patients admitted for fall injuries had balance deficits and visual impairments
- Screening for physical and cognitive impairments appears to be effective when combined with interventions to reduce fall risk factors

Evaluation of falls

History

- Diseases
- Drugs
- Recovery
- Onset
- Prodrome
- Precipitants

Evaluation of falls

Physical exam

- Postural vital signs
- Carotid bruits
- Heart murmurs
- Stools for occult blood
- Neurologic exam including MSE
- Gait assessment

Evaluation of falls

Laboratory and diagnostic

- General: CBC, BMP, ECG, Drug levels
- If associated with chest pain: Cardiac enz.
- Unexplained or with hx of palpitations;
Holter monitor
- If focal neurologic deficit, seizure or MS
changes CT, EEG, Toxic screen

Evaluation of falls

Laboratory and diagnostic

- If murmur present: echo
- If hyperreflexia or spasticity present neck films or MRI
- If alcohol suspected; BAL

Fall Risk Assessments

- HEROS[©] FALL RISK SCREENING FORM
- Mobility assessment – Get Up & Go
- Gait and balance assessment



Timed Up and Go

- Chair with back up against a wall
- Mark floor 10 feet from chair
- Patient can not use assistive device
- Patient arises from chair walks to mark on floor turns and returns to chair and sits down.
- < 10 sec normal
- 10-20 moderate risk
- >20 sec high risk

Gait and Balance Assessment (Tinetti)

- Gait initiation- smooth without hesitancy
- Step length-at least the length of the foot
- Step height-clearance of the swing foot from the floor
- Step symmetry- length and height
- Step regularity- smooth flow, as to swing foot is off the floor stance foot is pushing off with toes

Gait and Balance Assessment (Tinetti)

- Gait Speed
- Step path
- Trunk motion
- Walk stance- heels almost touch as they pass each other
- Arm swing
- Turn- smooth and continues

Fear of Falling

- Fear of falling and the fear of the inability to get up after a fall is prevalent in those older adults who have fallen and those who have not fallen. Fear of falling:
- Occurs in 20-55% of community dwelling older adults who have not fallen (Murphy, 2003).
- Occurs as high as 50-65% for those who have fallen, or who reside in long term care settings.
- Persists over time (Friedman, 2003).
- Identified in special groups: those older adults with arthritis, osteoporosis, or dizziness.
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Fall risk reduction

- A meta-analysis of randomized controlled trials concluded that the most effective interventions used clinical assessment combined with individualized fall risk reduction and patient follow-up. Such an assessment included testing gait, balance, and neurologic function, reviewing all medications, developing a tailored medical management approach, and making appropriate referrals

Interventions

- Medication Review
- Exercise Programs
 - Custom designed
 - Group based
- Home modifications
- Education
- Multi-factorial interventions

Elements of Intervention Programs

- Drug Review
 - Pharmacist
 - Reminder to take all drugs to their MD or RPh
 - Pay attention to symptoms after taking meds
 - Discussion on Sharing meds
 - Herbal education

Elements of Intervention Programs (cont.)

- General and specific physical activity programs
 - Specific activity to target balance, gait, strength
 - General programs: Tai Chi, Walking, Cycling, Aerobics and Endurance activities
- Programs that targets “Readiness potential”
- Programs should be of sufficient length to promote lifestyle change

Elements of Intervention Programs (cont.)

- Environmental modification programs
 - Fire safety, health professional or Paramedical home evaluation.
- Educational programs(talks, pamphlets, posters, skits)
 - Fall and injury prevention can be included in programs addressing other medical conditions
 - Existing programs from various groups

Environmental Fall Risk

- **Sixty percent of the falls occur in the home. Environmental risk factors can be grouped according to the support surface (floor, chair, bed), lighting, and obstacles. These categories of environmental risk factors can be used regardless of residency, i.e., home, hospital, nursing home, etc. In the hospital or nursing home setting, falls are also attributed to unsupervised activities, a reduction in the number of nursing staff, and the lack of hand rails.**

Home Based Fall Interventions

- reducing environmental risks (improving lighting on stairs and removing tripping hazards) has not been shown to reduce falls
- home modification interventions includes home visits by occupational therapists who discussed behavioral changes, tailored environmental changes to the client's specific needs, and facilitated recommended home modifications were effective.

Environmental Modification Best Practices

- Home modification - an effective strategy (along with other strategies e.g. education and counseling) for reducing falls.
- Successful home modification programs often included financial and/or manual assistance.
- Success and cost effectiveness of environmental strategies are enhanced by targeting those who are ready for change.
- Readiness for environmental modifications may be linked to having had a recent fall, and/or an increased understanding of the risks and prevention strategies.

Environmental Safety Checklist

Interior

- Lighting
- Floors
- Stairways
- Kitchen
- Bathroom
- Bedroom
- Closets
- Furniture and phones
- Pets

Environmental Safety Checklist

Exterior

- Lighting
- Walkways
- Stairways
- Lawns
- Driveways

Answers

- Stairs without handrail
- Deactivated fire alarm
- Cloth on space heater
- Overloaded outlets
- Loose extension cords in traffic areas
- Smoking. Cigarettes left unattended
- No automatic shut-off on coffee maker
- Open bottles of medicine
- Outdated medications in cabinet
- Loose rugs
- Flip-flop slippers
- Clutter on staircase
- Newspapers too close to lamp
- No handle and no deadbolt on door

Clothing and Shoes that Pose a Fall Risk

- Loose clothing that wraps around the legs or ankles.
- Clothing and belts that hang to the floor.
- Shoes without backs.
- Shoes that are too big for the feet.
- Shoes that have a large ‘bumper’ in the front of the toes.
- Shoes that have slippery soles or too grippy soles.
- Newton, 1998

Exercise Best Practices

- “The average American adult spends 170 minutes a day watching TV and movies and 101 minutes a day driving, but less than 19 minutes a day exercising. Spectator is a kind word for it; we are truly a nation of couch potatoes.”



Exercise Best Practices

- Certain exercise regimes seem effective for reducing falls, but more research needed
- Balance training - a component in most exercise programs with a significant reduction in falls
- Tai Chi - the only effective strategy examined in isolation of other strategies
- More research needed to determine which strategies are best for seniors with specific balance, strength or mobility problems
- Develop exercise programs carefully - it is unclear what optimal intensity level should be and at least one exercise regime was shown to increase falls
- Effects of exercise program is often short-lived without means of enhancing compliance over long-term

Physical Activity Programs

- Design based on individuals health status
- Based on functional capabilities of an older adult
- Use established exercise guidelines that include warming up and cooling down
- Include exercising the mind and make the activity a social occasion
- Lead by experienced appropriately certified individuals

Physical Activity Programs

- Use motivating techniques
- Encourage new members to join
- Use a culturally sensitive approach and appropriate language level
- Provide rewards or other kinds of positive reinforcement

Review of 44 exercise interventions to reduce fall incidence

- recommended that exercise interventions include progressively challenging balance
- exercises that are performed while standing and with minimal upper body support.
- It is further recommended that a minimum of 50 hours of exercise (twice weekly 1hour program for 25 weeks) is needed before fall incidence rates are lowered significantly

- A meta-analysis found that balance training and the total number of hours of exercise were the two key factors
- A walking program did not contribute to reducing fall rates, possibly because the time spent walking took the place of time spent improving balance
- walking programs have other health benefits for older adults including fitness, weight loss, and lower blood pressure

- Carefully designed and progressive exercise programs play an important role in preventing falls and/or lowering an older adult's risk for falling across multiple settings
- For healthy older adults at low risk for falls, engaging in a broad range of physical activities designed to improve aerobic endurance, strength, and balance on a regular basis is likely to be sufficient to substantially reduce the risk for falling.

- Older adults at moderate risk for falls may benefit more from engaging in structured exercise programs that systematically target the physical risk factors amenable to change and are progressed at a rate that is determined by the individual's capabilities and previous experience with physical activity

- Patients at high risk for falls benefit more from an individually tailored exercise program that may or may not be embedded within a larger, multifactorial intervention approach, depending on which risk factor or factors are determined to be the major contributors to an individual's fall risk
- Determining whether a single or multifactorial intervention approach is indicated will first require that comprehensive assessment of risk is undertaken

Education Best Practices



- Little evidence that education programs alone are effective in reducing risk factors or falls
- May play an important role in multi-faceted risk reduction strategies making seniors more willing to adopt strategies to modify fall risk factors.
- Reduction of falls in one study may have been due in part to the use of theoretical models for adult learners, such as valuing shared learning among peers and peer modeling for change.

Multi-factorial Best Practices

- Multiple strategies directed at a wide range of risk factors are effective.
- Multidisciplinary teams trained in detection and prevention of fall risk factors are necessary.
- Combination of strategies e.g. subsidies for home modifications and safety equipment, and accessible health and social services
- More research is needed to understand contribution of specific strategies and benefits of combinations of strategies.
- Education strategies may help seniors to be more willing to adopt strategies to modify risk factors.
- Dissemination of information to large groups may be best conducted through multiple strategies.

Long-term Adherence

- Critical for long-term reduction in fall risk
- Physical activity/exercise programs must appeal to older adults from diverse cultural and socioeconomic
- Behavioral counseling component in any exercise program is critical to develop the necessary self-regulation and self-monitoring of progress skills needed to integrate physical activity into their daily lives.

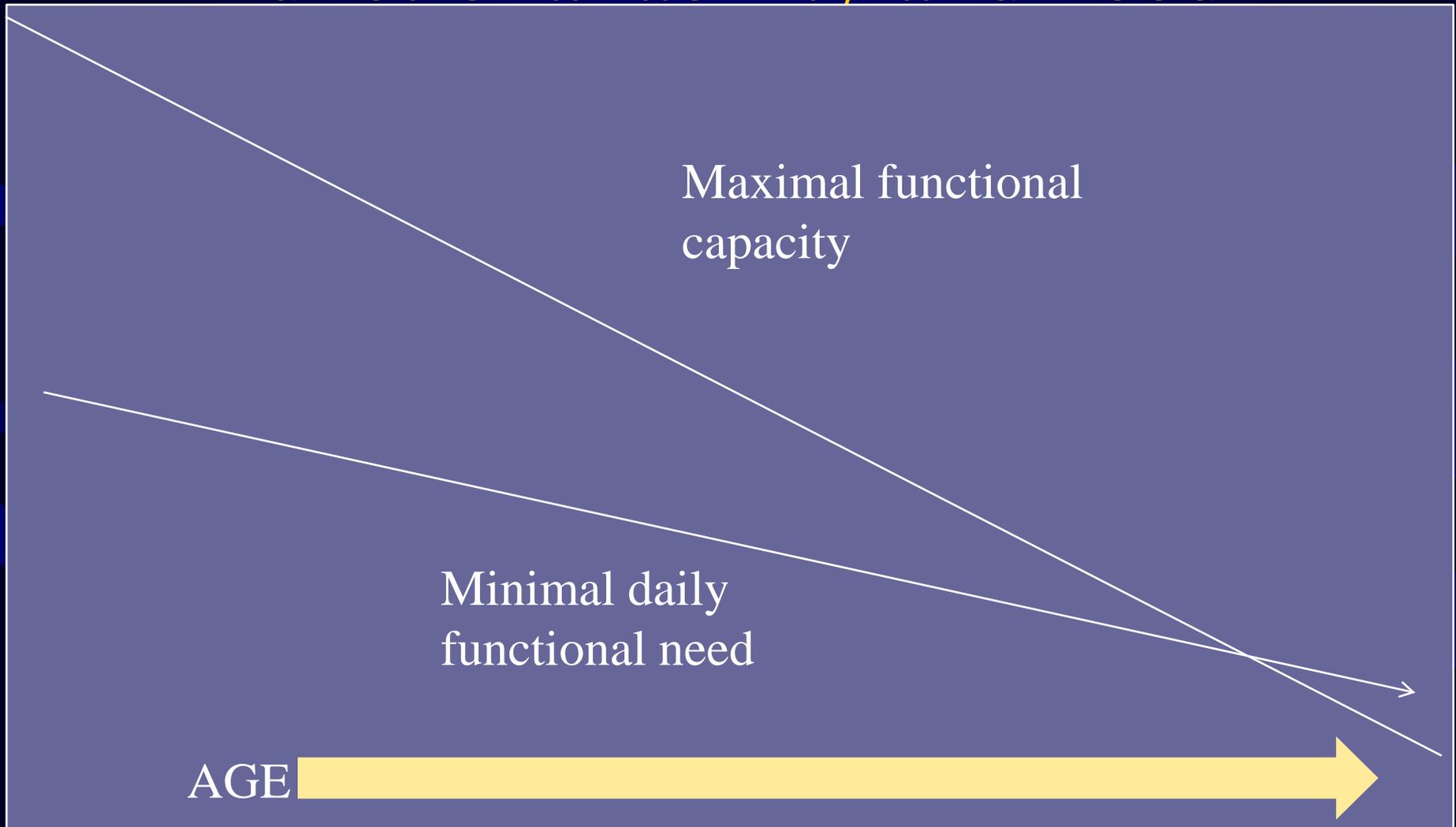
Treatment of falls

- Identify and treat predisposing factors
- Reduce environmental factors
- Physical therapy, gait training
- Exercise
- Assistive devices
- Treatment of underlying disease
- Address fluid balance 2-2.5l/day

Functional Decline with immobility and aging

- As people age the difference between daily functional need and maximal functional capacity decrease
- Bed rest and immobility result in a loss of approximately 5% of total functional capacity daily

Relationship between daily functional ability and need



Physical Activity Readiness: PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

YES NO

1. Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
2. Do you feel pain in your chest when you do physical activity?
3. In the past month, have you had chest pain when you were not doing physical activity?
4. Do you lose your balance because of dizziness or do you ever lose consciousness?
5. Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?
6. Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
7. Do you know of any other reason why you should not do physical activity?

If YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active

Exercise basics

- Endurance activities - walking, swimming, or riding a bike - which build "staying power" and improve cardiovascular health.
- Strengthening exercises which build muscle mass and reduce age-related muscle loss
- Stretching exercises to keep the body limber and flexible
- Balance exercises Balance exercises improve muscle coordination and interrelationships . Balance exercises can help patients stay independent by helping avoid disabilities that may result from falling.

Exercise for Older Adults

Strength Exercises

- Safety tips:
- Don't hold breath during strength exercises.
- Use smooth, steady movements to bring weights into position.
- Avoid jerking or thrusting movements.
- Avoid locking the joints of arms and legs into a strained position. Breathe out as they lift or push a weight and breathe in as they relax.
- Muscle soreness lasting a few days and slight fatigue are normal after muscle building exercises.
- Exhaustion, sore joints, and painful muscle pulls are not normal.

Exercise for Older Adults

Balance Exercises

- Safety tips:
- Hold onto a table or chair for balance with only one hand. As they progress, try holding on with only one fingertip.
- Next, try exercises without holding on at all. Ask someone to watch the first few times in case they lose their balance.
- If they are very steady on their feet, move on to doing the exercises using no hands, with their eyes closed. Have someone stand close by if they are unsteady.

Exercise for Older Adults

Endurance Exercises

- Safety tips:
- Stretch after activities, when muscles are warm.
- Drink water.
- Dress appropriately for the heat and cold.
- Recovery time should be 5-10minutes

Age	Desired Range for Heart Rate During Endurance Exercise (beats per minute)
40	128-153
50	119-145
60	112-136
70	105-128
80	98 - 119
90	91 - 111
100	84 - 102

Exercise for Older Adults

Stretching Exercises

- Safety tips:
- Mild discomfort or a mild pulling sensation is normal.
- Never bounce into a stretch -- make slow steady movements instead.

Charting Progress

- Endurance see how far the person can walk in 6 minutes
- Strength: lower body see how fast they can walk safely up a flight of stairs, upper body chart weight and reps
- Balance see how long they can stand on one foot un supported

CDC Efforts



"We feel stronger when we walk frequently. And we have a more positive outlook."

Many falls can be prevented. By making some changes, you can lower your chances of falling.

Four things YOU can do to prevent falls:

- 1 Begin a regular exercise program
- 2 Have your health care provider review your medicines
- 3 Have your vision checked
- 4 Make your home safer

A collage of four diverse elderly people smiling. From left to right: a woman with short white hair, a man with glasses, a woman with dark hair, and a man with a mustache and a hat.

What YOU Can Do

To Prevent Falls

CDC FOUNDATION
MetLife Foundation



Department of Health and Human Services
Centers for Disease Control and Prevention

For more information, contact:
Centers for Disease Control and Prevention
770-488-1506
www.cdc.gov/injury

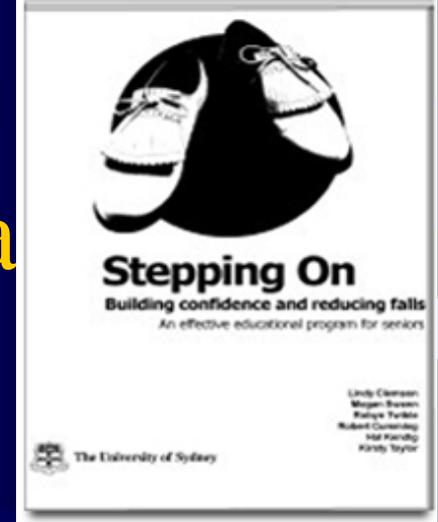
CDC FOUNDATION
MetLife Foundation



CDC Collaborative Projects

- Partner with organizations (e.g., Administration on Aging, Meals on Wheels Association of American, the National Floor Safety Institute) to help address the gaps and issues identified in the October 2006 meetings to align with their respective organization's focus.

Community Programs: Stepping On – Australia



- Multi-component intervention rigorously evaluated in a randomized trial
- Reduced falls 31% among community-dwelling seniors
- Especially effective among men -falls among male program participants were reduced by two-thirds
- Occupational therapist facilitated the program and conducted home visits
- A team of experts presented on key content areas
- The program took place over a 7-week period with a follow-up home visit within 6 weeks of the final session
- Each session covered a different aspect of reducing risk of falling

RI State Health Plan

- Goal: Prevent falls and resulting injuries to senior adults living in the community

Objectives:

- 1. Increase the percent of senior adults who exercise on most days of the week
- 2. Improve the safety of the physical environment in senior adult homes.
- 3. Improve the management of health conditions that place senior adults at increased risk of falls
- 4. Increase the percentage of senior adults who have medication reviews to promote medication management.

“Finding Balance Alberta”

- fall prevention program has been successfully implemented. A proactive fall prevention through a social marketing campaign using television and radio messaging, targeting a wide audience with 3 key messages:
 - (1) check your medications;
 - (2) stay active;
 - (3) watch your step.

Hospital Based Fall Interventions

- Environmental planning
- Staff education
- Delirium Treatment Rooms
- Ruby slipper program
- Fall Prevention Tool Kit

Vitamin D

- A meta-analysis of eight randomized clinical trials concluded that vitamin D supplementation in a dose of 700 to 1000 IU a day reduced the risk of falls among older individuals by 19%,
- a systematic review by the Agency for Health care Research and Quality (AHRQ) found the evidence that vitamin D reduced falls and fractures inconclusive

Physical Activity Programs

- The CDC/ACSM recommends that all adults should accumulate at least 30 minutes of moderate-intensity physical activity on five or more days of the week.

http://www.cdc.gov/nccdphp/dnpa/physical/recommendations/older_adults.htm

- Canadian programs –http://phac-aspc.gc.ca/seniors-aines/pubs/inventory/pdf/Inventory_e.pdf

Walking Programs

- Walking – better than more vigorous activities for adherence
- Hints:
 - Find a buddy
 - Use a pedometer
 - Schedule regular walks in calendar
 - Start slowly – but just get started; make 3 – 4 miles your goal
 - Check with doctor if chronic medical problems

Dispelling myths

- The health and injury risk are higher for elders who don't exercise than ones that do.
- Muscle mass can be built with exercise training even into the 9th decade
- Rest will not cure weakness

Dispelling myths

- The health and injury risk are higher for elders who don't exercise than ones that do.
- Muscle mass can be built with exercise training even into the 9th decade
- Rest will not cure weakness
- *“Lying still is only good for dead people”*

Conclusions

- Exercise and functional interventions for fall prevention can help modify the risk of falling.
- The best fall prevention programs involve a multifaceted approach.

CHAMPS



- Community Health Activity Model Program for Seniors (CHAMPS) – UCSF
<http://www.ucsf.edu/champs>
- Public health model program to promote increased lifetime physical activity levels of seniors
- Theory driven, research supported, individually tailored

Related Resources

- **The Fall Prevention Program Manual, Temple University**

http://www.temple.edu/older_adult/fppmanual.html

- CDC –
www.cdc.gov/nccdphp/dnpa/physical/recommendations/older_adults.htm
- CDC Growing Stronger – Strength Training –
www.cdc.gov/nccdphp/dnpa/physical/growing_stronger/
- AHRQ – Physical activity and older Americans
www.ahrq.gov/ppip/activity.htm
- National Blueprint - American College of Sports Medicine
-Active Aging Partnership : Increasing Physical Activity
among Adults age 50 and Older - www.agingblueprint.org/

Resources (cont'd)

- NIA – Exercise – Getting Fit for Life
www.niapublications.org/agepages/exercise.asp
- NIA Exercise Guidebook –free copy call
800/ 222-2225
- w.nia.nih.gov/HealthInformation/Publications/ExerciseGuide
- National Resource Center for Safe Aging –
ww.safeaging.org/model/default.asp

Resources (cont'd)



- Queensland Health –
www.health.qld.gov.au/fallsprevention/best_practice/default.asp
- Stanford CHAMPS project –article <http://biomed.gerontologyjournals.org/cgi.reprint/61/11/1157>
- Cochrane review <http://0-www.mrw.interscience.wiley.com/helin.uri.edu/cochrane/clsysrev/articles/CD004441/frame.html>