

Preventing Falls: What Works

A CDC Compendium of Effective Community-based
Interventions from Around the World

Exercise-based Interventions



Home Modification Interventions

Multifaceted Interventions



2008



Preventing Falls: What Works

A CDC Compendium of Effective Community-based
Interventions from Around the World

by

Judy A. Stevens, Ph.D.

Ellen D. Sogolow, Ph.D.

National Center for Injury Prevention and Control

Atlanta, Georgia

2008

This document is a publication of the
National Center for Injury Prevention and Control
of the Centers for Disease Control and Prevention:

Centers for Disease Control and Prevention
Julie L. Gerberding, MD, MPH, Director

Coordinating Center for Environmental Health and Injury Prevention
Henry Falk, MD, MPH, Director

National Center for Injury Prevention and Control
Ileana Arias, PhD, Director

Division of Unintentional Injury Prevention
David Wallace, MSEH, Acting Director

Home and Recreation Injury Prevention Team
Michael Ballesteros, PhD, Team Leader

Authors

Judy A. Stevens, PhD
Ellen D. Sogolow, PhD

Cover and Text Design

Lucinda Austin
Heather Coleman
Monika Gullett
Mary E. Miller

Acknowledgements

We acknowledge and appreciate the contributions of Dr. Christine Branche who provided encouragement and unwavering support of this project; Dr. Patricia D. Nolan and Mr. David Ramsey who developed the *Compendium* data base; Ms. Lisa Jeanette who produced the initial draft; and Dr. David Sleet, Dr. Daphne Moffett, and Dr. Michael Ballesteros who reviewed the content and provided valuable suggestions.

Suggested Citation: Stevens JA, Sogolow ED. Preventing Falls: What Works. A CDC Compendium of Effective Community-Based Interventions from Around the World. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, 2008

Contents



Exercise-based Interventions

Stay Safe, Stay Active (Barnett, et al.)	5
The Otago Exercise Program (Campbell, et al. and Robertson, et al.)	7
Tai Chi: Moving for Better Balance (Li, et al.)	11
Australian Group Exercise Program (Lord, et al.)	13
Veterans Affairs Group Exercise Program (Rubenstein, et al.)	15
Simplified Tai Chi (Wolf, et al.)	17



Home Modification Interventions

Home Visits by an Occupational Therapist (Cumming, et al.)	21
Falls-HIT (Home Intervention Team) Program (Nikolaus, et al.)	23



Multifaceted Interventions

Stepping On (Clemson, et al.)	27
PROFET (Prevention of Falls in the Elderly Trial) (Close, et al.)	31
The NoFalls Intervention (Day, et al.)	33
The SAFE Health Behavior and Exercise Intervention (Hornbrook, et al.)	37
Yale FICSIT (Frailty and Injuries: Cooperative Studies of Intervention Techniques) (Tinetti, et al.)	39
A Multifactorial Program (Wagner, et al.)	43

Appendix A Intervention Study Selection Process	46
Appendix B Bibliography of Compendium Studies	50
Appendix C Tables	54
Table 1 Overall Population Characteristics	55
Table 2 Study Characteristics	57
Table 3 Intervention Characteristics	67
Appendix D Original Intervention Materials	70
Appendix D-1 Barnett Materials	71
Appendix D-2 Wolf Materials	83
Appendix D-3 Close Materials	87

Introduction

More than one-third of people aged 65 and older fall each year, and those who fall once are two to three times more likely to fall again.

Older adults value their independence, and a fall can significantly limit their ability to remain self-sufficient. More than one-third of people aged 65 and older fall each year, and those who fall once are two to three times more likely to fall again. Fall injuries are responsible for significant disability, reduced physical function, and loss of independence. In 2000, direct medical costs for fall injuries totaled \$19 billion. However, we know that falls are not an inevitable result of aging. In recent years, systematic reviews of fall intervention studies have established that prevention interventions can reduce falls.

Purpose

The Centers for Disease Control and Prevention (CDC) developed the *Compendium of Effective Community-based Interventions* to help public health practitioners effectively address the problem of falls. This *Compendium* includes specific interventions that have rigorous scientific evidence of effectiveness and provides relevant information about these interventions to public health practitioners, senior service providers, and others who wish to implement fall prevention programs.

Process

CDC gathered information about science-based fall prevention intervention studies that met the following criteria:*

- Included community-dwelling adults aged 65 and older
- Used a randomized controlled study design
- Measured falls as a primary outcome (did not include intervention studies using other outcomes, such as balance improvement or reduced fear of falling)
- Demonstrated statistically significant positive results in reducing older adult falls

Using this selection process, CDC identified 14 studies of effective fall interventions published before January 2006.

* For details about the selection process, see Appendix A.

Content

The *Compendium* groups interventions into three categories: exercise-based, home modification, and multifaceted interventions. Information about each intervention was obtained from the published study and by directly contacting the principal investigator. Each is presented using a standardized format that includes a short summary of the research study and results as well as a longer section describing relevant details about the intervention. The intervention description includes information about the focus, program setting, content, number of sessions, duration, provider, provider's training, key elements, available intervention materials, and contact information for the study's principal investigator.

The *Compendium* also has appendices. These include a figure illustrating the intervention study selection process; a bibliography of the research studies; tables comparing the participating populations, study characteristics, and intervention characteristics of the 14 studies; and supplemental materials, such as assessment instruments and evaluation materials, provided by the principal investigators.

A large, stylized graphic in shades of blue and white. It depicts a hand holding a circle, with the hand's fingers and palm visible. The background is a light blue gradient, and the hand and circle are rendered in white and darker blue. The graphic is partially obscured by a dark blue horizontal bar.

Exercise-based Interventions

Stay Safe, Stay Active (Barnett, et al.)	5
The Otago Exercise Program (Campbell, et al. and Robertson, et al.)	7
Tai Chi: Moving for Better Balance (Li, et al.)	11
Australian Group Exercise Program (Lord, et al.).....	13
Veterans Affairs Group Exercise Program (Rubenstein, et al.)	15
Simplified Tai Chi (Wolf, et al.).....	17

Stay Safe, Stay Active

This study used weekly structured group sessions of moderate-intensity exercise, held in community settings, with additional exercises performed at home. Participants were 40 percent less likely to fall and one-third less likely to suffer a fall-related injury compared with those who did not receive the intervention.

Population: Participants were individuals at risk for falling because of lower limb weakness, poor balance, and/or slow reaction time. All were aged 67 or older and lived in the community. About two-thirds of participants were female.

Geographic Locale: Southwest Sydney, Australia

Focus: Improve balance and coordination, muscle strength, reaction time, and aerobic capacity.

Program Setting: Classes were conducted in local indoor lawn bowling and sports clubs that hosted community programs for various sports and exercise activities, comparable to U.S. community exercise, sports, and recreation facilities. Many lawn bowling and sports clubs also included other indoor attractions such as restaurants, meeting facilities, and movies.

Content: The classes were designed by a physical therapist to address physical fall risk factors: balance and coordination, strength, reaction time, and aerobic capacity. Each class began with 5 to 10 minutes of warm-up that included stretching of the major lower limb muscle groups and 10 minutes of cool-down that included gentle stretching, relaxation, and controlled-breathing practice. Each class included music chosen by the participants.

The classes included the following types of exercises:

- Balance and coordination exercises, including modified Tai Chi exercises, practice in stepping and in changing direction, dance steps, and catching and throwing a ball
- Strengthening exercises, including exercises that used the participant's weight (e.g., sit-to-stand, wall press-ups) and resistance-band exercises that worked both upper and lower limbs
- Aerobic exercises, including fast-walking practice with changes in pace and direction

As the classes progressed, the complexity and speed of the exercises and the resistance of the bands were steadily increased.

Participants also took part in a home exercise program using content from the exercise class and recorded their participation in a home exercise diary.



Duration: A total of 37 1-hour classes were conducted once a week over a 1-year period.

Delivered by: Nationally accredited exercise instructors who had been trained to conduct this exercise program by a licensed physical therapist (accredited by Australia's National Association for Gentle Exercise). The study used currently accredited exercise leaders who already had a good understanding of the exercise principles.

Before classes began, regular meetings were held with the exercise leaders to discuss the content and how the classes would be run, giving leaders ownership in the program. Training included approximately 6 hours of additional meetings, discussion, and practice sessions before beginning the program. During the classes, instructors were visited by the physical therapist for support once each term.

Minimum Level of Training Needed: Information was not provided by the principal investigator.

Key Elements:

- This study used health practitioners to assess and recruit participants. General practitioners are in an ideal position to both identify older people at risk of falls and to support their participation in an exercise program when appropriate.
- The program used existing services and facilities in the community, so it is likely to be sustainable and transferable to other settings.

Available Materials: In addition to the guidance received during the exercise sessions, participants received:

- A home exercise program based on class content*
- A “hot tips” sheet listing practical strategies for avoiding falls such as where to place hands and feet if a loss of balance occurs*

* See Appendix D-1.

Study Citation: Barnett A, Smith B, Lord S, Williams M, Baumann A. Community-based group exercise improves balance and reduces falls in at-risk older people: A randomized controlled trial. *Age and Ageing*. 2003 Jul;32(4):407-14.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Anne Barnett, MPH
Physiotherapy Department
Bankstown Hospital, Locked Mailbag 1600
Bankstown NSW 2200
Australia
Tel: +61 (9) 722 7154
Fax: +61 (9) 722 7125
E-mail: anne.barnett@swhs.nsw.gov.au

Campbell,
et al. and
Robertson,
et al.

The Otago Exercise Program

This intervention, tested in four randomized controlled trials and one controlled multi-center trial, was an individually tailored program of muscle-strengthening and balance-retraining exercises of increasing difficulty, combined with a walking program. This extensively tested fall prevention program is now used worldwide.

Overall, the fall rate was reduced by 35 percent among program participants compared with those who did not take part. The program was equally effective for men and women. Participants aged 80 years and older who had fallen in the previous year showed the greatest benefit.

Population: Participants were aged 65 to 97 years and lived in the community.

Geographic Locale: Dunedin, New Zealand

Focus: Improve strength and balance with a simple, easy-to-implement, and affordable home-based exercise program.

Program Setting: The program was conducted in participants' homes and was intended for people who did not want to attend, or could not reach, a group exercise program or recreation facility.

Content: A physical therapist (PT) or nurse visited each participant four times at home over the first 2 months (at weeks 1, 2, 4, and 8) and visited again for a booster session at 6 months. To maintain motivation, participants were telephoned once a month during the months when no visits were scheduled.

The first home visit lasted an hour; all subsequent visits took about half an hour. During the visits, the PT or nurse prescribed a set of in-home exercises (selected at appropriate and increasing levels of difficulty) and a walking plan.



The exercises included:

- Strengthening exercises for lower leg muscle groups using ankle cuff weights
- Balance and stability exercises such as standing with one foot in front of the other and walking on the toes
- Active range of motion exercises such as neck rotation and hip and knee extensions

Participant safety was ensured by tailoring the exercise program and by giving participants instructions and an illustration for each exercise.

Duration: The exercises took about 30 minutes. Participants were encouraged to complete the exercises three times a week and to walk outside the home at least two times a week. Exercises then were continued on an ongoing basis. In three trials, the exercise program was prescribed for 1 year and in one trial was extended to 2 years.

Delivered by: The program was delivered by either a PT experienced in prescribing exercises for older adults, or a nurse who was given special training and received ongoing supervision from a PT.

Minimum Level of Training Needed: PTs can deliver the program immediately after reading the manual. Nurses can be trained to deliver the program after a 2-day training program and with ongoing supervision by a PT.

Key Elements: PTs should understand the research evidence on which the program is based and avoid adding or subtracting exercises from the set used in the trials, as this particular combination of exercises worked to reduce falls.

Available Materials: The Otago Exercise Program instruction guide, which describes the program exercises, is available to health professionals at:
<http://www.acc.co.nz/injury-prevention/home-safety/older-adults/otago-exercise-programme/index.htm>

Study Citation:

Primary studies

Campbell AJ, Robertson MC, Gardner MM, Norton RN, Tilyard MW, Buchner DM. Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *BMJ*. 1997 Oct 25;315(7115):1065-9.

Campbell AJ, Robertson MC, Gardner MM, Norton RN, Buchner DM. Falls prevention over 2 years: A randomized controlled trial in women 80 years and older. *Age and Ageing*. 1999 Oct;28(6):513-8.

Campbell AJ, Robertson MC, Gardner MM, Norton RN, Buchner DM. Psychotropic medication withdrawal and a home-based exercise program to prevent falls: A randomized controlled trial. *Journal of the American Geriatrics Society*. 1999 Jul;47(7):850-3.

Campbell AJ, Robertson MC, La Grow SJ, Kerse NM, Sanderson GF, Jacobs RJ, Sharp DM, Hale LA. Randomised controlled trial of prevention of falls in people aged ≥ 75 with severe visual impairment: The VIP trial. *BMJ*. 2005 Oct 8;331(7520):817-20.

Robertson MC, Devlin N, Gardner MM, Campbell AJ. Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 1: Randomised controlled trial. *BMJ*. 2001 Mar 24;322(7288):697-701.

Robertson MC, Gardner MM, Devlin N, McGee R, Campbell AJ. Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 2: Controlled trial in multiple centres. *BMJ*. 2001 Mar 24;322(7288):701-4.

Supplemental articles

Gardner MM, Buchner DM, Robertson MC, Campbell AJ. Practical implementation of an exercise-based falls prevention programme. *Age and Ageing*. 2001 Jan;30(1):77-83.

Robertson MC, Campbell AJ, Gardner MM, Devlin N. Preventing injuries in older people by preventing falls: A meta-analysis of individual-level data. *Journal of the American Geriatrics Society*. 2002 May;50(5):905-11.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

M. Clare Robertson, PhD
Department of Medical and Surgical Sciences
University of Otago Medical School
PO Box 913
Dunedin 9054
New Zealand
Tel: +64 (3) 474 7007 extension 8508
Fax: +64 (3) 474 7641
E-mail: clare.robertson@stonebow.otago.ac.nz

Tai Chi: Moving for Better Balance

This study compared the effectiveness of a 6-month program of Tai Chi classes with a program of stretching exercises. Participants in the Tai Chi classes had fewer falls and fewer fall injuries, and their risk of falling was decreased 55 percent.

Population: Participants were inactive seniors aged 70 years or older. Three-quarters were female. All participants lived in the community.

Geographic Locale: Portland, Oregon, USA

Focus: Improve balance and physical performance with Tai Chi classes designed for older adults.

Program Setting: The Tai Chi programs were conducted in community settings such as local senior centers and adult activity centers.

Content: The program included 24 Tai Chi forms that emphasized weight shifting, postural alignment, and coordinated movements. Synchronized breathing aligned with Tai Chi movements was integrated into the movement routine.

Each session included instructions in new movements as well as review of movements from previous sessions. Each practice session incorporated musical accompaniment.

Each hourlong session included:

- A 5- to 10-minute warm-up period
- Practice of Tai Chi movements
- A 5- to 10-minute cool-down period

Practicing at home was encouraged and monitored using a home-practice log.

Duration: One-hour classes were held three times a week for 26 weeks, followed by a 6-month period in which there were no organized classes.

Delivered by: Experienced Tai Chi instructors who followed the classical Yang style, which emphasizes multidirectional weight shifting, body alignment, and coordinated movement of the arms, legs, and trunk.



Minimum Level of Training Needed: Instructors should be familiar with the fundamental principles of Tai Chi and the major postures and movements, be able to follow the training protocol, and have experience teaching physical activity to older adults.

Key Elements:

- Program settings can include facilities such as senior centers, adult activity centers, and community centers.
- An average class size of 15 is ideal for effective learning and teaching.
- For this program to be successful, participants should attend Tai Chi classes at least two times a week and participate actively in class.
- Tai Chi can also be used in rehabilitative settings where the emphasis is on retraining balance in older adults.

Available Materials: The *Tai Chi: Moving for Better Balance* program package, specifically designed for community-dwelling older adults and senior service providers, is available from Dr. Fuzhong Li. The package contains an implementation plan, training manuals, and class materials on videotape and/or DVD.

Study Citation: Li F, Harmer P, Fisher KJ, McAuley E, Chaumeton N, Eckstrom E, Wilson NL. Tai Chi and fall reductions in older adults: A randomized controlled trial. *Journal of Gerontology*. 2005 Feb;60A(2):187-94.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Fuzhong Li, PhD
Oregon Research Institute
1715 Franklin Boulevard
Eugene, OR 97403
Tel: 541-484-2123
E-mail: fuzhongl@ori.org

Australian Group Exercise Program

This study evaluated a 12-month group exercise program for frail older adults. The program was tailored to each participant's abilities. Overall, the fall rate was 22 percent lower among people who took part in the program, and 31 percent lower among participants who had fallen in the previous year, compared with those who were not in the program.

Population: Ages ranged from 62 to 95, although nearly all were 70 years or older. Most study participants were female. Participants lived in retirement villages and most were independent.

Geographic Locale: Sydney and Wollongong, Australia

Focus: Increase participants' strength, coordination, balance and gait, and increase their ability to carry out activities of daily living such as rising from a chair and climbing stairs.

Program Setting: Programs were conducted in common rooms in residential care community centers and senior centers within the retirement villages.

Content: The group classes included weight-bearing exercises and balance activities that were challenging but not so difficult as to discourage participation or cause any adverse events. The program emphasized social interaction and enjoyment.

The program consisted of four 3-month terms. The first term included understanding movement, how the body works, training principles, and basic exercise principles. This was followed by progressive strength training and increasingly challenging balance exercises, using equipment to maintain interest. In each term, the exercise sessions built on the skills acquired in the previous term.

Each hourlong class had three segments:

- A 5- to 15-minute warm-up period that included chair-based activities, stretching large muscle groups, and later in the program, slow to moderate walking.
- A 35- to 40- minute conditioning period that included aerobic exercises, strengthening exercises, and activities to improve balance, hand-eye and foot-eye coordination, and flexibility. As the program progressed, the number of repetitions of each exercise increased, beginning with 4 repetitions at week 2 and reaching 30 by week 10. Thirty repetitions were maintained for rest of the program.



- A 10-minute cool-down period that included muscle relaxation, controlled breathing, and guided imagery.

Duration: One-hour classes were held twice a week for 12 months. The program consisted of four successive 3-month terms.

Delivered by: Six exercise instructors were trained to deliver the program. All had previously completed a training course conducted by the Australian Council for Health, Physical Education, and Recreation on leading exercise programs for frail, older people. The project coordinator regularly observed the instructors to provide support and to monitor program fidelity and consistency.

Everyone involved in implementing the program received specific 1-day training and met regularly to discuss issues and training updates.

Minimum Level of Training Needed: Instructors should have taken an exercise instructor course as well as a specific course on teaching exercise to older adults.

Key Elements: Information was not provided by the principal investigator.

Available Materials: No intervention materials were available at the time of publication.

Study Citation: Lord SR, Castell S, Corcoran J, Dayhew J, Matters B, Shan A, Williams P. The effect of group exercise on physical functioning and falls in frail older people living in retirement villages: A randomized, controlled trial. *Journal of the American Geriatric Society*. 2003 Dec;51(12):1685-92.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Stephen R. Lord, PhD
Prince of Wales Medical Research Institute
Barker Street, Randwick,
Sydney NSW 2031, Australia
Tel: +61 (2) 9399 1061
Fax: +61 (2) 9399 1005
E-mail: s.lord@unsw.edu.au

Veterans Affairs Group Exercise Program

This study evaluated a structured group exercise program for fall-prone older men. During the 3-month program, participants were two-thirds less likely to fall compared with those who did not take part in the program.

Note: This study calculated the fall rate as the number of falls per hour of physical activity.

Population: All participants were aged 70 or older and lived in the community. All were males who had at least one of these fall risk factors: leg weakness; impaired gait, mobility, and/or balance; and had fallen two or more times in the previous 6 months.

Geographic Locale: Los Angeles, California, USA

Focus: Increase strength and endurance and improve mobility and balance using a low- to moderate-intensity group exercise program.

Program Setting: The program was conducted at a Veterans Affairs ambulatory care center.

Content:

- Strength training included hip flexion, extension, abduction, and adduction; knee flexion and extension; squats, dorsiflexion, and plantar flexion. Over the first 4 weeks, participants increased each exercise from one to three sets of 12 repetitions. Resistance levels also were increased progressively. The rate of progression was modified for subjects with physical limitations.
- Endurance training used bicycles, treadmills, and indoor walking sessions. Endurance training alternated between cycling (once a week), using a treadmill (twice a week), and indoor walking that included a walking loop as well as two flights of stairs (twice a week). Heart rates were monitored to ensure that participants did not exceed 70 percent of their heart rate reserve.
- Balance training used a rocking balance board, balance beam, obstacle course, and group activities such as balloon volleyball and horseshoes. Balance training sessions were held twice a week and increased in difficulty over the 12-week program.



Duration: Three 1 ½-hour sessions a week for 12 weeks.

Delivered by: Exercise physiology graduate students with training from experienced exercise physiologists or physical therapists.

Minimum Level of Training Needed: Facilitators should have approximately 2 weeks of on-the-job training by an experienced exercise physiologist or physical therapist.

Key Elements:

- Using a group format and providing a wide variety of exercise activities
- Focusing on strength, balance, and endurance
- Providing personal encouragement and reinforcement

Available Materials: No materials were available at time of publication.

Study Citation: Rubenstein LZ, Josephson KR, Trueblood PR, Loy S, Harker JO, Pietruszka FM, Robbins, AS. Effects of a group exercise program on strength, mobility, and falls among fall-prone elderly men. *Journal of Gerontology: Medical Sciences*. 2000 Jun;55A(6):M317-21.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Laurence Z. Rubenstein, MD, MPH
VA Medical Center, GRECC (11e)
1611 Plummer St.
Sepulveda, CA 91343
Tel: 818-895-9311
Fax: 818-891-8181
E-mail: laurence.rubenstein@va.gov

Simplified Tai Chi

This study compared a 15-week program of Tai Chi classes that used 10 simplified movements, with a balance training program. After 4 months, the risk of falling more than once among participants in the Tai Chi classes was almost half that of people in the comparison group.

Participants reported that after the study they were better able to stop themselves from falling by using their environment and appropriate body maneuvers. After the study ended, almost half the participants chose to continue meeting informally to practice Tai Chi.

Population: All were 70 years or older and lived in the community. Most study participants were female.

Geographic Locale: Atlanta, Georgia, USA

Focus: Improve strength, balance, walking speed, and other functional measures among seniors using Tai Chi.

Program Setting: The program used facilities in a residential retirement community.

Content: Participants were taught a simplified version of Tai Chi. The 108 existing Tai Chi forms were synthesized into a series of 10 composite forms (see Appendix D-2) that could be completed during the 15-week period. The composite forms emphasized all elements of movement that generally become limited with age.

Exercises systematically progressed in difficulty. The progression of movements led to gradually reducing the base of standing support until, in the most advanced form, a person was standing on one leg. This progression also included increasing the ability to rotate the body and trunk as well as performing reciprocal arm movements. These exercises were led during the group sessions; however, individuals were encouraged to practice these forms on their own, outside of the group setting.

Example of a simplified Tai Chi form:

FORM 6



Duration: The 15-week program included:

- Twice weekly 25-minute group sessions
- Weekly 45-minute individual contact time with the instructor
- Twice daily 15-minute individual practice sessions at home without an instructor

Delivered by: A Tai Chi Quan grand master with 50 years of experience instructed the classes and met individually with participants. A nurse/coordinator maintained contact with participants to ensure their participation.

Minimum Level of Training Needed: Information was not provided by the principal investigator.

Key Elements: This program needs to be led by a very experienced Tai Chi grand master. No elements should be changed in order to replicate these results among seniors who are similar to study participants.

Available Materials: Illustrations of the 10 Tai Chi exercises are found in Appendix D-2.

Study Citation: Wolf SL, Barnhart HX, Kutner NG, McNeely E, Coogler C, Xu T. Reducing frailty and falls in older persons: An investigation of Tai Chi and computerized balance training. *Journal of the American Geriatric Society*. 1996 May;44(5):489-97.

Supplemental article

Wolf SL, Coogler C, Xu T. Exploring the basis for Tai Chi Chuan as a therapeutic exercise approach. *Archives of Physical Medicine and Rehabilitation*. 1997 Aug;78(8):886-92.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Steven L. Wolf, PhD, PT, FAPTA
Department of Rehabilitation Medicine
Emory University School of Medicine
1441 Clifton Road NE
Atlanta, GA 30322
Tel: 404-712-4801
Fax: 404-712-5895
E-mail: swolf@emory.edu



Home Modification Interventions

Home Visits by an Occupational Therapist (Cumming, et al.).....	21
Falls-HIT (Home Intervention Team) Program (Nikolaus, et al.)	23

Home Visits by an Occupational Therapist

This intervention used an occupational therapist (OT) who visited participants in their homes, identified environmental hazards and unsafe behaviors, and recommended home modifications and behavior changes. Fall rates were reduced by one-third but only among men and women who had experienced one or more falls in the year before the study.

Population: All participants were 65 or older and lived in the community. More than half of the participants were female.

Geographic Locale: Sydney, Australia

Focus: Assess and reduce home hazards.

Program Setting: The program was conducted in participants' homes.

Content: The OT visited each participant's home and conducted an assessment using the standardized *Westmead Home Safety Assessment* form (see Available Materials below). The OT identified environmental hazards such as slippery floors, poor lighting, and rugs with curled edges, and discussed with the participant how to correct these hazards.

Based on standard occupational therapy principles, the therapist also assessed each participant's abilities and behaviors, and how each functioned in his or her home environment. Specific unsafe behaviors were identified such as wearing loose shoes, leaving clutter in high-traffic areas, and using furniture to reach high places. The OT discussed with the participants ways to avoid these unsafe behaviors.

Two weeks after the initial home visit the OT telephoned each participant to ask whether they had made the modifications and to encourage them to adopt the recommended behavioral changes.



Duration: One-hour home visit with a follow-up telephone call 2 weeks later. Total contact time was approximately 2 hours.

Delivered by: An occupational therapist with 2 years experience.

Minimum Level of Training Needed: A degree in occupational therapy is the minimum qualification needed to conduct the home assessments, develop the recommendations, and supervise the home modifications.

Key Elements:

- Using an experienced occupational therapist is critical
- These researchers emphasized that this study should not be used to justify widespread, untargeted home modification programs implemented by people who do not have skills in caring for older people

Available Materials: Information on the falls prevention kit, which includes the *Westmead Home Safety Assessment* form and a booklet that gives background information on falls and hazards can be purchased from the following company:

Co-ordinates Therapy Services
10 Collier Crescent
Brunswick 3055 Australia
Tel: +61 (3) 9380 1127
Fax: +61 (3) 9387 4829
Email: jenny@therapybookshop.com

Study Citation: Cumming RG, Thomas M, Szonyi M, Salkeld G, O'Neill E, Westburg C, Frampton G. Home visits by an occupational therapist for assessment and modification of environmental hazards: A randomized trial of falls prevention. *Journal of the American Geriatric Society*. 1999 Dec;47(12):1397-1402.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Robert G. Cumming, PhD
Centre for Education and Research on Ageing (CERA)
Concord Hospital C25
Concord NSW 2139
Australia
Tel: +61 (2) 9767 6818 or +61 (2) 9767 7212
Fax: +61 (2) 9767 5419
E-mail: bobc@health.usyd.edu.au

Nikolaus,
et al.

Falls-HIT (Home Intervention Team) Program

This intervention provided home visits to identify environmental hazards that can increase the risk of falling, provided advice about possible changes, offered assistance with home modifications, and provided training in using safety devices and mobility aids. The fall rate for participants was reduced 31 percent. The intervention was most effective among those who had experienced two or more falls in the previous year; the fall rate for these participants was reduced 37 percent.

Population: Participants were frail community-dwelling older adults who had been hospitalized for conditions unrelated to a fall, and then discharged to home. Participants showed functional decline, especially in mobility. All were 65 years or older and lived in the community. Three-quarters were female.

Geographic Locale: Mid-sized town, Southern Germany

Focus: Assess and reduce fall hazards in participants' homes.

Program Setting: Intervention team members contacted patients once or twice while they were hospitalized to explain the program. The program took place in participants' homes.

Content: The first home visit was conducted while the participant was still hospitalized. Two team members, an occupational therapist with either a nurse or a physical therapist, depending on patient's anticipated needs, conducted a home assessment. They identified home hazards using a standardized home safety checklist and determined what safety equipment a participant needed.

During two to three subsequent home visits, an occupational therapist or nurse met with the participant to:

- Discuss home hazards
- Recommend home modifications
- Facilitate necessary modifications
- Teach participants how to use safety devices and mobility aids when necessary



Duration: The program consisted of two or more home visits, each lasting about 1.5 hours. After the participant was discharged from the hospital, three home visits typically were needed to provide advice on recommended home modifications and to teach the participant how to use safety devices and mobility aids. On average, the total individual contact time was 8 hours.

Delivered by: The home intervention team was composed of a physical therapist, occupational therapist, three nurses, a social worker, and a secretary. Occupational therapists generally worked with all participants. Depending on individual need, either a physical therapist or nurse also helped the participant. The social worker was available to provide information about ambulatory services and to help participants complete applications for additional money from the mandatory care insurance.

Minimum Level of Training Needed: Information was not provided by the principal investigator.

Key Elements: Participants met all intervention team members at the hospital before they were discharged, which facilitated follow-up.

Available Materials: A standardized home safety checklist is available in German only.

Study Citation: Nikolaus T, Bach M. Preventing falls in community-dwelling frail older people using a home intervention team (HIT): Results from the Randomized Falls HIT Trial. *Journal of the American Geriatrics Society*. 2003 Mar;51(3):300-5.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Thorsten Nikolaus, MD
Department of Geriatric Medicine,
University of Ulm and Bethesda Geriatric Clinic
Zollernring 26, D-89073 Ulm
Germany
Tel: +49 731 187185
Fax: +49 731 187389
E-mail: thorsten.nikolaus@bethesda-ulm.de



Multifaceted Interventions

Stepping On (Clemson, et al.)	27
PROFET (Prevention of Falls in the Elderly Trial) (Close, et al.)	31
The NoFalls Intervention (Day, et al.)	33
The SAFE Health Behavior and Exercise Intervention (Hornbrook, et al.)	37
Yale FICSIT (Frailty and Injuries: Cooperative Studies of Intervention Techniques) (Tinetti, et al.)	39
A Multifactorial Program (Wagner, et al.)	43

Stepping On

This study used a series of small group sessions to teach fall prevention strategies to community-dwelling older adults. The fall rate among participants was reduced about 30 percent compared with those who did not receive the intervention. The intervention was especially effective for men. The fall rate among male participants was reduced almost two-thirds.

Population: Participants were individuals who had fallen in the previous year or who were concerned about falling. All were 70 years or older and lived in the community. Most study participants were female.

Geographic Locale: Sydney, Australia

Focus: Improve self-efficacy, empower participants to make better decisions and learn about fall prevention techniques, and make behavioral changes.

Program Setting: Initial sessions were conducted in easily accessible community settings. Refreshments were provided before and after the sessions to give participants an opportunity to talk to each other and with the facilitators and content experts. Follow-up visits took place in the participants' homes.

Content: The program addressed multiple fall risk factors: improving lower limb balance and strength, improving environmental and behavioral safety in both the home and community, and encouraging visual and medical screenings to check for low vision and possible medication problems.

Each session covered a different aspect to reducing fall risk:

- Session 1: Risk appraisal; introducing balance and strength exercises
- Session 2: Review and practice exercises; how to move safely in the home
- Session 3: Hazards in and around the home and how to remove or reduce them
- Session 4: How to move safely in the community; safe footwear and clothing
- Session 5: Poor vision and fall risk; the benefits of vitamin D, calcium, and hip protectors



- Session 6: Medication management; review of exercises; more strategies for moving safely in the community
- Session 7: Review of topics covered in program
- Follow-up home visit: Review fall prevention strategies; assist with home adaptations and modifications, if needed
- Three-month booster session: Review achievements and how to maintain motivation.

Duration:

- Seven weekly 2-hour program sessions
- A 1 to 1 ½ -hour home visit, 6 weeks after the final session
- A 1-hour booster session 3 months after the final session

Delivered by: An occupational therapist (OT) facilitated the program and conducted the home visits.

A team of content experts, trained by the OT and guided by the *Stepping On* manual, led the sessions. These included:

- A physical therapist who introduced the exercises and led a segment on moving about safely.
- An OT who led segments on home safety, community safety, behavioral methods to sleeping better, and hip protectors.
- An older adult volunteer from the Roads and Traffic Authority who spoke on pedestrian safety.
- A retired volunteer nurse from the Medicine Information Project who discussed how to manage medications.
- A mobility officer from the Guide Dogs who spoke on coping with low vision. (The *Stepping On* manual has a topics section that outlines the information required to run this session.)

Minimum Level of Training Needed: The program should be facilitated by a health professional with experience both in group work and in working with older adults in community settings.

This program requires a physical therapist, an OT, a person trained in road safety for older drivers who can discuss pedestrian safety, a low vision expert, and a nurse or community pharmacist who can discuss medications. Other potentially useful content experts include a podiatrist or perhaps a nutritionist. All content experts need to receive training in fall prevention.

Key Elements: Using content experts is critical. It is also important to let each expert know what is expected of them, to provide feedback, and to make sure each focuses on fall prevention.

The *Stepping On* manual is essential for all program facilitators and provides a step-by-step guide to running the 7-week group program. It outlines topic areas and provides the background information for each content expert.

Chapters include:

- Essential background information for understanding the conceptual underpinning of the program and the group process
- Valuable content information for all the key fall prevention areas that can be used to train local experts participating in the program
- A guide to useful resources
- Handouts for group participants
- Ideas on recruitment and evaluation

Work is ongoing to develop training workshops and certification for *Stepping On* program leaders.

Available Materials: The program manual *Stepping On: Building Confidence and Reducing Falls. A Community-Based Program for Older People* by Dr. Lindy Clemson is available at:

Freiberg Press Inc
bfreiberg@cfu.net
2302 W. 1st St.
Cedar Falls, IA 50613
USA

Study Citation: Clemson L, Cumming RG, Kendig H, Swann M, Heard R, Taylor K. The effectiveness of a community-based program for reducing the incidence of falls in the elderly: A randomized trial. *Journal of the American Geriatrics Society*. 2004 Sep;52(9):1487-94.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Lindy Clemson, PhD
School of Occupation & Leisure Sciences
The University of Sydney
P.O. Box 170
Lidcombe 1825
Australia
Tel: +61 (2) 9351 9372
Fax: +61 (2) 9351 9166
E-mail: L.Clemson@fhs.usyd.edu.au

Close,
et al.

PROFET (Prevention of Falls in the Elderly Trial)

This intervention provided medical assessments for fall risk factors with referrals to relevant services and an occupational therapy home hazard assessment with recommendations for home modifications. After 12 months, those in the intervention group were 60 percent less likely to fall once and 67 percent less likely to fall repeatedly (at least three times), compared with those who did not receive the intervention.

Population: Participants were seniors who had been treated for a fall in a hospital emergency department. All were aged 65 years and older and lived in the community. Two-thirds of participants were female.

Geographic Locale: London, United Kingdom

Focus: Identify medical risk factors and home hazards, and provide referrals and/or recommendations to reduce fall risk and improve home safety.

Program Setting: The medical assessment took place in an outpatient hospital clinic. The occupational therapy assessment took place in participants' homes.

Content: The medical assessment was conducted soon after the fall that was treated in the emergency room. It included assessments of visual acuity, postural hypotension, balance, cognition, depression, and medication problems. The results were used to identify and address problems that could contribute to fall risk. Participants received referrals to relevant services, as appropriate, based on identified risk factors.

The home assessment was conducted during a single visit. The occupational therapist (OT) identified environmental hazards in the home such as uneven outdoor surfaces, loose rugs, and unsuitable footwear. Based on findings, the OT provided advice and education regarding safety within the home, made safety modifications to the home with the participant's consent, and provided minor safety equipment.

The OT made social service referrals for participants who required hand rails, other technical aids, adaptive devices such as grab bars and raised toilet seats, and additional support services.

Duration: The average length of the medical assessment was 45 minutes. The average length of the home assessment was 60 minutes.

Delivered by: A physician specializing in geriatrics conducted the medical assessment. An OT delivered the home hazard assessment.



Minimum Level of Training Needed: This program could be implemented by:

- Appropriately trained geriatricians
- General practitioners with a strong interest in older adult health
- Trained physical therapists or nurses with the support of a general practitioner in case medication modification, referrals to specialists, or other medical services were required

Key Elements: For medication review and modification, a medical specialist rather than a general practitioner is recommended.

Available Materials:

- Folstein mini-mental state examination (see Supplemental Articles)
- Modified geriatric depression scale (see Supplemental Articles)
- Snellen vision assessment chart
- Medical assessment form*—the form used in the outpatient hospital clinic setting
- Accident and emergency assessment tool*—the instrument used in the emergency department to identify people at high risk of falling and those who should be referred for a comprehensive geriatric assessment
- Environmental hazards checklist*—the checklist used to guide the home assessment

* See Appendix D-3.

Study Citation: Close J, Ellis M, Hooper R, Glucksman E, Jackson S, Swift C. Prevention of Falls in the Elderly Trial (PROFET): A randomised controlled trial. *Lancet*. 1999 Jan 9;353(9147):93-7.

Supplemental articles

Folstein MF, Folstein SE, McHugh PR. “Mini-mental state.” A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*. 1975 Nov;12(3):189-98.

Sheikh J, Yesavage J. Geriatric depression scale (GDS): Recent evidence and development of a shorter version. *Clinical Gerontology*. 1986;5(1/2):165-72.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Jacqueline Close, MD
Prince of Wales Medical Research Institute
Barker Street, Randwick,
Sydney NSW 2031, Australia
Tel: +61 (2) 9399 1000
Fax: +61 (2) 9399 1082
E-mail: j.close@unsw.edu.au

Day,
et al.

The NoFalls Intervention

This study looked at the effectiveness of group-based exercise in preventing falls when used alone or in combination with vision improvement and/or home hazard reduction. The intervention components focused on increasing strength and balance, improving poor vision, and reducing home hazards.

The group-based exercise was the most potent single intervention; when used alone, it reduced the fall rate by 20 percent. Falls were reduced further when vision improvement or home hazard reduction was combined with exercise. The most effective combination was the group-based exercise with both vision improvement and home hazard reduction. Participants who received all three components were one-third less likely to fall.

Population: All participants were aged 70 and older and lived in the community. Sixty percent were female.

Geographic Locale: City of Whitehorse, Melbourne, Australia

Focus: Increase strength and balance, improve poor vision, and reduce home hazards.

Program Setting: The exercise program was delivered in community settings such as exercise rooms in fitness centers and community health centers. The vision intervention was delivered via usual services available in the community. Participants went to their optometrist or ophthalmologist if they had one. If any further action was required, it was facilitated using normal services such as hospitals for cataract surgery, optometrists for new glasses, and general practitioners or ophthalmologists for medication if required. The home hazard intervention was conducted in participants' homes.



Content:

Exercise: The exercise intervention consisted of weekly 1-hour classes plus daily home exercises. Classes were designed by a physical therapist to improve flexibility, leg strength, and balance. About one-third of the exercises were devoted to balance improvement. Exercises were adjusted for participants with limitations. Music was played during the sessions.

Leaders provided a social time with coffee and tea after each session to talk informally about exercise improvements and opportunities.

Vision improvement: The vision intervention included referral to an appropriate eye care provider if a participant's vision fell below predetermined criteria during the baseline assessments for visual acuity, contrast sensitivity, depth perception, and field of view. Criteria for referral included more than four lines difference between the line of smallest letters read correctly on the high and low contrast sections of the vision chart or any loss of field of view.

A referral was recommended if:

- (1) A potential visual deficit was identified and the participant was not already receiving treatment, or
- (2) If a deficit had been identified previously but the participant had not received treatment during the previous 12 months. The intervention consisted of the participant receiving the recommended treatment by an appropriate specialist.

Home hazard reduction: The home hazard assessment consisted of a walk-through using a checklist for those rooms used in a normal week. The checklist included a comprehensive section defining the different areas of the house and specific hazards. The checklist was divided into rooms or areas of the house—access points (main entry door, back door, etc.), hallways, stairwells, dining room, living room, den, bedrooms, and wet areas (kitchen, bathroom, laundry rooms). Within each of these areas, the focus was on steps and stairs, floor surfaces, lighting, and some key furniture items or fixtures such as a favorite chair or bathroom fixtures.

After the assessment, the results were discussed with the participant and potential interventions described in the checklist were suggested. If the participant agreed to the intervention, it was determined who would carry it out. Hazards could be removed or modified by the participant, their family, the City of Whitehorse home maintenance program, or some other person. Study staff visited the participants' homes and provided quotes for the materials needed for the suggested modifications; labor was provided free of charge.

Duration:

Exercise: Weekly 1-hour group classes for 15 weeks and 25 minutes of daily home exercises.

Vision improvement: Duration depended on the specific intervention (such as cataract surgery or new glasses).

Home hazard reduction: Duration depended on the length of time the home modifications were left in place by the participant.

Delivered by:

Exercise: Classes were led by trainers who were accredited to lead exercise classes for older adults, and were trained in the *NoFalls* program by the physical therapist who designed the program.

Vision improvement: Initial assessment was conducted by nurses with up to a half-day's training required on the vision assessment. Detailed vision assessment was conducted by each participant's usual eye care provider, general practitioner, local optometrist, or ophthalmologist.

Home hazard reduction: Home assessments were conducted by research nurses who followed the study protocol for assessment with 1 day of training required on the home hazard assessment. Modifications were undertaken by participants, their family or a private contractor, or by the City of Whitehorse home maintenance program.

Minimum Level of Training Needed:

Exercise: Requires a basic level of exercise leadership training such as that received by a physical therapist or certified fitness instructor.

Vision and home hazard assessments: Nurses or other allied health professionals with the appropriate training.

Key Elements: Although the most effective single component was the *NoFalls* exercise program, the complete program should be followed because partial implementation may not reduce falls.

Available Materials: The *NoFalls* exercise program manual, which was developed for trained professionals, is available free of charge in electronic format at <http://www.monash.edu.au/muarc//projects/nofalls/>.

These researchers have not made the home assessment protocol available because this intervention component by itself was not effective.

Study Citation: Day L, Fildes B, Gordon I, Fitzharris M, Flamer M, Lord S. Randomised factorial trial of falls prevention among older people living in their own homes. *British Medical Journal*. 2002 Jul 20;325(7356):128-33.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Lesley Day, PhD, MPH
Accident Research Centre
Building 70, Monash University
Wellington Road
Clayton Victoria 3800, Australia
Tel: +61 (3) 9905 1811
Fax: +61 (3) 9905 1809
E-mail: NoFalls.enquire@general.monash.edu.au

The SAFE Health Behavior and Exercise Intervention

The Study of Accidental Falls in the Elderly (SAFE) health behavior intervention was a program of four group classes on how to prevent falls. The classes addressed environmental, behavioral, and physical risk factors and included exercise with instructions and supervised practice. The home safety portion included a home inspection with guidance and assistance in reducing fall hazards.

Overall, participants were 15 percent less likely to fall compared with those who did not receive the intervention. Male participants showed the greatest benefit.

Population: All were participants were 65 years or older and lived in the community. About 60 percent of participants were female.

Geographic Locale: Portland, Oregon, and Vancouver, Washington, USA

Focus: Reduce risky behaviors, improve physical fitness through exercise, and reduce fall hazards in the home.

Program Setting: No information was available on where risk education and group exercise classes took place. Home safety inspections were conducted in participants' homes.

Content: The SAFE health behavior intervention consisted of four 1 ½- hour group classes that used a comprehensive approach to reducing fall risks. Classes addressed environmental, behavioral, and physical risk factors.

Classes included:

- A slide presentation on common household risks
- Discussions of behavioral risks such as walking on ice or using a chair to reach high places
- A self-appraisal of home hazards using a specially designed form
- Small group sessions during which participants worked together to develop action plans

Each class session also had an exercise component that included a brief demonstration of fall prevention exercises and about 20 minutes of supervised practice. Participants received a manual describing the exercises and were encouraged to begin walking at least three times a week.

The exercises were chosen to:

- Actively involve all parts of the body
- Maintain full range of motion of all joints
- Strengthen muscles
- Improve posture
- Improve balance



During the home safety inspection, the assessor inspected the participant's home and identified fall hazards using a standard protocol. The assessor encouraged the participant to remove or repair the hazards identified during this initial visit. The participant was also given fact sheets on how to obtain technical and financial assistance for making repairs and modifications to his or her home.

After the four classes were completed, the assessor returned to the participant's home to check on the progress of repairs and to offer financial and technical assistance if needed, as well as discounts on safety equipment.

Duration:

- Two home visits, each lasting about 15 minutes
- Four weekly 1 ½-hour classes (including 20 minutes of supervised exercise) over a 1-month period

Delivered by:

- The home inspection was performed by a BA-level home assessor who was trained during a 2-day program that included practice assessments of elderly volunteers' homes.
- The fall prevention program and exercise sessions were delivered by MA-level lifestyle change experts with various backgrounds including health behavior change and sports training. Each group meeting was conducted by a team consisting of a lifestyle change expert and a physical therapist.

Minimum Level of Training Needed: Information was not provided by the principal investigator.

Key Elements: Information was not provided by the principal investigator.

Available Materials: No intervention materials were available for distribution at the time of publication. Please contact the principal investigator for information on how to obtain the exercise manual.

Study Citation: Hornbrook MC, Stevens VJ, Wingfield DJ, Hollis JF, Greenlick MR, Ory MG. Preventing falls among community-dwelling older persons: Results from a randomized trial. *The Gerontologist*. 1994 Feb;34(1):16-23.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Mark C. Hornbrook, PhD
Kaiser Permanente Center for Health Research
3800 N Interstate Ave
Portland, OR 97227
Tel: 503-335-6746
E-mail: mark.c.hornbrook@kpchr.org

Tinetti,
et al.

Yale FICSIT (Frailty and Injuries: Cooperative Studies of Intervention Techniques)

This study used a tailored combination of intervention strategies based on an assessment of each participant's fall risk factors. Participants were about 30 percent less likely to fall compared with people who did not receive the intervention.

Population: Participants were members of a health maintenance organization. All were 70 years or older and lived in the community. Most participants were female.

Geographic Locale: Farmington, Connecticut, USA

Focus: Identify and modify each participant's risk factors.

Program Setting: The intervention was delivered to participants in their homes.

Content: This program provided an individualized intervention for each participant. The content varied based on the fall risk factors identified. Possible intervention components included medication adjustment, recommendations for behavioral change, education and training, home-based physical therapy, and a home-based progressive balance and strengthening exercise program.

The selection of interventions was guided by decision rules and priorities. No participant received more than three balance and strength training programs.



Risk Factor	Intervention
Assessed by a nurse practitioner:	
Postural hypotension	Behavioral recommendations such as elevating the head of the bed and using ankle pumps; made changes in medications
Use of sedative-hypnotic medication	Education; discontinued medication; non-pharmacological alternatives
Use of 4+ prescription medications	Reviewed medications with primary physician; the final decision on medication changes was made by the primary physician
Inability to transfer safely to bathtub or toilet	Training in transfer skills; home modifications (such as installing grab bars and a raised toilet seat)
Environmental hazards	Home modifications (such as removing rugs and installing railings)
Assessed by a physical therapist:	
Gait impairments	Gait training; use of assistive devices; balance and/or strengthening exercises
Impairments in transfer skills or balance	Training in transfer skills; home modifications; balance exercises (progressing through 4 levels of difficulty)
Impairment in leg or arm strength or in range of motion	Progressive strengthening exercises with resistance bands and putty, increasing resistance after participant could complete 10 repetitions; exercises were performed for 15-20 minutes twice a day

Multifaceted Interventions

Duration: The intervention was conducted over a 3-month period. The amount and duration of contacts varied by the type of interventions received.

Delivered by: A nurse practitioner and physical therapist (PT) conducted the risk factor assessments. Medication adjustments were undertaken in cooperation with the participant's primary physician who made the final decision on medication changes. The PT conducted all physical therapy and supervised exercise sessions.

Minimum Level of Training Needed: The assessment requires at least a well trained paraprofessional such as a PT assistant or licensed practical nurse (LPN). The intervention needs at least a BA-level nurse. The physical therapy portion requires a physical or occupational therapist, or a physical or occupational therapy assistant with supervision by a physical or occupational therapist.

Key Elements: The assessments need to be clearly linked to the intervention components. The minimum risk factor interventions include (1) postural blood pressure and behavioral recommendations; (2) medication review and reduction (especially psychoactive medications); (3) balance, strength, and gait assessments and interventions; and (4) environmental assessment and modification.

It is essential that the progressive balance and strength exercise program includes both supervised and at-home (unsupervised) components.

Available Materials: Intervention materials including risk factor assessments and treatment worksheets, medication reduction strategies, balance exercises, home safety checklists, and information sheets can be requested through the intervention Web site: <http://www.fallprevention.org>.

Study Citation: Tinetti ME, Baker DI, McAvay G, Claus EB, Garrett P, Gottschalk M, Koch ML, Trainor K, Horwitz RI. A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *New England Journal of Medicine*. 1994 Sept 29;331(13):821-7.

Supplemental articles

Koch M, Gottschalk M, Baker DI, Palumbo S, Tinetti ME. An impairment and disability assessment and treatment protocol for community-living elderly persons. *Physical Therapy*. 1994 Apr;74(4):286-94.

Tinetti ME, Baker DI, Garrett PA, Gottschalk M, Koch ML, Horwitz RI. Yale FICSIT: Risk factor abatement strategy for fall prevention. *Journal of American Geriatric Society*. 1993 Mar;41(3):315-320.

Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Mary Tinetti, MD
Department of Epidemiology and Public Health
Yale University School of Medicine
Internal Medicine-Geriatrics
PO Box 208025
New Haven, CT 06520-8025
Tel: 203-688-5238
Fax: 203-688-4209
E-mail: Mary.tinetti@yale.edu

Wagner,
et al.

A Multifactorial Program

This study tested a moderate-intensity intervention that used tailored strategies based on assessments of each participant's risk factors. After 1 year, participants were 10 percent less likely to fall and 5 percent less likely to have an injurious fall, compared with people who received usual medical care.

Population: All participants were 65 years and older and lived in the community. About 60 percent of participants were female.

Geographic Locale: Seattle, Washington, USA

Focus: Reduce disability and/or falls by: improving physical fitness, modifying excessive alcohol use, improving home safety, reducing psychoactive medication use, and improving hearing and vision.

Program Setting: Participants received the assessments and interventions from a nurse at local health maintenance organization (HMO) centers. Participants conducted a home assessment or had it done by a family member or volunteer.

Content: The assessments consisted of simple screening tests for six risk factors. The intervention content varied based on the individual's risk factors.



Risk Factor	Intervention
Inadequate exercise	Participated in a 2-hour exercise orientation class testing fitness, given exercise instruction, and encouraged to begin a program of brisk walking
Excessive alcohol use	Referred to an alcohol treatment program if alcoholism was suspected, or given an instructional booklet that provided strategies for limiting use
Home hazards	Assessed home safety using an instructional home safety checklist
Use of psychoactive drugs	Reviewed medications using a pharmacist and sent written recommendations to the participant's primary care provider
Impaired hearing	Had a hearing aid evaluation. Program provided behavioral intervention classes for participants with uncorrectable deficits
Impaired vision	Corrected when possible. Participants with uncorrectable visual impairments received information about available community resources

Duration: The initial visit consisted of a 1 to 1 ½-hour interview. The length and number of subsequent sessions varied by the type of interventions selected for each participant.

Delivered by: The program was delivered by a single nurse educator who received brief training by the research team. There was no formal curriculum because only one nurse was involved. Either trained volunteers or participants' family members completed the home safety assessment using the provided checklist.

Minimum Level of Training Needed: Information was not provided by the Principal Investigator.

Key Elements: The nurse's follow-up phone contacts and home visits may have had positive effects on participants' health that were independent of the interventions for specific risk factors.

Available Materials: No intervention materials were available for distribution at the time of publication.

Study Citation: Wagner EH, LaCroix AZ, Grothaus L, Leveille SG, Hecht J, Artz K, Odle K, Buchner DM. Preventing disability and falls in older adults: A population-based randomized trial. *American Journal of Public Health*. 1994 Nov;84(11):1800-6.

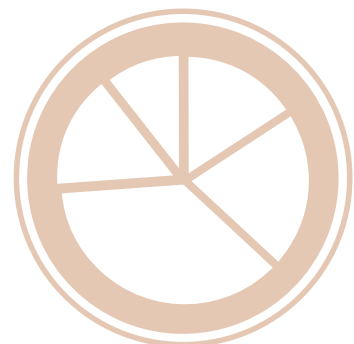
Contact

Practitioners interested in using this intervention may contact the principal investigator for more information:

Edward H. Wagner, MD, MPH
Center for Health Studies
Group Health Cooperative
1730 Minor Avenue, Ste. 1290
Seattle, WA 98101
Tel: 206-287-2877
E-mail: wagner.e@ghc.org

Appendix A

Intervention Study Selection Process



Intervention Study Selection Process

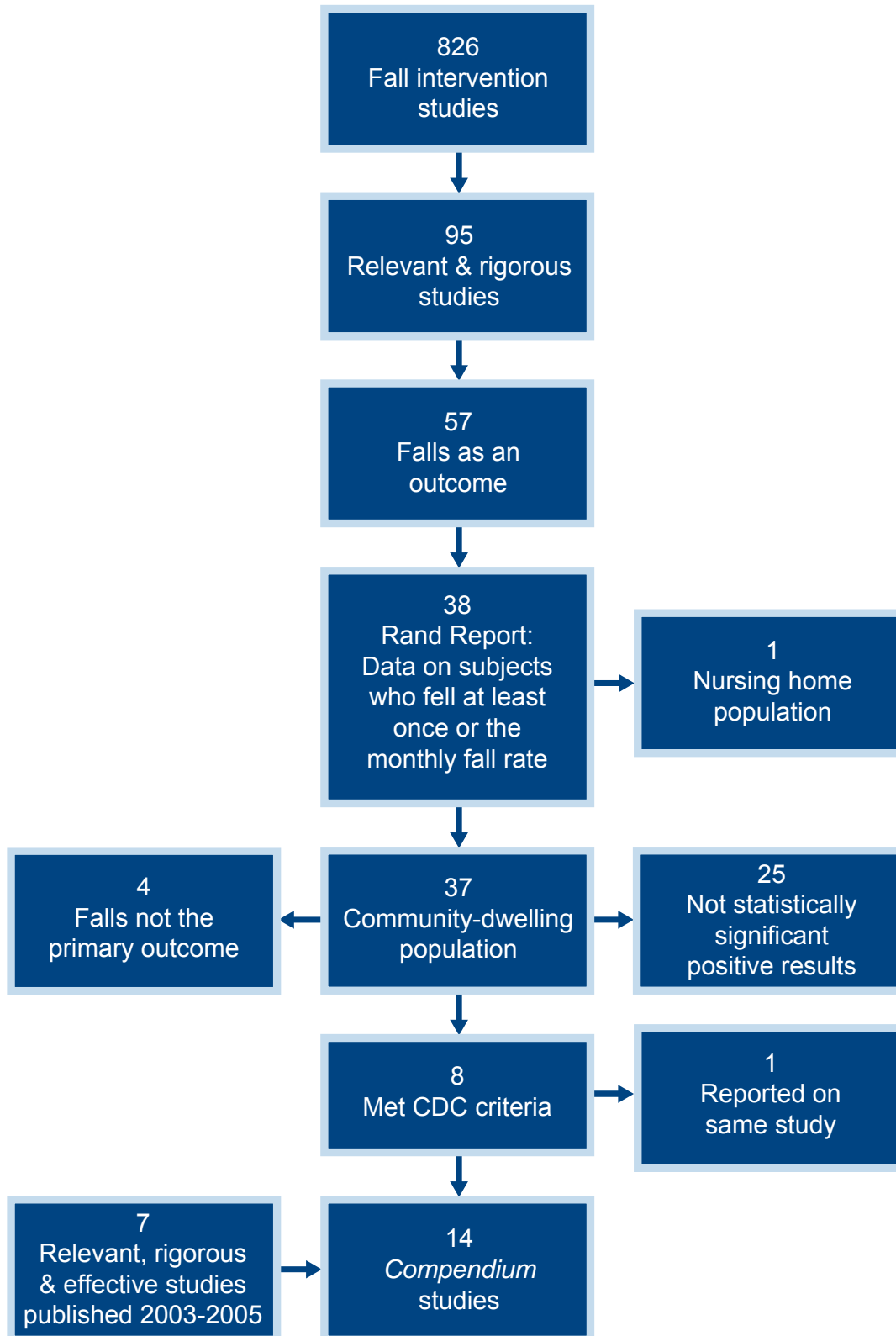
In 2003, the Rand Corporation was commissioned by the Centers for Medicare and Medicaid Services (CMS) to review and analyze the existing research in fall prevention interventions. They conducted a comprehensive literature search and reviewed 826 intervention studies, of which 95 met the following selection criteria: (1) included adults aged ≥ 65 years; (2) used a randomized controlled trial or controlled clinical trial study design; (3) identified falls as an outcome; and (4) measured the number of falls at least 3 months after the start of the intervention. Of the 95 studies, 57 had falls as a primary outcome and 38 of the 57 reported either the number of subjects who fell at least once, or the monthly rate of falling. Rand included these 38 studies in their meta-analyses to determine the effectiveness of fall prevention interventions (categorized as exercise, education, environmental modification, or multiple component interventions.)*

Beginning with data from the 38 studies Rand included in their meta-analysis (used by permission, L. Rubenstein, personal communication), CDC identified those that met the following inclusion criteria: (1) included community-dwelling adults aged ≥ 65 years; (2) used a randomized controlled study design; (3) measured falls as a primary outcome; and (4) demonstrated statistically significant positive results for at least one fall outcome (i.e., showed statistically fewer falls for intervention participants). As illustrated in Figure 1, CDC excluded 1 study that focused on nursing home residents, 4 that did not include falls as the primary outcome, and 25 that did not demonstrate statistically significant, positive results. Of the remaining eight, two described the same study and were combined. Lastly, CDC also identified seven studies published after the Rand Report that met the established criteria. In total, the *Compendium* includes 14 studies published before January 2006.



* Available at <http://www.cms.hhs.gov/PrevntionGenInfo/Downloads/Exercise%20Report.pdf>

Figure 1. Flow chart showing the selection process for studies used in the *Compendium*



Appendix A

Appendix B

Bibliography of *Compendium* Studies



Bibliography of Compendium Studies and Supplemental Articles

Barnett A, Smith B, Lord SR, Williams M, Baumann A. Community-based group exercise improves balance and reduces falls in at-risk older people: A randomized controlled trial. *Age and Ageing*. 2003 Jul;32(4):407-14.

*Campbell AJ, Robertson MC, Gardner MM, Norton RN, Buchner DM. Falls prevention over 2 years: A randomized controlled trial in women 80 years and older. *Age and Ageing*. 1999 Oct;28(6):513-18.

Campbell AJ, Robertson MC, Gardner MM, Norton RN, Tilyard MW, Buchner DM. Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *BMJ*. 1997 Oct 25;315(7115):1065-69.

*Campbell AJ, Robertson MC, Gardner MM, Norton RN, Buchner DM. Psychotropic medication withdrawal and a home-based exercise program to prevent falls: A randomized controlled trial. *Journal of the American Geriatrics Society*. 1999 Jul;47(7):850-53.

*Campbell AJ, Robertson MC, La Grow SJ, Kerse NM, Sanderson GF, Jacobs RJ, Sharp DM, Hale LA. Randomised controlled trial of prevention of falls in people aged >75 with severe visual impairment: The VIP trial. *British Medical Journal*. 2005 Oct 8;331(7520):817-20.

Clemson L, Cumming RG, Kendig H, Swann M, Heard R, Taylor K. The effectiveness of a community-based program for reducing the incidence of falls in the elderly: A randomized trial. *Journal of the American Geriatrics Society*. 2004 Sep;52(9):1487-94.

Close J, Ellis M, Hooper R, Glucksman E, Jackson S, Swift C. Prevention of falls in the elderly trial (PROFET): A randomized controlled trial. *Lancet*. 1999 Jan 9;353(9147):93-97.

Cumming RG, Thomas M, Szonyi G, Szonyi M, Salkeld G, O'Neill E, Westburg C, Frampton G. Home visits by an occupational therapist for assessment and modification of environmental hazards: A randomized trial of falls prevention. *Journal of the American Geriatric Society*. 1999

Dec;47(12):1397-1402.

Day L, Fildes B, Gordon I, Fitzharris M, Flamer H, Lord S. Randomized factorial trial of falls prevention among older people living in their own homes. *British Medical Journal*. 2002 Jul 20;325(7356):128-33.

*Folstein MF, Folstein SE, McHugh PR. "Mini-mental state." A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research*. 1975 Nov;12(3):189-98.

*Gardner MM, Buchner DM, Robertson MC, Campbell AJ. Practical implementation of an exercise-based falls prevention programme. *Age and Ageing*. 2001 Jan;30(1):77-83.

Hornbrook MC, Stevens VJ, Wingfield DJ, Hollis JF, Greenlick MR, Ory MG. Preventing falls among community-dwelling older persons: Results from a randomized trial. *The Gerontologist*. 1994 Feb;34(1):16-23.

*Koch M, Gottschalk M, Baker DI, Palumbo S, Tinetti ME. An impairment and disability assessment and treatment protocol for community-living elderly persons. *Physical Therapy*. 1994 Apr;74(4):286-94.

Li F, Harmer P, Fisher KJ, McAuley E, Chaumeton N, Eckstrom E, Wilson NL. Tai Chi and fall reductions in older adults: A randomized controlled trial. *Journal of Gerontology: Medical Sciences*. 2005 Feb;60A(2):187-94.

Lord SR, Castell S, Corcoran J, Dayhew J, Matters B, Shan A, Williams P. The effect of group exercise on physical functioning and falls in frail older people living in retirement villages: A randomized, controlled trial. *Journal of the American Geriatric Society*. 2003 Dec;51(12):1685-92.

Nikolaus T, Bach M. Preventing falls in community-dwelling frail older people using a home intervention team (HIT): Results from the randomized falls—HIT trial. *Journal of the American Geriatric Society*. 2003 Mar;51(3):300-5.

*Robertson MC, Campbell AJ, Gardner MM, Devlin N. Preventing injuries in older people by preventing falls: A meta-analysis of individual-level data. *Journal of the American Geriatrics Society*. 2002 May;50(5):905-11.

*Robertson MC, Devlin N, Gardner MM, Campbell AJ. Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 1: Randomised controlled trial. *British Medical Journal*. 2001 Mar 24; 322(7288):697-701.

*Robertson MC, Gardner MM, Devlin N, McGee R, Campbell AJ. Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 2: Controlled trial in multiple centres. *British Medical Journal*. 2001 Mar

24;322(7288):701-4.

Rubenstein LZ, Josephson KR, Trueblood PR, Loy S, Harker JO, Pietruszka FM, Robbins, As. Effects of a group exercise program on strength, mobility, and falls among fall-prone elderly men. *Journal of Gerontology: Medical Sciences*. 2000 Jun;55A(6):M317-21.

*Sheik J, Yesavage J. Geriatric depression scale (GDS): Recent evidence and development of a shorter version. *Clinical Gerontology*. 1986;5(1/2):165-72.

*Tinetti ME, Baker DI, Garrett PA, Gottschalk M, Koch ML, Horwitz RI. Yale FICSIT: Risk factor abatement strategy for fall prevention. *Journal of American Geriatric Society*. 1993 Mar;41(3):315-20.

Tinetti ME, Baker DI, McAvay G, Claus EB, Garrett P, Gottschalk M, Koch ML, Trainor K, Horwitz RI. A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *New England Journal of Medicine*. 1994 Sept 29;331(13):821-7.

Wagner EH, LaCroix AZ, Grothaus L, Leveille SG, Hecht J, Artz K, Odle K, Buchner DM. Preventing disability and falls in older adults: A population-based randomized trial. *American Journal of Public Health*. 1994 Nov;84(11):1800-6.

Wolf SL, Barnhart HX, Kutner NG, McNeely E, Coogler C, Xu T. Reducing frailty and falls in older persons: An investigation of Tai Chi and computerized balance training. *Journal of the American Geriatric Society*. 1996 May;44(5):489-97.

*Wolf SL, Coogler C, Xu T. Exploring the basis for Tai Chi Chuan as a therapeutic exercise approach. *Archives of Physical Medicine and Rehabilitation*. 1997 Aug;78(8):886-92.

*Supplemental article

Appendix C

Tables

Table 1 Overall Population Characteristics

Table 2 Study Characteristics

Table 3 Intervention Characteristics

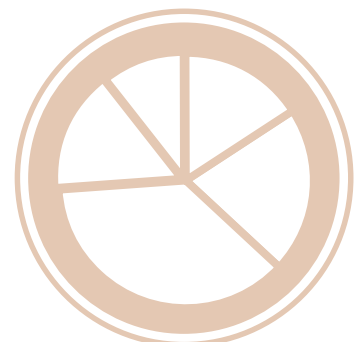


Table 1: Overall Population Characteristics (1 of 2)

Study	No. Study Participants	Mean Age	% Female	Race/Ethnicity	Socioeconomic Status	Previous Falls	Other Characteristics
Barnett 2003	163	75	67%	90% used English as primary language	Study conducted in low SES areas	42% fell in past year	27% lived alone
Campbell 1997	233	84	100%	Most were White	20% used community services	44% fell in past year	
Clemson 2004	310	78	74%	NA*	52% had below average weekly income	65% fell in past year	
Close 1999	397	78	68%	NA	NA	65% fell in past year	61% lived alone
Cumming 1999	530	77	57%	100% White	NA	31% fell in past year	37% used a walking aid
Day 2002	1,090	76	60%	77% born in Australia	Study conducted in mainly middle class area	6% fell in past year	54% lived alone 47% married
Hornbrook 1994	3,182	73	62%	90% White	33% education > HS	15% fell in past year	37% lived alone 56% married
Li 2005	256	77	70%	90% White	92% education ≥ HS 68% income < \$35,000	37% fell in past 3 months	48% lived alone

Table 1: Overall Population Characteristics continued (2 of 2)

Study	No. Study Participants	Mean Age	% Female	Race/Ethnicity	Socioeconomic Status	Previous Falls	Other Characteristics
2003	551	80	86%	100% White	NA	34% fell in past year	22% in assisted living housing
2003	360	82	73%	98% White	NA	30% ≥ two falls in past year	All showed functional decline, especially in mobility
2000	59	75	0%	95% White	63% education > HS	56% fell in past 6 months	73% married
1994	301	78	69%	NA	31% education > HS	43% fell in past year	44% married
1994	1,559	73	59%	93% White 7% Nonwhite	25% education > 16 years 35% income < \$15,000	33% fell in past year	
1996	200	76	81%	Most were White	77% education > HS	36% fell in past year	

Information available

Table 2: Study Characteristics continued (1 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Barnett 2003	SW Sydney, Australia	Recruited while patients in general practice clinics or attending hospital-based PT clinics	Age 65+ and >1 physical impairment assoc w. fall risk (lower limb weakness, poor balance, slow reaction time)	Cognitive impairment, degenerative conditions or medical conditions precluding participating in an exercise program	Yes
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Postal surveys sent to participants each month. If not received within 2 weeks, participant was interviewed by telephone.	12 months	Fall rate Fall w/ injury	RR = 0.60 (0.36-0.99) RR = 0.66 (0.38-1.15)	None
Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Campbell 1997	Dunedin, New Zealand	Women registered with a general practice in Dunedin were invited by GP to take part.	Age 80+ and able to move around within their own home	Cognitively impaired or receiving physical therapy	Yes
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Participants given 12 pre-addressed & stamped monthly fall calendar postcards. If one was not received, participant was interviewed by telephone.	12 months	Fall rate First fall First fall w/ injury	RR = 0.67; p<0.05 HR = 0.81 (0.56-1.16) HR = 0.61 (0.39-0.97)	None

Table 2: Study Characteristics continued (2 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Clemson 2004	Sydney, Australia	Community residents recruited through referrals, advertisements, & community organizations	Age 70+, had a fall in past year or fear of falling, & spoke English	Cognitively impaired or homebound	No
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Participants mailed in a pre-addressed, stamped calendar each month.	14 months	Fall rate, overall Fall rate, males Fall rate, females	RR = 0.69 (0.50-0.96) RR = 0.32 (0.17-0.59) RR = 0.96 (0.50-1.85)	None
Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Close 1999	London, United Kingdom	Community residents treated in an ED for a fall, sent letters & contacted by telephone	Age 65+, ambulatory, & had been treated for a fall	Cognitively impaired & had no regular caregiver, or spoke little or no English	Yes
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Postal questionnaires were sent to participants every 4 months.	12 months	Total number of falls Fall risk Risk of ≥ 3 falls	183 vs. 510; $p < 0.002$ OR = 0.39 (0.23-0.6) OR = 0.33 (0.16-0.68)	None

Table 2: Study Characteristics continued (3 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Cumming 1999	Sydney, Australia	Recruited while hospital patients or from among people attending outpatient clinics or a local senior center	Age 65+, ambulatory	Cognitively impaired & not living with someone who could give informed consent & report falls, or planned to have a home assessment by an OT	No
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Monthly falls calendar was completed daily & returned by mail each month. If not received within 10 days, participant was interviewed by telephone.	12 months	Fall rate for participants w/ no falls at baseline Fall rate for participants w/ falls at baseline	RR = 1.03 (0.75-1.41) RR = 0.64 (0.50-0.83)	None

Table 2: Study Characteristics continued (4 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Day 2002	Melbourne, Australia	Identified from electoral roll & through general practitioners. Subjects were sent letters & then contacted by telephone.	70+, owns or leases home & able to make home modifications	Planning to move within 2 years, recent physical activity with a balance component, unable to walk 10-20 m w/o rest, help or angina, severe respiratory or cardiac disease, cognitively impaired, had made recent major home modifications, or did not have physician approval	No
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Monthly calendar postcards completed daily & returned by mail. If not received within 5 working days after end of month, participant was interviewed by telephone.	18 months	Fall rates	Exercise alone: RR = 0.82 (0.70-0.97) Exercise+ vision: RR = 0.73 (0.58-0.91) Exercise+ home mod: RR = 0.76 (0.60-0.95) Exercise+ vision+ home mod: RR = 0.67 (0.51-0.88)	None

Table 2: Study Characteristics continued (5 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Hornbrook 1994	Portland OR & Vancouver WA metro area	Members of a Kaiser Permanente HMO were recruited by mail	Age 65+, ambulatory	Blind, deaf, housebound, non-English speaking, severely mentally ill, terminally ill, not willing to travel or lived >20 mi. from research center	Yes Also "near falls"
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Fall reported by postcard as soon as it occurred. Participant interviewed by telephone about circumstances & consequences. Monthly diaries monitored quarterly by mail or telephone for self-reported falls & associated injuries & medical care.	24 months	Fall risk Fall risk for men Fall risk for men age 75+	OR = 0.85 (p<.05) OR = 0.82 (p<.05) OR = 0.53 (p<.05)	None

Table 2: Study Characteristics continued (6 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Li 2005	Portland, OR	Subjects enrolled in the Legacy Health System in Portland, OR were sent letters from their physicians encouraging them to participate	Age 70+, inactive, ambulatory, no chronic medical problems that would limit participation, had a physician's clearance to participate, & not cognitively impaired	In poor health, had difficulty with language or transportation	Yes
Method of Recording Falls		Length of Follow-up	Fall Outcomes	Results*	Adverse effects
Falls recorded daily in a fall calendar that was collected by a research assistant.		12 months	Fall rate Multiple fall rate	RR = 0.35 (p<0.001) RR = 0.45 (0.30-0.70)	None

Table 2: Study Characteristics continued (7 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Lord 2003	Sydney & Wollongong, Australia	Residents of self-care and intermediate-care retirement villages attended information sessions & then were approached individually	Age 62+	Cognitively impaired, had a medical condition that prevented participation in an exercise program, or already attended exercise classes of equivalent intensity	Yes
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Completed monthly questionnaires. If not received within a week after end of month, received home visits or telephone calls. Nursing staff at each intermediate-care site also kept a falls record book.	12 months	Fall rate Fall rate for participants w. no falls at baseline Fall rate for participants w. falls at baseline	RR = 0.78 (0.62-0.99) RR = 0.88 (0.65-1.20) RR = 0.69 (0.48-0.99)	None

Table 2: Study Characteristics continued (8 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Nikolaus 2003	Mid-sized town, Southern Germany	Recruited while inpatients at a geriatric clinic	Lived at home before hospital admission, had multiple chronic conditions or functional deterioration, & were discharged to home	Severe cognitive decline, terminal illness, or lived >15 km away	Yes
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Kept a falls diary & also contacted monthly by phone.	12 months	Fall rate Fall rate for participants w. ≤ 1 fall at baseline Fall rate for participants w. ≥ 2 falls at baseline	IRR = 0.69 (0.51-0.97) IRR = 0.91 (0.72-1.22) IRR = 0.63 (0.43-0.94)	None
Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Rubenstein 2000	Los Angeles, CA	Male patients at VA Ambulatory Care Center recruited through flyers and telephone screening	Age 70+, ambulatory, had at least one of 4 risk factors (lower extremity weakness, impaired gait, impaired balance, or >1 fall in past 6 months)	Exercised regularly, had cardiac or pulmonary disease, a terminal illness, severe joint pain, dementia, medically unresponsive depression, or progressive neurologic disease	No
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Questioned about falls and injuries every 2 weeks by phone or in-person during exercise class.	12 weeks (at end of intervention)	Activity-adjusted fall rate**	RR = 0.37 (p=.027)	None

Table 2: Study Characteristics continued (9 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Tinetti 1994	Southern Connecticut	Members of an HMO, contacted first by letter & then screened by telephone	Age 70+, ambulatory in own home, had at least one of 9 risk factors (postural hypotension; used sedatives; ≥4 medications; inability to transfer; gait impairment; loss of strength or range of motion; home hazards)	Cognitively impaired or had participated in vigorous sports or walking for exercise in previous month	No
Method of Recording Falls		Length of Follow-up	Fall Outcomes	Results*	Adverse effects
A monthly falls calendar was returned by mail. If a calendar was not received or if it indicated any falls, participant was interviewed by telephone.		12 months	Fall rate Falls per person-week	RR = 0.76 (0.58-0.98) RR = 0.69 (0.52-0.90)	None

Table 2: Study Characteristics continued (10 of 10)

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Wagner 1994	Seattle, WA	Random sample of HMO members sent an introductory letter followed by a mail questionnaire	Age 65+, ambulatory, independent in ADLs	Institutionalized or seriously ill	Yes
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Mailed questionnaires at baseline, at 1 & at 2 years. If not returned, participants were interviewed by telephone. Falls were identified through self-report and hospital discharge files.	24 months	Difference in % falling Falls, Year 1 Falls, Year 2 Fall w. injury, Year 1 Fall w. injury, Year 2	-9.3% (4.1-14.5) +2.2% n.s. -4.6% (p<.01) +3.3% n.s.	None

Study	Location	Study population & recruitment	Inclusion Criteria	Exclusion Criteria	Defined Falls
Wolf 1996	Atlanta, GA	Community seniors & residents of an independent living facility, recruited through advertisements & direct contact	Age 70+, ambulatory, willing to participate weekly for 15 wk program and at 4-month follow-up	Severely cognitively impaired or had debilitating conditions such as metastatic cancer, Parkinson's disease, stroke, or profound visual deficits	Yes
	Method of Recording Falls	Length of Follow-up	Fall Outcomes	Results*	Adverse effects
	Monthly calendar or monthly phone calls from staff.	7-20 months	Fall risk ≥1 falls w. injury	RR = 0.53 (0.32-0.86) RR = 0.81 (0.33-2.02)	None

Results shown with 95% confidence intervals. * RR = Relative Rate, HR = Hazard Ratio, OR = Odds Ratio, IRR = Incidence Rate Ratio
 ***per 1,000 hrs of activity

Table 3: Intervention Characteristics (1 of 3)

Study	Focus	Providers	Structure	Number of sessions	Provider Contact Time
Barnett 2003	Exercise program to improve balance, coordination, strength, reaction time, & aerobic capacity	Accredited exercise instructors trained to provide intervention	Group exercise classes	37 weekly 1-hour classes	Classes: 37 hours
Campbell 1997	Improve strength & balance with simple home-based exercise program	Physical therapist or nurse	One-on-one exercise training at home	Exercise program ½ hour 3 times a week Walking ½ hour 3 times a week	4 home visits: 1-hour each
Clemson 2004	Learn fall prevention techniques, improve self-efficacy & make behavioral changes	Occupational therapist & team of trained content experts	Small group classes	7 weekly 2-hour program classes 1 home visit 6 weeks after the final class 1 booster session 3 months after the final class	Classes: 14 hours Home visit: 1 to 1½ hours Booster: 1½ hours
Close 1999	Identify medical risk factors & home hazards; provide referrals and recommendations to reduce fall risk & improve home safety	Physician & occupational therapist	One-on-one	2 sessions—one for each type of assessment	Medical assessment: ¾ hour Home assessment: 1 hour
Cumming 1999	Assess & reduce home hazards	Occupational therapist	One-on-one	1-hour home assessment & follow-up telephone call	Total about 2 hours

Table 3: Intervention Characteristics continued (2 of 3)

Study	Focus	Providers	Structure	Number of sessions	Provider Contact Time
Day 2002	Improve strength & balance, improve poor vision, & reduce home hazards	Exercise instructors accredited by State-recognized institute & trained for intervention	Group exercise classes	15 weekly 1-hour classes Vision assessment & treatment Home assessment & modification	Classes: 15 hours Vision management: NA Home modification: NA
Hornbrook 1994	Reduce risky behaviors, improve physical fitness & reduce home hazards	BA-level assessor trained for intervention, health behaviorist & physical therapist	Group exercise classes & home visits	4 weekly 1½-hour group sessions (incl. 20 minutes group exercise) Two 15-minute home visits	Classes: 6 hours Home visits: 1½ hours
Li 2001-2002	Improve balance & physical performance	Experienced Tai Chi instructors who followed the classical Yang style	Group classes	1-hour sessions 3 times a week for 26 weeks	Classes: 78 hours
Lord 2003	Increase strength, coordination, balance, & gait & improve ADLs	Trained exercise instructors certified for leading programs for older adults	Group exercise classes	1-hour class 2 times a week for 12 months (four 3-month terms)	Classes: 96 hours
Nikolaus 2003	Assess & reduce home hazards	Home intervention team incl. 3 nurses, a physical therapist, an occupational therapist, a social worker, & a secretary	Home visits	2+ (usually 3-4) home visits, about 1½ hours each visit	Home visits: 8 hours on average
Rubenstein 2000	Increase strength & endurance, improve mobility & balance	Exercise physiology graduate students with on-the-job training or experienced physical therapist	Group exercise classes	1½ -hour class 3 times a week for 12 weeks	Classes: 54 hours

Table 3: Intervention Characteristics continued (3 of 3)

Study	Focus	Providers	Structure	Number of sessions	Provider Contact Time
Tinetti 1994	Identify & modify each participant's fall risk factors	Medication adjustments coordinated w. participant's primary physician; exercise sessions conducted by PT	Varied by type of intervention	Varied by type & number of interventions received	Varied
Wagner 1994	Reduce disability and/or falls by addressing 6 specific risk factors	Specially trained nurse-educator	Home visit with follow-up behavioral intervention	Initial interview 1 to 1½-hours Length & number of subsequent sessions varied by type of intervention(s)	Varied
Wolf 1996	Improve strength, balance, walking speed & physical functioning	Tai Chi master	Group classes w. individual practice at home	25-minute group classes 2 times a week for 15 weeks & 15-min practice at home 2 times a week	Classes: 12 hours

Appendix D

Original Intervention Materials

Appendix D-1 Barnett Materials

Appendix D-2 Wolf Materials

Appendix D-3 Close Materials



Appendix D-1 Barnett Materials



**South Western Sydney Area Health Service
Health Promotion
A Unit of the Division of Population Health**



Falls Prevention Project Stay Safe Stay Active



EXERCISES

1. Warm up



Breathe in deeply through nose, lift arms above head and stretch. Lower arms and breathe out 6 times.

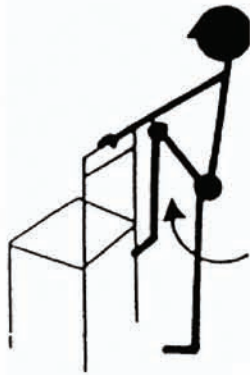
2. Shoulder rolls (Flexibility)



Gently rotate shoulders up to ceiling, backwards, and down. Then reverse; up, forward and down. 6 times each way.

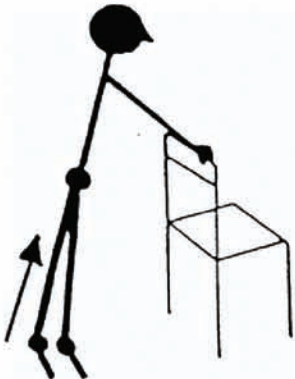
Exercises

3. March on spot (mobility)



Hold onto chair with 2 hands. Walking on the spot. Try to lift knees a bit higher than usual. Step 10 times with each leg.

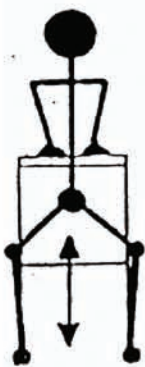
4. Ankle (strength)



Hold onto chair. Rise up onto toes of both feet, hold for 5 seconds, then lower. Keep heels on the floor and lift toes off the floor hold for 5 seconds. Repeat both movements 6 times.

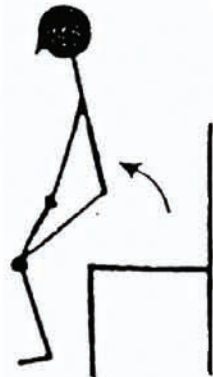
Exercises

5. Knee bend (strength)



Hold on to chair. Stand with knees soft and back straight. Keep knees pointing over toes. Bend your knees gently, and then raise your body by straightening your knees. Do this 6 times.

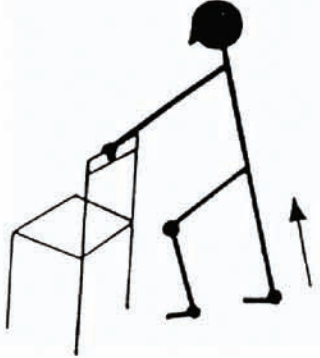
6. Sit to Stand (strength)



Sit in chair against wall. Stand up without using your hands 6 times. If this is too hard use a pillow on the chair to start until you get stronger.

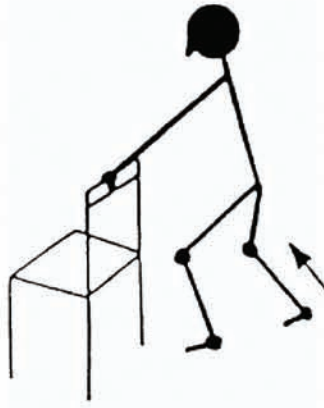
Exercises

7. Calf (stretch)



Hold onto chair; stretch one leg behind, toes facing forward, gently bend front knee until you feel a stretch in your calf. Hold stretch for 10 seconds. Do 6 stretches.

8 Calf (stretch)



Hold onto chair, stretch as in previous picture. When you feel the stretch in your back calf, keep the heel of that foot on the ground, and slightly bend the back knee.

General Information on Exercise

As we age our muscles tend to become less flexible and strong, and our joints become stiffer. This can affect our balance. Exercise is the best way to improve strength and mobility. Greater strength and mobility means you may be able to recover your balance if you lose it, therefore avoiding a fall.

Tips for Exercising

- **Wear comfortable clothes and shoes**
- **Drink some water before and after exercise**
- **Do exercises slowly and gently**
- **If you feel pain STOP that exercise and discuss with your exercise leader or project manager**
- **If you feel breathless or dizzy STOP and rest**

Well done you have now completed all the exercises Exercises. If you have and questions or concerns regarding the exercise program please don't hesitate to contact your gentle exercise leader or the project manager.

Project Manager

Anne Barnett
Health Promotion Unit
Hugh Jardine Building
Locked Mail Bag 7017
Liverpool NSW 1871

Tel. 9828 6008

C 1999

Stage 1 home program - Stay Safe Stay Active: Falls prevention in Primary Care 2001, SWSAHS.

Stay Safe Stay Active Daily Exercise Program

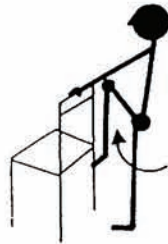
1. Warm up



2. Shoulder rolls (Flexibility)



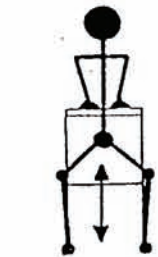
3. March on spot (mobility)



4. Ankle (strength)



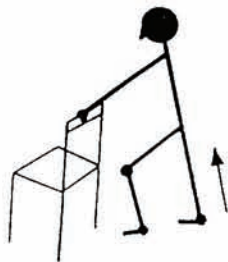
5. Knee bend (strength)



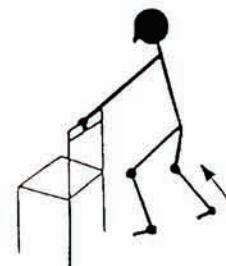
6. Sit to Stand (strength)



7. Calf (stretch)



8. Calf (stretch)

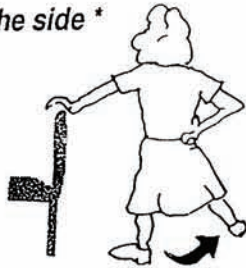


Thank you Sally Castell for your diagrams

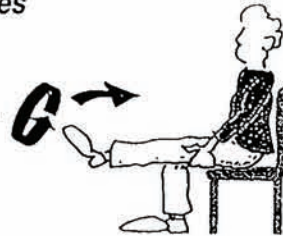
Stay Safe Stay Active

Daily Exercise Program (Stage 2)

1. Hip to the side *



2. Foot Circles *



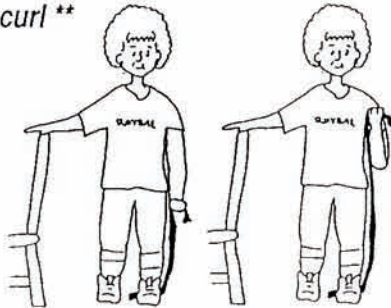
3. Lift leg backwards *



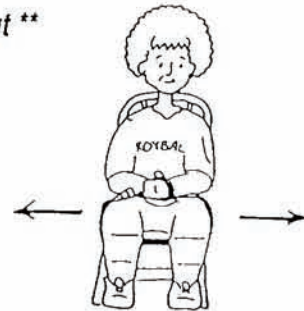
4. Shoulder blade exercises **



5. Arm curl **



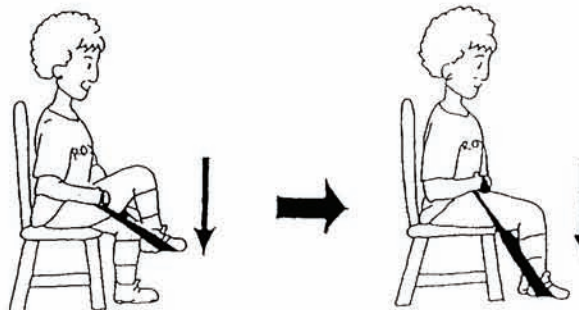
6. Knees in and out **



7. Ankle Pumps **



8. Hip extension **



Thank you to Stay on Your Feet* and Roybal - Boston University** for allowing us to use your diagrams

Tips to Prevent Falling

1 Medications

Discuss with GP or Pharmacist if you feel they may be causing drowsiness or dizziness

2 The environment

Loose rugs, slippery surfaces, unsecured cords, poor lighting especially at night, and spills of water or grease, all increase the risk of falling. Try and clear away clutter, especially where you need to walk, and secure rugs with grippers to the floor. Mop up any spills immediately.

3 Shoes

Wear non-slip shoes that fit well, and have laces or Velcro fastening. Shoes with medium or low heels, which are rounded, are better than high thin heels. Slippers and thongs are not a good idea, as they do not offer enough support. Be careful of wet or slippery surfaces.

4 Hearing

A loss of hearing can cause dizziness and balance problems, see your GP if this occurs. It could be something as simple as a lump of wax.

5 Vision

Adequate lighting is very important, do not forget to turn light on if you get up at night, or keep a nightlight on – keep your glasses by your bed! Bifocals can make going up and down stairs difficult as they alter the perception of where the stair edges are. When walking outside in the sun it is useful to wear a broad rimmed hat, it helps you pick up contrasts on the ground such as steps and edges. Remember to have annual eye tests, as this can detect any changes in your vision.

6 Good diet

Eat a well balanced diet, and don't allow yourself to become too thin.

7 Colds/Sinus

If you have a cold or sinus problems then take extra care as this can affect your balance

8 Walking aid

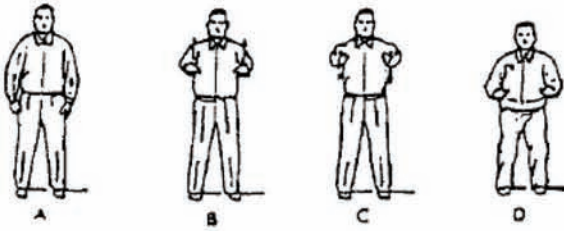
If you use a walking aid, make sure the rubber on the bottom is not worn, and keep it by the bed at night in case you need to get up.

If you do fall in the house do not panic. Stay still for a few minutes to get over the shock. If you are OK try to slide yourself over to a sturdy piece of furniture, sofa, bed or chair and position yourself along side of it. Get into a kneeling position and gradually push yourself up and sit down until you recover. If you are unable to move try and cover yourself with something to keep warm, until help arrives.

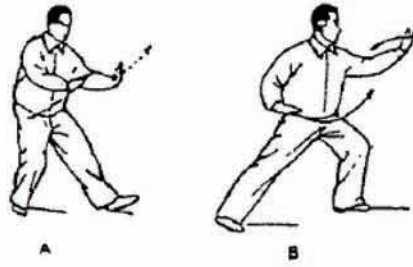
Appendix D-2

Wolf Materials

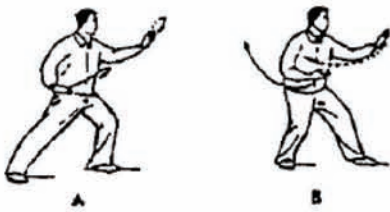
FORM 1. OPENING FORM



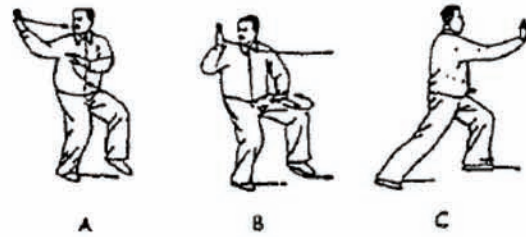
FORM 6



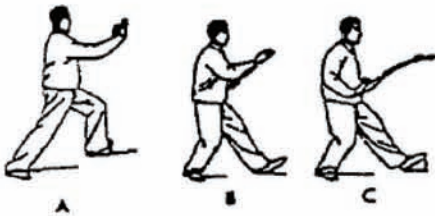
FORM 2



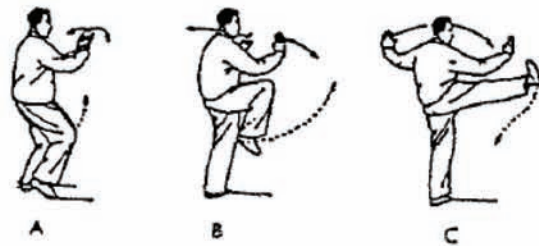
FORM 7



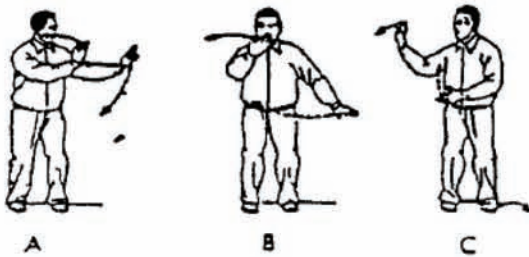
FORM 3



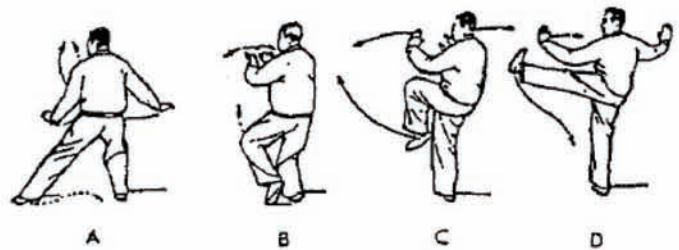
FORM 8



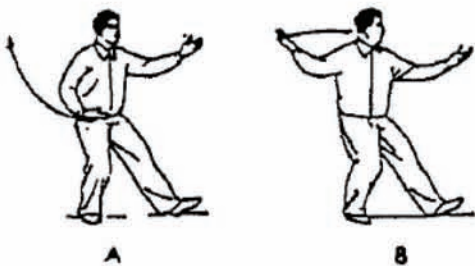
FORM 4



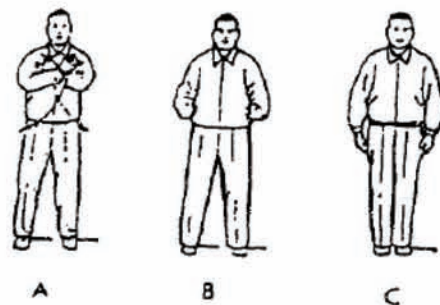
FORM 9



FORM 5



FORM 10



APPENDIX: DIRECTIONS AND THERAPEUTIC ELEMENTS FOR LEARNING 10 FORMS OF TC

FORM 1. Directions

(1) Stand upright with feet shoulder-width apart, toes pointing forward, arms hanging naturally at sides. Look straight ahead (1A).

(2) Raise arms slowly forward to shoulder level, palms down.

The hands do not go above the shoulders and the elbows are held in (1B & 1C).

(3) Bend knees as you press palms down gently, with elbows dropping towards knees. Look straight ahead (1D).

FORM 1. Therapeutic elements 3, 4

This "warmup" form begins with nonstressful bilateral stance where all thoughts other than those about movement clear the head. Attention is directed to relaxing all muscles except those of the legs--the feet are to "stick to the ground." As movement begins, concentration is directed to move all four extremities at the same constant speed that begins and ends concomitantly in the arms and legs.

FORM 2. Directions

The body is turned slightly to the left, with left foot at 9 o'clock for a left bow stance. The left forearm and back of hand are at shoulder level, while right hand is at the side of right hip, palm down. Look at left forearm (2A). Turn torso slight to left (9 o'clock) while extending left hand forward, palm down. Turn torso slightly right while pulling both hands down in a curve past abdomen, until right hand is extended sideways at shoulder level, palm up, and left forearm is across chest, palm turned inward. Shift weight onto right leg. Look at right hand (2B). Turn torso slightly left, palm turned slowly outward, while left hand moves in a curve past abdomen up to shoulder level with palm turned slowly obliquely inward (4B & 4C).

FORM 2. Therapeutic elements 1-7

The trunk and head rotate while both feet remain on floor. The arms move in asymmetrical positions so that the center of mass is extended further from left to right due to arm positions. The trunk and head are kept erect so that rotation is around a central axis. The body weight is predominantly on a flexed leg for greater balance and strength mechanism.

FORM 3. Directions

Look straight ahead; face 9 o'clock with weight on left leg in a bow stance and hands forward at shoulder height in a pushing position (3A). Turn both palms downward as right hand passes over left wrist, moves forward, then to the right until it is on the same level with left hand. Separate hand shoulder-width apart and draw them back to the front of abdomen, palms facing obliquely downward. At the same time, sit back and shift weight onto right leg, slightly bent, raising toes of left foot. Look straight ahead (3B & 3C).

FORM 3. Therapeutic elements 1-4 & 7

The body center of mass moves diagonally posteriorly than other forms with a decreased base of support from only heel contact of the left leg, demanding greater balance and strength than the previous form. The trunk rotation is decreased and the arm movement is symmetrical

FORM 4. Directions

Turn torso to the left (10-11 o'clock), shifting weight to left leg. Move left hand in a curve past face with palm turned slowly leftward, while right hand moves up to the front of left shoulder with palm turned obliquely inward. As right hand moves upward, right foot and left foot are parallel and 10 to 20cm apart. Look at right hand (4A). Turn torso gradually to the right (1 to 2 o'clock), shifting weight onto right leg. At the same time, move right hand continuously to right

FORM 4. Therapeutic elements 1-7

While the legs are symmetrical, weight is shifted laterally. The arms are asymmetrical, the trunk and head rotate with arm movement. Both knees are flexed and weight shifts to the leg on the side to which the arms are moving.

FORM 5. Directions

Turn torso slightly to the right, moving right hand down in a curve past abdomen and then upward to shoulder level, palm up and arm slightly bent. Turn left palm up and place toes of left foot on floor. Eyes first look to the right as body turns in that direction, and then to look at left hand (5A & 5B).

FORM 5. Therapeutic elements 1-7

Again a smaller base of support with the majority of weight on one extremity. The arm on the weight bearing side is curved back into shoulder extension. Done on the right leg and then reversed and done on the left leg. Again trunk rotates at the end of the movement.

FORM 6.Directions

Hold torso erect and keep chest relaxed. Move arms in a curve without stretching them when you separate hands. Use waist as the axis in body turns. The movements in taking a bow stance and separating hands must be smooth and synchronized in tempo. Place front foot slowly in position, heel coming down first. The knee of front leg should not go beyond toes while rear leg should be straightened, forming a 45 with ground. There should be a transverse distance of 10 to 30cm between heels. Face 9 o'clock in final position.

FORM 6. Therapeutic elements 1-7

Hand assumes a position of holding a ball initially. Movements in the form are diagonals and rotations of the trunk and head. Movements slide back and forth in and out of 6A and 6B, and then position is reversed for right and left.

FORM 7. Directions

Turn torso to the right (11 o'clock) as right hand circles up to ear level with arm slightly bent and palm facing obliquely upward, while left hand moves to the front of the right part of chest, palm facing obliquely downward. Look at right hand (7A). Turn torso to the left (9 o'clock) as left foot takes a step in that direction for a left bow stance. At the same time, right hand draws leftward past right ear and, following body turn, pushes forward at nose level with palm facing forward, while left hand circles around left knee to stop beside left hip, palm down. Look at fingers of right hand (7B & 7C).

FORM 7. Therapeutic elements 1-7

This form begins in the position of 7A, but with both feet flat on the floor. They remain on the floor throughout the exercise. Move in and out of the position 7A, B, C, A, B, C, then reverse right-left positions.

FORM 8. Directions

Continue to move hands in a downward-inward-upward curve until wrists come in front of chest, with right hand in front and both palms turned inward. At the same time, draw right foot to the side of left foot, toes on floor. Look forward to the right (8A). Separate hands, turning torso slightly to 8 o'clock and extending both arms sideways at shoulder level with elbows slightly bent and palms turned outward. At the same time, raise right knee and thrust foot gradually towards 10 o'clock. Look at right hand (8B & 8C).

FORM 8. Therapeutic elements 1-7

With the elderly, the kick is only a small part of their available range. The form is utilized for kicking with both dorsiflexion and plantar flexion of the foot. Forms 8 and 9 are the most stressful for maintaining balance due to the small base of support and the extreme movement of the kicking leg. However, forms are done continuously with slow movements and a strong degree of concentration. The range for the kick is not extreme in the elderly.

FORM 9. Directions

Shift weight onto right leg and draw left foot to the side of right foot, toes on floor. At the same time, move both hands in a downward-inward-upward curve until wrists cross in front of chest, with left hand in front and both palms facing inward. Look forward to the left (9A & 9B). Separate hands, extending both arms sideways at shoulder level, elbows slightly bent and palms facing outward. Mean-while, raise left knee and thrust foot gradually towards 4 o'clock. Look at left hand (9C & 9D).

FORM 9. Therapeutic elements 1-7 The same as Form 8 but right and left are reversed.

FORM 10. Directions

Turn palms forward and downward while lowering both hands gradually to the side of hips. Look straight ahead (10A, 10B & 10C).

FORM 10. Therapeutic elements

This is a warm-down form like Form 1 and constitutes both a physical and mental ending of the exercise.

Appendix D-3

Close Materials

Falls Clinic

Day Hospital, Department of Health Care of the Elderly

Name: _____ Hosp No: _____
D.O.B.: _____ GP: _____

Referred from: _____ Date referred: _____
Clinic Dr: _____ Date of clinic: _____

Fall History

First fall: _____ Y / N

No of falls in previous year:

Location of fall: Outdoors /Stairs / Kitchen / Bathroom / Living Room / Bedroom / Other

Was fall witnessed: _____ Y / N

Definite slip/trip: _____ Y / N Associated dizziness: _____ Y / N

LOC: _____ Y / N Palpitations: _____ Y / N

Able to get self off floor: _____ Y / N Time on floor (mins): _____

Injuries sustained from fall _____

Medical History

Full Drug History

Heart disease _____
Stroke _____
COPD/Asthma _____
Hypertension _____
Diabetes _____
Degenerative joint disease _____
Cognitive impairment _____
Visual impairment _____
Syncope _____
Epilepsy _____
Incontinence _____
Other - (please state) _____

Alcohol: _____ units/week

Smoking: _____ cigarettes/day

Social Circumstances

Lives in: Flat / House / Bungalow / WCF / Residential Home / Nursing Home

Lives alone: Y / N

Stairs: Yes / No

Lambeth / Southwark / Other

Usually able to go out: Yes / No

**Mobility: Independent
Stick
Frame
Wheelchair**

**Services: MOW
HH
Personal Care
District Nurse
Day Centre
Day Hospital**

**Carer: None
Spouse
Other family
Friend/neighbour**

Examination

AMT

**Age
Time (to nearest hour)
Address for recall
Year
Location
Recognition of two persons
Date of Birth
WW2
Present monarch
Count backwards 20 – 1**

**Weight: _____ kg
Height: _____ m

Pulse: _____ bpm
regular / irregular

BP sitting:
BP standing:

Visual acuity
R Eye
L Eye**

Score: _____ /10 (If <8 do MMSE)

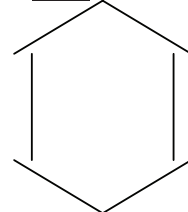
CVS:

**Carotid bruits: Yes / No
Valvular defect: Yes / No
LVF: Yes / No
RHF: Yes / No
CCF: Yes / No**

RS



Abdo



Cranial Nerve Deficit:

Visual Fields: L Eye R Eye



Cataract Formation: Yes / No

Hearing: Normal / Shout / Hearing Aid

PNS:

Tone

R Arm	L Arm
R Leg	L Leg

Reflexes

	R	L
Biceps		
Triceps		
Supinator		
Knee		
Ankle		
Plantars		

Power

Arms

- Shoulder abduction
- Shoulder adduction
- Elbow flexion
- Elbow extension
- Wrist flexion
- Wrist extension
- Finger abduction
- Finger adduction
- Opposition

	R	L

Legs

- Hip flexors
- Hip extensors
- Knee flexion
- Knee extension
- Ankle dorsiflexion
- Ankle plantiflexion

	R	L

Lower limb

- Sensation Intact: Yes / No
- Proprioception intact Yes / No
- Vibration intact Yes / No

Joint deformities

- Hands
- Elbows
- Shoulders
- Spine
- Hips Knees
- Ankles

- Good foot care Yes / No
- Sensible footwear Yes / No

Timed Up and Go: _____secs

MMSE (if indicated) _____/30

GDS – 15 Question Form _____/15

Summary

Likely Cause of Fall

Risk Factors for Falls

Planned investigations and/or modifications

Follow up Arrangements

Referrals

FBC

LFT's

U&E

TFT's

ECG

Vit D

Urinalysis

Signature:

Print

Date:

PROFET – Environmental Assessment

Name:

Number:

			At time of fall	In the home	In the environment
Slip Hazards	1	Liquid/solid spills			
	2	Wet floors			
	3	Incorrect footwear			
	4	Loose mats on polished floors			
	5	Rain, sleet, snow, ice			
	6	Change from wet to dry surface			
	7	Unsuitable floor surface			
	8	Dusty floors			
	9	Sloping surfaces			
Trip Hazards	10	Loose floorboards / tiles			
	11	Loose and worn mats / carpets			
	12	Uneven outdoor surfaces			
	13	Holes / cracks			
	14	Change in surface level – ramps, steps, stairs			
	15	Cables across walking areas			
	16	Obstructions			
	17	Bumps, ridges and protruding nails etc			
	18	Low wall and floor fixtures, door catches, door stops etc.			
Risk Factors	19	Organisation of walkways			
	20	Badly placed mirrors / reflections from glazing			
	21	Poor or unsuitable lighting			
	22	Wrong cleaning regime / materials			
	23	Moving goods, carrying, pushing or pulling a load			
	24	Rushing around			
	25	Distractions			
	26	Fatigue			
	27	Effects of alcohol			
	28	Effects of other drugs			
	29	Other factor (describe)			

Falls Assessment Proforma

Accident & Emergency, Department of Health Care of the Elderly
Falls Specialist Practitioner – Bleep 929 Mon-Fri

Name: _____ Hosp No _____ Attending Dr _____

Date of attendance: _____ Time: _____

Fall History

First fall: _____ Y / N

***No of falls in previous year:** (**>1 = high risk**)

***Location of fall: Indoors / Outdoors** (**(indoors = high risk)**)

Was fall witnessed: _____ Y / N

Definite slip/trip: _____ Y / N Associated dizziness: _____ Y / N

LOC: _____ Y / N Palpitations: _____ Y / N

***Able to get self off floor:** _____ Y / N (**N=high risk**) Time on floor (mins): _____

Medical History

***Full Drug History (4+ meds = high risk)**

Heart disease _____
Stroke _____
COPD/Asthma _____
Hypertension _____
Diabetes _____
Degenerative joint disease _____
Cognitive impairment _____
Visual impairment _____
Syncope _____
Epilepsy _____
Incontinence _____
Other - (please state) _____

Smoking: _____ no/week

Alcohol: _____ units/week

Social Circumstances

Lives in: Flat / House / Bungalow /Maisonette/ WCF / Residential Home / Nursing Home

Lives alone: Y / N Stairs: Yes / No

Lambeth / Southwark / Other Usually able to go out: Yes / No

Mobility: Independent	Services: MOW	Carer: None
Stick	HH	Spouse
Frame	Personal Care	Other family
Wheelchair	District Nurse	Friend/neighbour
	Day Centre	
	Day Hospital	

Examination

GCS: BM
Temp: Pulse: BP; Lying / Standing /

AMT

- Age
- Time (to nearest hour)
- Address for recall
- Year
- Location
- Recognition of two persons
- Date of Birth
- WW2
- Present monarch
- Count backwards 20 – 1

Injuries Sustained

- Head injury – no laceration
- Head injury - laceration
- Fracture _____
- Laceration requiring stitches _____
- Laceration but no stitches _____
- Superficial bruising _____
- No injury

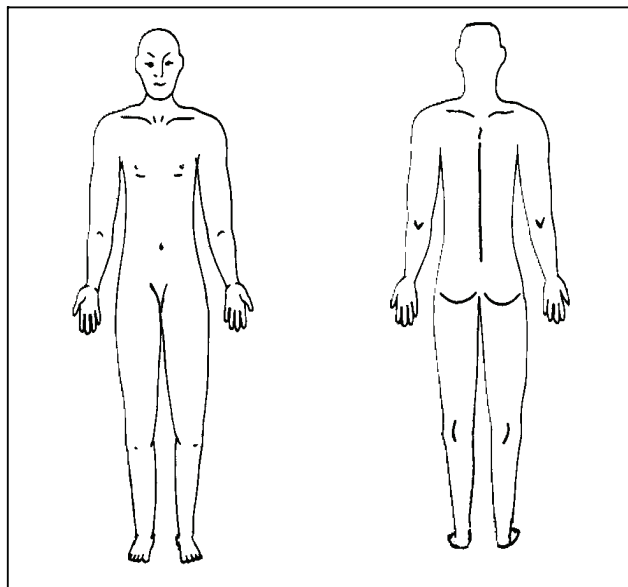
Score: /10

Relevant Systems Examination

Current Level of Function

- No change from pre-fall level of function
- Decreased mobility/function but able to go home
- Decreased mobility/function – unable to discharge

Indicate site of injury including pressure areas



Results

Conclusions

Likely cause of fall: simple slip/trip, acute illness, multifactorial, unexplained

Comments

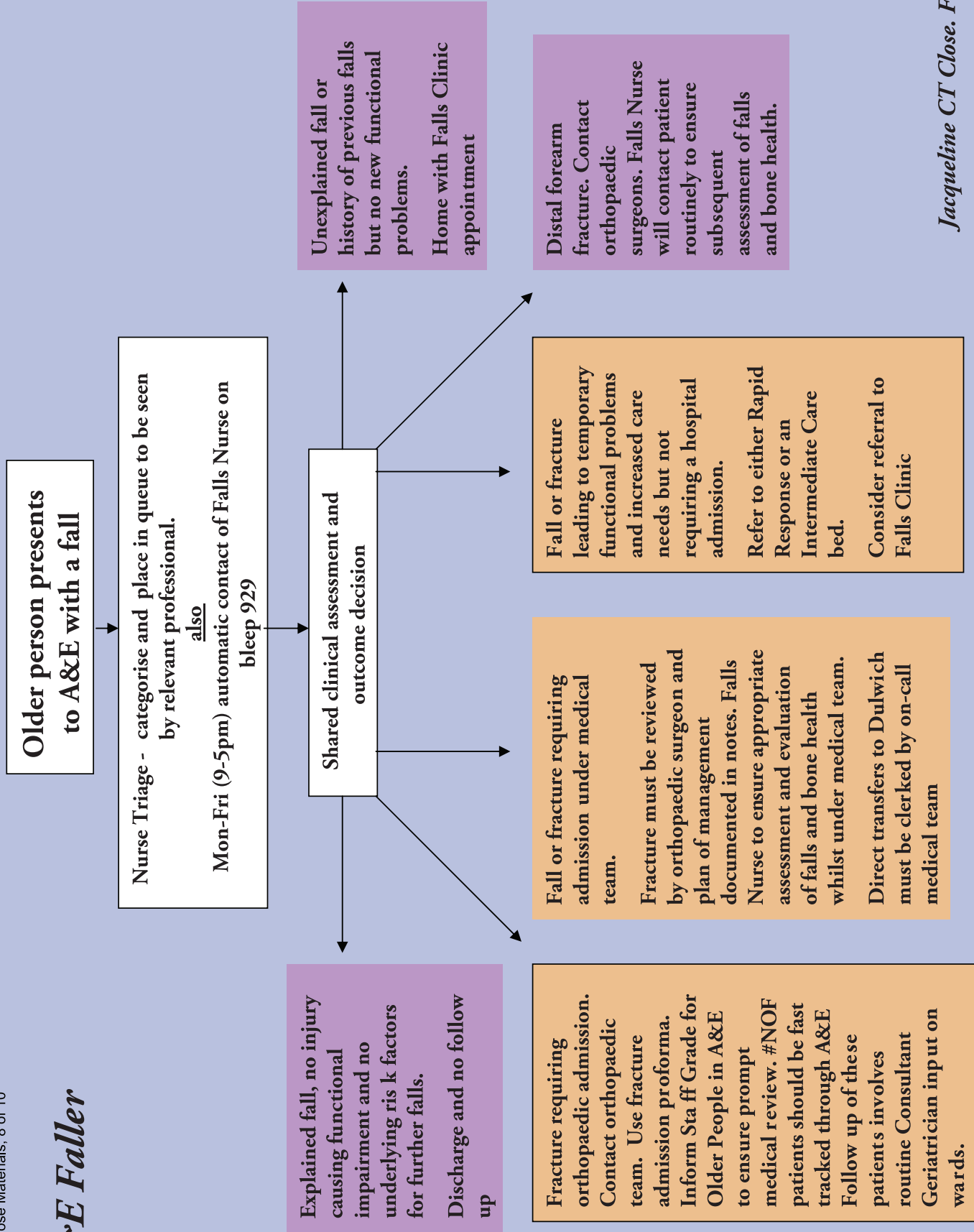
*** High risk – recommend referral to Falls Clinic if Falls Nurse not available to assess**

Outcome:

- Home with GP letter
- Admit to CDU
- Refer to Falls Clinic / Day Hospital
- Refer to Rapid Response
- Refer to DHE (Out-Patients)
- Refer for hospital admission

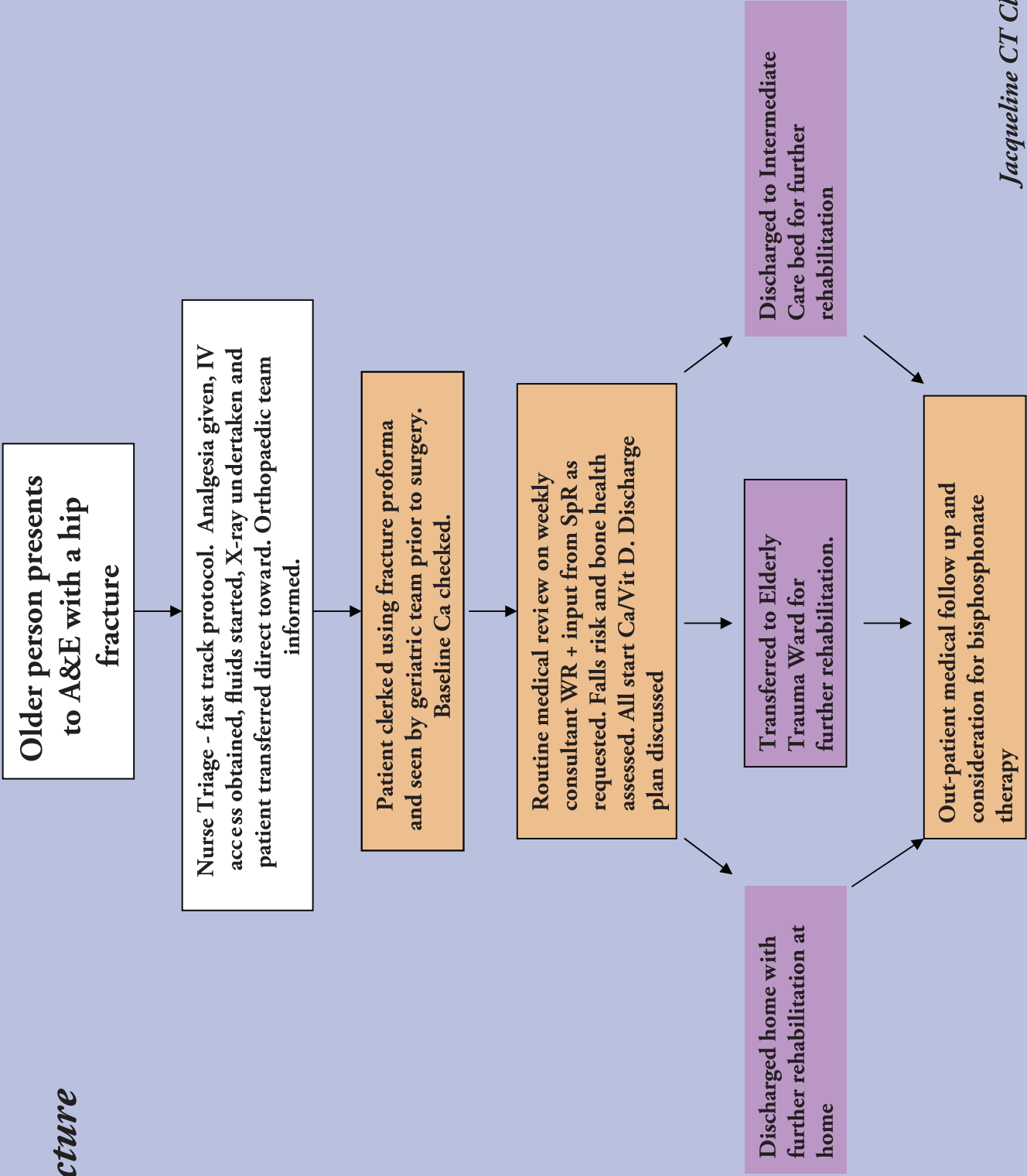
Signature: _____ Print Name: _____ Date: _____

A&E Faller



Jacqueline CT Close. Feb 2003

Hip Fracture



Low trauma distal forearm fracture

