



Meeting 3

Aging

Chair: Loretta DiPietro

Members: David Buchner, Wayne Campbell, Kirk Erickson, Abby King, Ken Powell

Experts and Consultants



- Invited experts:
None

- Consultants: None

Subcommittee Questions



1. What is the relationship between physical activity and risk of injury due to a fall?
2. What is the relationship between physical activity and physical function?
3. What is the relationship between physical activity and risk of frailty?

Question 1

1. What is the relationship between physical activity and risk of injury due to a fall?
 - a) Is there a dose-response relationship? If yes, what is the shape of the relationship?
 - b) Does the relationship vary by age, sex, race/ethnicity, or socio-economic status?
 - c) What type(s) of physical activity are effective for preventing injuries due to a fall?
 - d) What factors modify the relationship between physical activity and risk of injury due to a fall?

Analytical Framework

Systematic Review Question

What is the relationship between physical activity and the risk of injuries from falling?

Target Population

Adults, 50 years and older (Lower age range for included data must be a minimum of 50 years)

Comparison

Adults, 50 years and older, who participate in varying levels of physical activity, including no reported physical activity

Intervention/Exposure

All types and intensities of physical activity

Intermediate Outcomes

- Balance
- BMI
- Bone health
- Disease diagnosis
- Falls
- Functional limitations
- Mobility
- Strength

Endpoint Health Outcomes

- All/Any injuries from falls
- Fractures
- Head injuries
- Intraabdominal injury
- Limitation of daily activities
- Medically attended injury
- Neck, back, and spine injuries
- “Pooled” injuries
- Reduction in routine activities
- Sprains

Key Definitions:

- Fall: The act of moving without control from being upright to not being upright
- Injury from a fall: An injury resulting from a fall
- Risk of injury from a fall: The statistical odds of experiencing an injury from a fall

Inclusion/Exclusion Criteria: High-Quality Reviews¹ and Reports

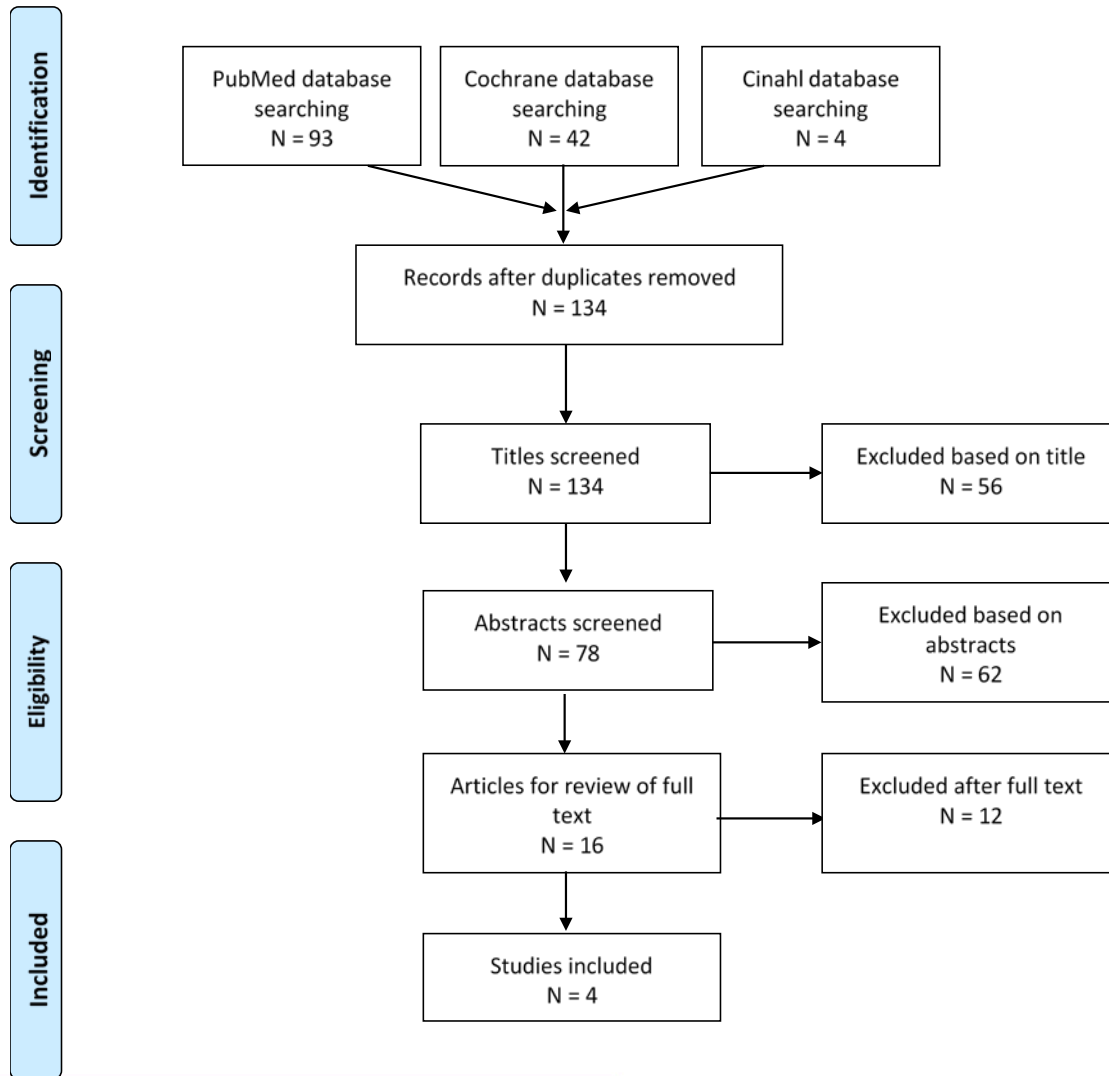
- **Date of Publication**
 - Existing Sources: Include 2006 - Present
- **Study Subjects**
 - Include: Adults, 50 years and older
 - Exclude: Nonambulatory only, Hospitalized only, Athletes only
- **Study Design**
 - Include: Systematic reviews, Meta-analyses, Pooled analyses, PAGAC-Approved reports
 - Exclude: Prospective cohort studies, Retrospective cohort studies, Case-control studies, Randomized controlled trials, Non-randomized controlled trials, Narrative reviews, Commentaries, Editorials, Cross-sectional studies, Before-and-after studies
- **Exposure/Intervention**
 - Include: All types and intensities of physical activity
 - Exclude: Missing physical activity, Single, acute session of exercise, Therapeutic exercise, Physical fitness as the exposure
- **Outcome**
 - Include: All/Any injuries from falls, Fractures from falls, Head injuries from falls, Intraabdominal injury from falls, Medically attended injury from falls, Neck, back, and spine injuries from falls, “Pooled” injuries from falls, Sprains from falls

¹ Reviews include systematic reviews, meta-analyses, and pooled analyses.

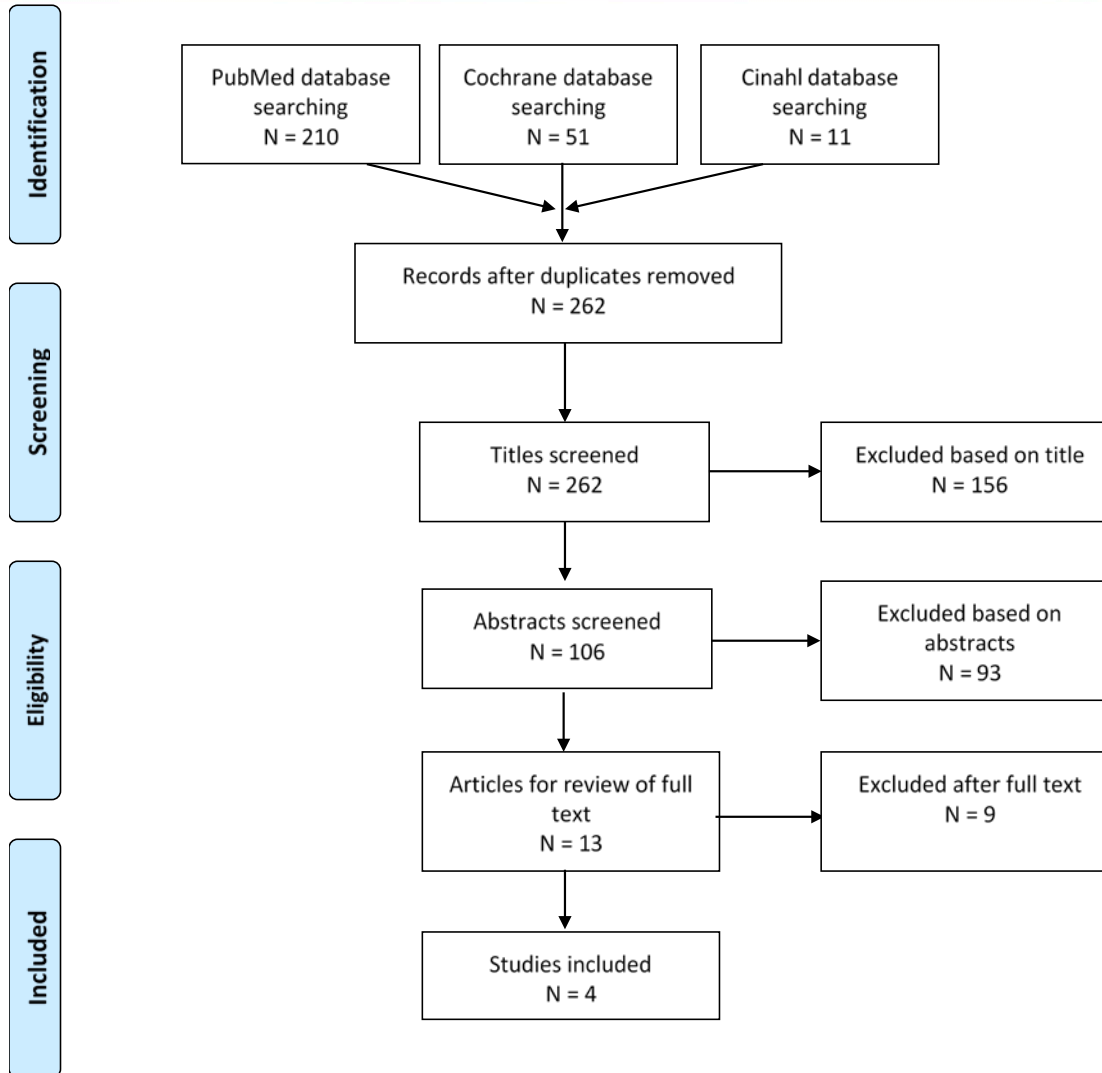
Inclusion/Exclusion Criteria: Original Research

- **Date of Publication**
 - Original Research: Include 2006 - Present
- **Study Subjects**
 - Include: Adults, 50 years and older
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- **Study Design**
 - Include: Prospective cohort studies, Retrospective cohort studies, Case-control studies
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- **Exposure/Intervention**
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- **Outcome**
 - Include: All/Any injuries from falls, Fractures from falls, Head injuries from falls, Intraabdominal injury from falls, Medically attended injury from falls, Neck, back, and spine injuries from falls, “Pooled” injuries from falls, Sprains from falls

Search Results: High-Quality Reviews¹



Search Results: Original Research



Description of the Evidence

- The evidence is based on 4 systematic reviews/meta-analyses of randomized controlled trials (RCTs);
 - El-Khoury, et al., 2013 (17 studies; N=4305 older people)
 - Zhao, et al., 2016 (15 studies; N=3136 older people)
 - Gillespie, et al., 2012 (6 studies; N=810 older people)
 - Ontario Medical Advisory Secretariat 2008 (5 studies, N=972 older people)
- 3 prospective cohort studies;
 - Cauley, et al., 2013 (N=2731 men; mean age 79 y)
 - Heesch, et al., 2008 (N=8188 women; 70-79 y)
 - Linattiniemi, et al. 2008 (N=512; mostly women; ≥85 y)
- 1 case-control study
 - Peel et al., 2006 (N=126 cases and 261 controls; ≥65 y)

Draft Key Findings



- Higher levels of physical activity reduce the risk of injurious falls among older adults in community and home settings;
- The reduction in risk is approximately 32-66% for all injurious falls and 40-66% for fall with fractures;
- Multi-component exercise programs (including various combinations of moderate-intensity balance, strength, endurance, gait, and physical function training, and recreational sports) appear to be important in effectively reducing risk

Draft Key Findings

- Still discussing the evidence with regard to the dose-response relationship
- Limited evidence in low-income, and in minority populations and in men

Draft Conclusion Statement



Conclusion Statement:

Participation in multicomponent group or home-based fall prevention physical activity and exercise programs can reduce the risk of injury from falls, including severe falls, those requiring medical care, and fractures among community dwelling older adults.

- Grade: **Strong**

Committee Discussion

1. What is the relationship between physical activity and risk of injury due to a fall?
 - a) Is there a dose-response relationship? If yes, what is the shape of the relationship?
 - b) Does the relationship vary by age, sex, race/ethnicity, or socio-economic status?
 - c) What type(s) of physical activity are effective for preventing injuries due to a fall?
 - d) What factors modify the relationship between physical activity and risk of injury due to a fall?

Question 2

2. What is the relationship between physical activity and physical function?
 - a) Is there a dose-response relationship? If yes, what is the shape of the relationship?
 - b) Does the relationship vary by age, sex, race/ethnicity, or socio-economic status?
 - c) What type(s) of physical activity are effective for improving or maintaining physical function?
 - d) What factors modify the relationship between physical activity and physical function?
- Source of evidence to answer question: TBD

Analytical Framework

Systematic Review Question

What is the relationship between physical activity and physical function?

Target Population

Adults, 50 years and older (Lower age range for included data must be a minimum of 50 years)

Comparison

Adults, 50 years and older, who participate in varying levels of physical activity, including no reported physical activity

Intervention/Exposure

All types and intensities of physical activity

Endpoint Health Outcomes

- Physical function
- Functional ability
- Move around
- Behavioral ability
- Behavioral disability
- Functional limitations
- Loss of physical function
- Physical disability
- Physical intrinsic capacity

Key Definitions:

- “Physical function” and “physical functioning” are regarded as synonyms that refer to: “the *ability* of a person to move around and to perform types of physical activity.”
- For example, measures of physical function include measures of ability to walk (e.g., usually gait speed), run, climb stairs, carry groceries, sweep the floor, stand up, and bath oneself.
- As measures of behavioral abilities, physical function measures do not include:
 - Physiologic measures, including measures of physiologic capacity (e.g., maximal lung capacities, maximal aerobic capacity, maximal muscle strength, bone density).
 - Measures of the environment or of the host-environmental interaction (e.g., disability accommodation).
 - Measures of what a person usually does (e.g., physical activity level) (as opposed to what a person is capable of doing).

Common Inclusion/Exclusion Criteria



- Language
 - Exclude: Studies that do not have full text in English
- Publication Status
 - Include: Studies published in peer-reviewed journals, PAGAC-approved reports
 - Exclude: Grey literature
- Study Subjects
 - Exclude: Studies of animals only

Inclusion/Exclusion Criteria



- **Date of Publication**
 - Original Research: Include 2006 - Present
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- **Study Subjects**
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- **Exposure/Intervention**
 - Include: All types and intensities of physical activity
 - Exclude: Missing physical activity, Single, acute session of exercise, Therapeutic exercise, Physical fitness as the exposure, Only used as confounding variable
- **Outcome**
 - Include: Physical function, functional ability, move around, behavioral ability, behavioral disability, functional limitations, loss of physical function, physical disability, physical intrinsic capacity

Search Terms: Physical Activity

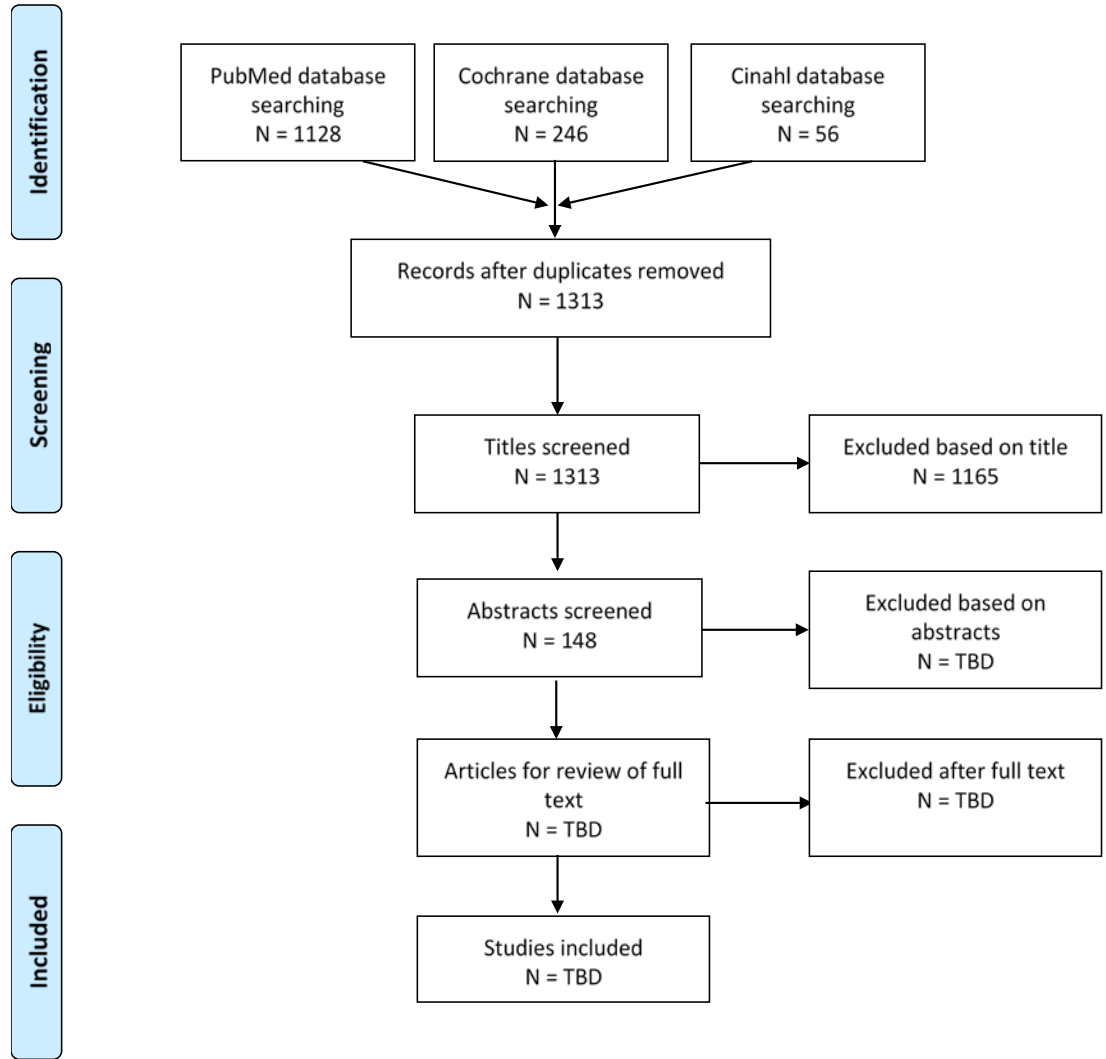


- Aerobic Activity (ies)
- Cardiovascular Activity (ies)
- Chi Kung
- Endurance Activity (ies)
- Exercise
- Functional Training
- Physical Activity (ies)
- Physical Conditioning
- Qi gong
- Recreational activity (ies)
- Resistance training
- Strength training
- Sedentary
- Sedentary lifestyle
- Stretching
- Tai Ji
- Walk (ing)
- Yoga

Search Terms: Outcome

- Activity(ies) of daily living
- Chair stands
- (Functional AND Physical)
- Gait speed
- Health related quality of life
- Health status
- HRQOL
- Mobility
- Physical ability
- Physical disability
- Physical function
- Physical functioning
- Physical performance
- Tandem walk
- Walking speed

Search Results: High-Quality Reviews¹



Committee Discussion

2. What is the relationship between physical activity and physical function?
 - a) Is there a dose-response relationship? If yes, what is the shape of the relationship?
 - b) Does the relationship vary by age, sex, race/ethnicity, or socio-economic status?
 - c) What type(s) of physical activity are effective for improving or maintaining physical function?
 - d) What factors modify the relationship between physical activity and physical function?

Additional Prioritized Questions



3. What is the relationship between physical activity and risk of frailty?