Research update

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Discover — Conquer — Cure

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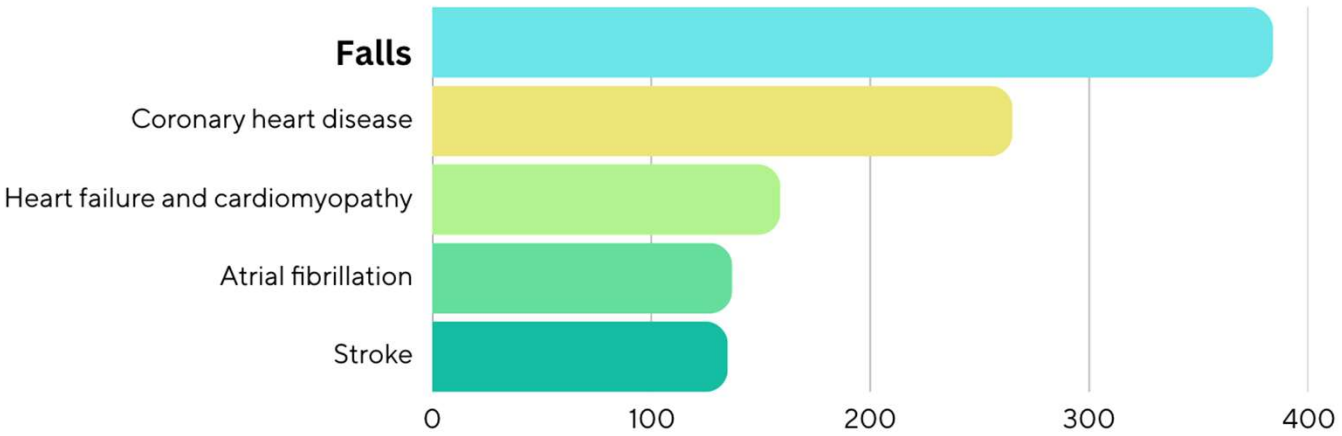
New numbers from AIHW

NUMBER OF HOSPITALISATIONS IN PEOPLE AGED 65+ PER DAY BY CAUSE



Source: AIHW National Mortality Database and ABS National, state and territory population (2021-22)

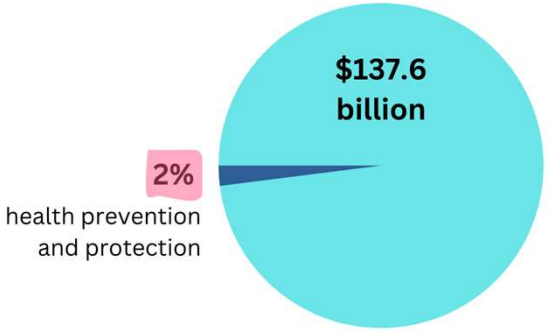
EVERY 3 MINUTES, 1 PERSON AGED 65+ IS HOSPITALISED BECAUSE OF A FALL

Sources: AIHW National Mortality Database and ABS National, state and territory population

COST OF FALLS IN THE OLDER POPULATION

Health system spending on falls in Australians aged 65 and over in 2022–23 was $2,999,633,031
Source: AIHW disease expenditure database

2023–2024 BUDGET ALLOCATIONS FOR HEALTH, AGED CARE AND SPORT



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NSW Fall Prevention & Healthy Ageing Network

AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Preventing Falls and Harm from Falls in Older People: Best Practice Guidelines ~~2009~~ 2025

COMMUNITY

Exercises: for all older people (1A)

- **community exercise or safe home exercise** "lower" risk (e.g. < 1 fall/year) (1A)
- **individualised programs**: **increased risk** (e.g., 1+ fall/year) (1A)
- **cognitive impairment:** support (1B)

For those at higher risk:

- **Home and community safety education + exercise** if higher risk (1-2 falls/year)
- **Home safety interventions from occupational therapist** if increased risk (1A)
- **Tailored interventions after individualised assessment from health professional** 2+ falls/year (1B)

Single interventions for those with particular risk factors.

- **cataract surgery** (1A)
- **multifaceted podiatry interventions:** foot problems or disabling foot pain (1A)
- **cardiac pacemaker:** cardio inhibitory carotid sinus hypersensitivity (2B)
- **minimise psychoactive medications & other fall risk increasing drugs** (2B)
- **single-lens distance glasses** (2B)
- **care after change in spectacle prescription** (2B)
- **vitamin D supplements** daily or weekly if deficient vit D or little sunlight (1B)
- **bone protective treatments** if osteoporosis or low-trauma fractures (1A)

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HOSPITAL

- **Tailored education** (1B)
- **Personalised multifactorial fall prevention intervention** (2B)
- Calculating fall risk score is not necessary (2B)
- **After hip fracture: geriatric orthopaedic care** (1B)
- **Home safety interventions** (1A)

AGED CARE

- **Multifactorial fall prevention (1A)**
- **Exercise: tailored supervised ongoing (1B)**
- **Dairy foods: adequate provision (1B)**
- **Vitamin D: daily or weekly (1A)**
- **Bone protective treatments (1A)**
- **Hip protectors (2A)**

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Research update

Fall risk screening

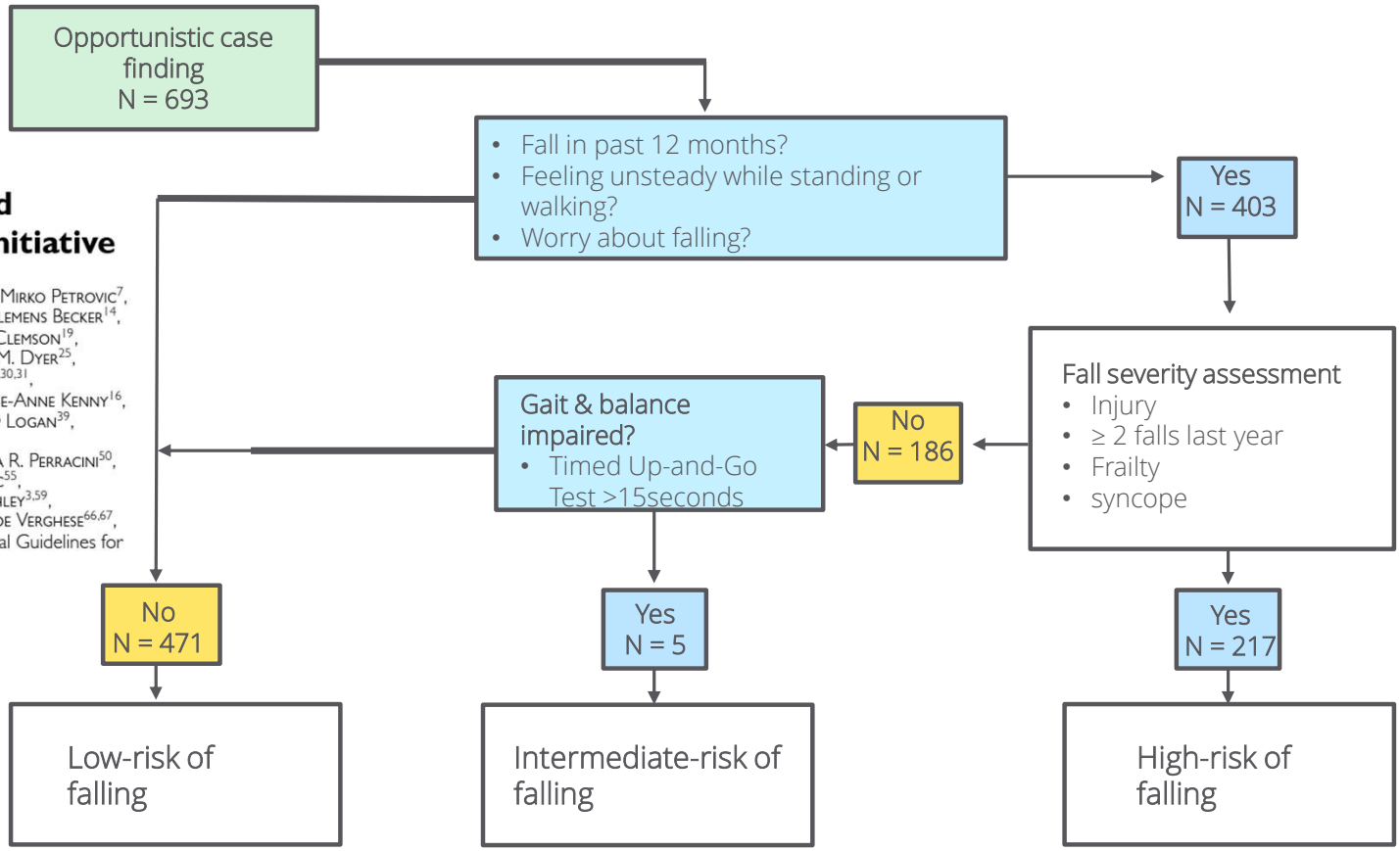
World Falls Guidelines algorithm

GUIDELINE

World guidelines for falls prevention and management for older adults: a global initiative

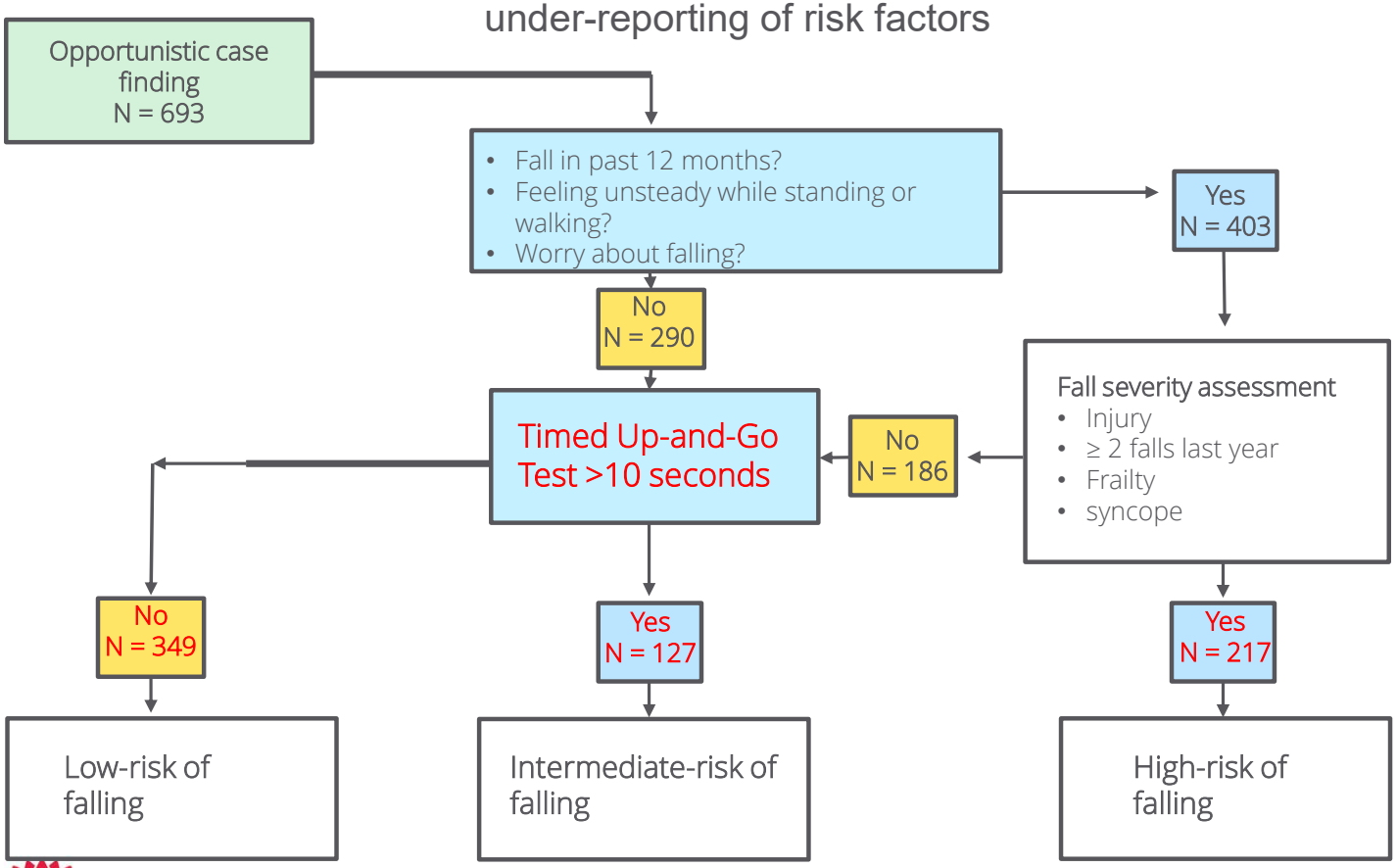
Manuel Montero-Odasso[1,2,3,†], Nathalie van der Velde[4,5,†], Finbarr C. Martin[6], Mirko Petrovic[7], Maw Pin Tan[8,9], Jesper Ryg[10,11], Sara Aguilar-Navarro[12], Neil B. Alexander[13], Clemens Becker[14], Hubert Blain[15], Robbie Bourke[16], Ian D. Cameron[17], Richard Camicioli[18], Lindy Clemson[19], Jacqueline Close[20,21], Kim Delbaere[22], Leilei Duan[23], Gustavo Duque[24], Suzanne M. Dyer[25], Ellen Freiberger[26], David A. Ganz[27], Fernando Gómez[28], Jeffrey M. Hausdorff[29,30,31], David B. Hogan[32], Susan M.W. Hunter[33], Jose R. Jauregui[34], Nellie Kamkar[1], Rose-Anne Kenny[16], Sarah E. Lamb[35], Nancy K. Latham[36], Lewis A. Lipsitz[37], Teresa Liu-Ambrose[38], Pip Logan[39], Stephen R. Lord[40,41], Louise Mallet[42], David Marsh[43], Koen Milisen[44,45], Rogelio Moctezuma-Gallegos[46,47], Meg E. Morris[48], Alice Nieuwboer[49], Monica R. Perracini[50], Frederico Pieruccini-Faria[1,2], Alison Pighills[51], Catherine Said[52,53,54], Ervin Sejdic[55], Catherine Sherrington[56], Dawn A. Skelton[57], Sabestina Dsouza[58], Mark Speechley[3,59], Susan Stark[60], Chris Todd[61,62], Bruce R. Troen[63], Tischa van der Cammen[64,65], Joe Verghese[66,67], Ellen Vlaeyen[68,69], Jennifer A. Watt[70,71], Tahir Masud[72], the Task Force on Global Guidelines for Falls in Older Adults[‡]

Age Ageing, Vol 51:9, September 2022.



Modifications

- Reducing the cut point for Timed Up-and-Go test to >10seconds
- Providing a mobility assessment to all people to reduce under-reporting of risk factors



	Low risk n = 349	Inter-mediate risk n = 127	High risk n = 217
Fallers	36%	32%	63%
Multiple Fallers	14%	15%	33%

	Fall Rate, Inter Rate Ratio (95% CI)
Low vs high	2.49 (1.96–3.16)
Intermediate vs High	2.04 (1.47–2.84)
Low vs intermediate	1.22 (0.86–1.73)

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Cameron Hicks, et al

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Preventing Falls and Harm from Falls in Older People: Best Practice Guidelines ~~2009~~ 2025

COMMUNITY

Lower risk: 0 falls/ year	• Community and/ or home exercise, targeting balance and functional strength
Moderate risk: 1-2 falls/ year	• Individualised exercise for all • Home & community safety education plus exercise. • Indicated single interventions: cataract surgery, eyewear, medicines review, Vit D, podiatry, home safety, pacemaker
Higher risk: 2+ falls/ year	• Individualised exercise for all • Tailored interventions as indicated: cataract surgery, eyewear, medicines review, Vit D, podiatry, home safety, pacemaker, assistive devices, and strategies to address concerns about falling, anxiety, depression and cognitive impairment.

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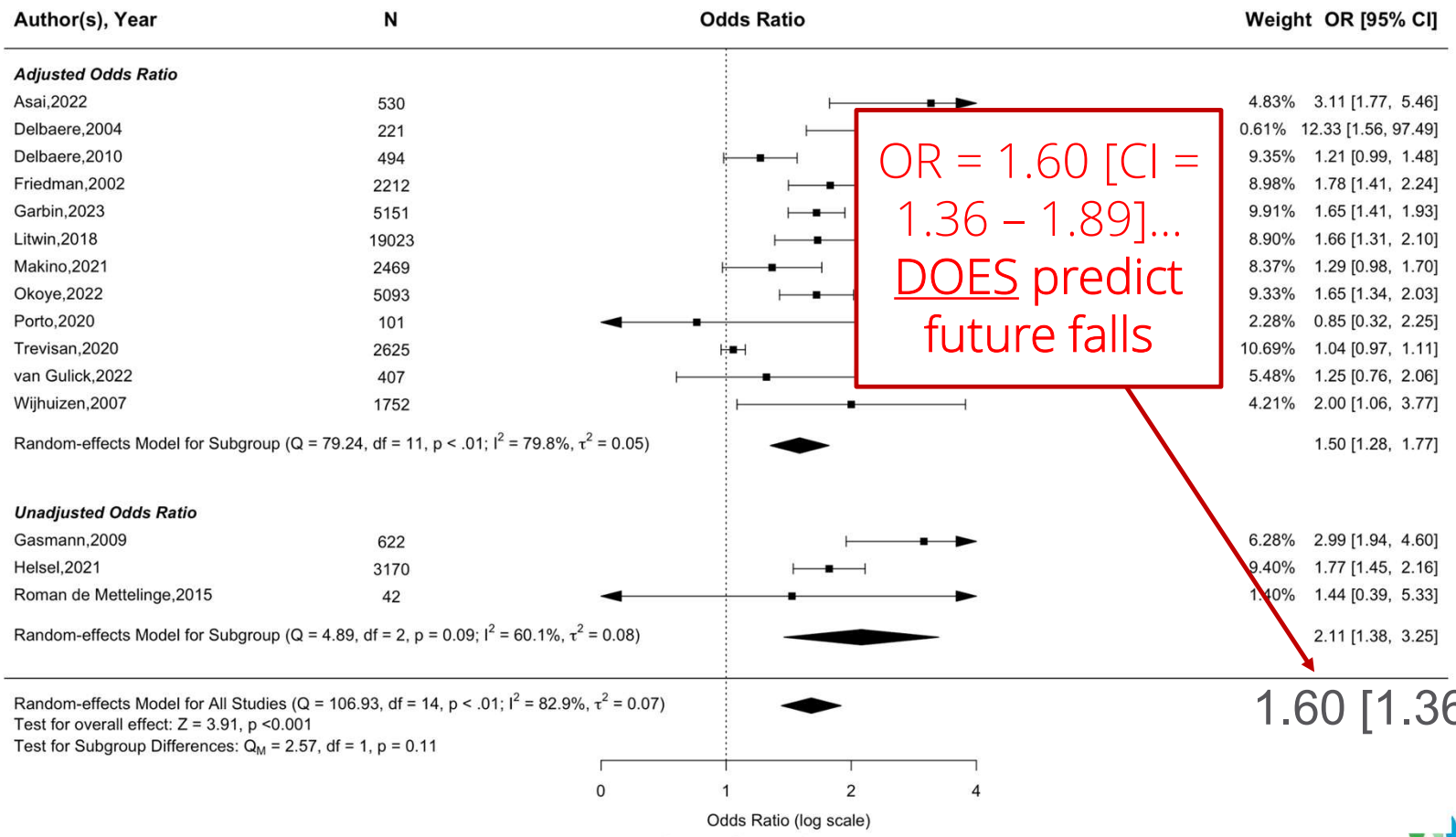
Does concern about falling predict future falls?



Research update

Fall Prevention

Population-level approaches


Cochrane Library

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Access provided by: NHMRC National Cochrane Australia | Review language : E

Title Abs

Cochrane Reviews | Trials | Clinical Answers | About | Help

Cochrane Database of Systematic Reviews | Review - Intervention

Population-based interventions for preventing falls and fall-related injuries in older people

Sharon R Lewis, Lisa McGarrigle, Michael W Pritchard, Alessandro Bosco, Yang Yang, Ashley Gluchowski, Jana Sremanakova, Elisabeth R Boulton, Matthew Gittins, Anneliese Spinks, Kilian Rapp, Daniel E MacIntyre, Roderick J McClure, Chris Todd Authors' declarations of interest

Version published: 05 January 2024 Version history

Strong evidence

- from 600+ clinical trials
- summarised over 12 Cochrane reviews

that 20% to 30% of falls are preventable.

defined as *coordinated, community-wide, multi-strategy initiatives, for reducing fall-related injuries among older people*

- 6 studies met the criteria for inclusion, no randomised controlled trials
- relative reduction in fall-related injuries ranged from 6% to 33%
- very low-certainty evidence

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Population-level approaches

Stepping On: a scaled-up falls prevention program

- Study 1. Lasting impacts of *Stepping On* participation reported for exercise and walking behaviour in a survey of 291 participants 6 months after completion.
- Study 2. No indication of reduced state-wide fall-related ambulance use or hospital admissions was seen from the delivery of the program to 10,000 eligible people. Ambulance call-outs for falls in people aged 75-84 years may have reduced following program participation.
- Study 3. Initial program benefits for health service usage that tapered off over time were observed in an analysis of 3 years of service use before and after program participation in 9163 Stepping On program participants.
- Study 4. *Stepping On* appeared to mitigate participants' rising fall-related health service use in a comparison between 1452 *Stepping On* participants and 5799 controls from the *45 and Up* study.

Remote Exercise Programs

nature medicine

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Article | Published: 16 January 2024

Exergame and cognitive training for preventing falls in community-dwelling older people: a randomized controlled trial

Daina L. Sturnieks ✉, Cameron Hicks, Natassia Smith, Mayna Ratanapongleka, Jasmine Menant, Jessica Turner, Joanne Lo, Carly Chaplin, Jaime Garcia, Michael J. Valenzuela, Kim Delbaere, Robert D. Herbert, Catherine Sherrington, Barbara Toson & Stephen R. Lord

Nature Medicine **30**, 98–105 (2024) | Cite this article

- Aged 65+ (*n* = 769, 71% female) independent community living
- Randomised to one of three arms.
- Reduced rate of falls over 12 months by 26% with step training
- Not statistically different for cognitive training

Remote Exercise Programs

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Research

E-health StandingTall balance exercise for fall prevention in older people: results of a two year randomised controlled trial

BMJ 2021 ; 373 doi: https://doi.org/10.1136/bmj.n740 (Published 06 April 2021)
Cite this as: *BMJ* 2021;373:n740

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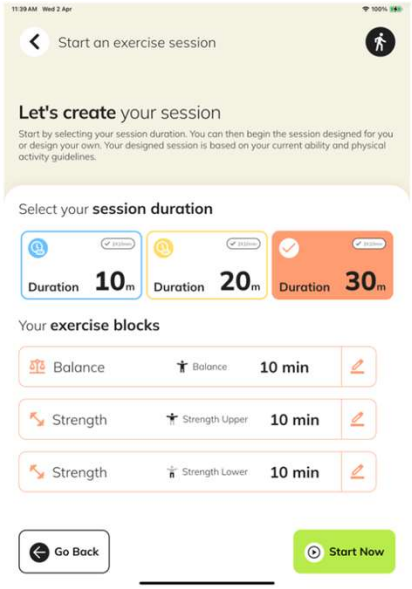
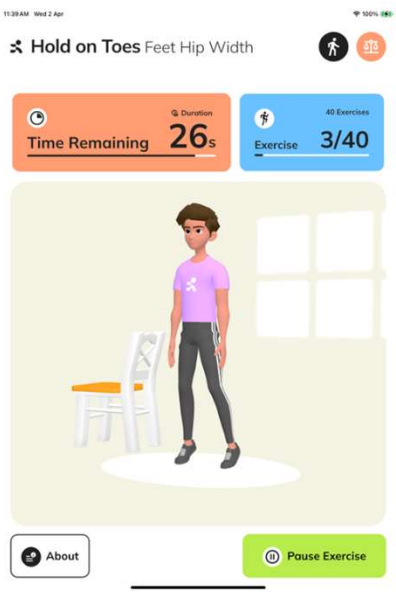
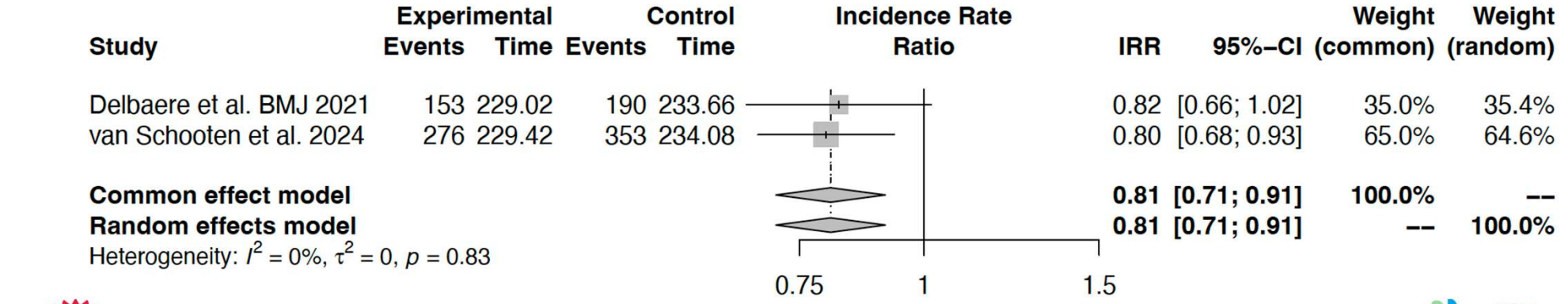
Thomas Lung, senior research fellow[3 7],Ashley Woodbury, research assistant[1],Jessica Chow, research assistant[1],
Garth McInerney, research assistant[1],Lillian Miles, research assistant[1],Barbara Toson, senior research fellow[1 8],
Nancy Briggs, senior statistical consultant[9],Kimberley S van Schooten, senior postdoctoral fellow[1 2]







Remote Exercise Programs

TOP UP key intervention components

10 Physio telehealth sessions over 6 months over Zoom

2 hours of exercise per week supported by online exercise

Progressive, tailored balance and strength moderate-intensity exercise (Otago informed)

Care staff (coaches) support participants one hour per week

Outcome	Definition	Result
Reach	Proportion of participants successfully recruited	18%
Feasibility	Proportion of participants completing intervention	77%
Safety	Description of adverse events	1 fall
Mobility	Change in the Short Physical Performance Scale (0-12)	2.1 points (95% CI 1.4 to 2.7)
Falls	Reduction in amount of people who fell	RaR: 0.62 (95% CI 0.42 to 0.92)
Pain	Change in pain as measured on VAS (0-10)	-1.1 points (95% CI -1.8 to -0.3)
Quality of life	Change in EQ-5D-5L VAS (0-100)	6.24 points (95% CI 1.17 to 10.7)
Exercise dose	Amount of strength and balance exercise	1.7 hours (95% CI 1.1 to 2.3)
Acceptability	Participants recommend TOP UP to others	94%

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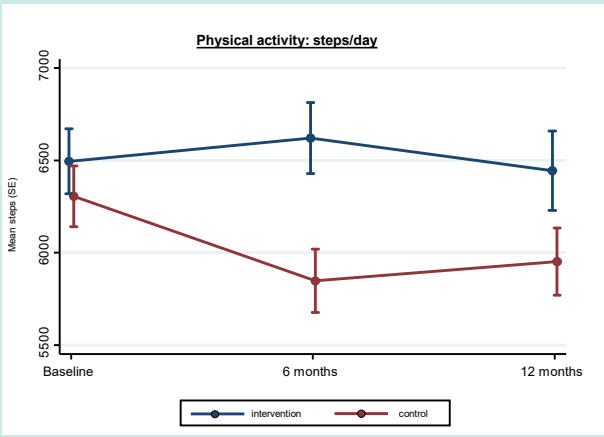
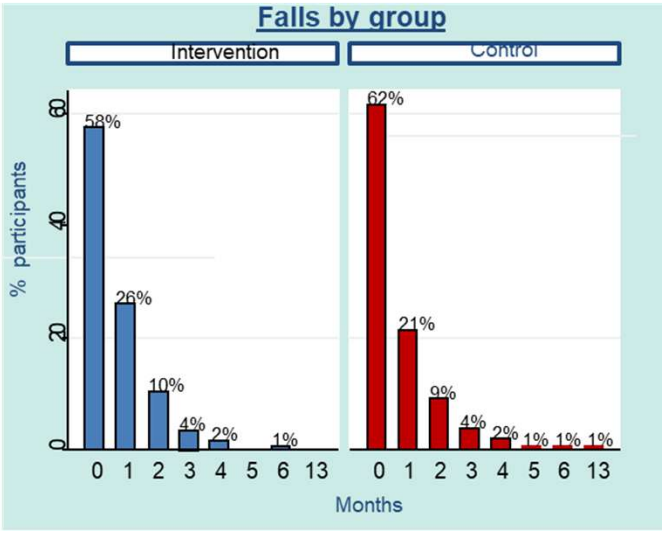
Remote Exercise Programs

- Increases in general physical activity may bring an increased risk of falls due to the exposure to additional hazards.
- Important to promote fall prevention alongside physical activity?

Fall prevention and physical activity plan

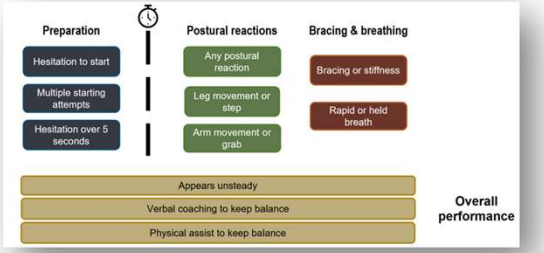
- Physical activity significantly higher in intervention group at 6 months (mean difference 649 steps/day) and 12 months (MD 460 steps/day).
- Lower fall rate in intervention group (0.71 falls per person/year) versus control group (0.87 falls per person/year); however not statistically significant (IRR 0.86, 95% CI 0.6 to 1.1).





Balance Intensity Scale (Farlie et al., 2019)

Hierarchy of observable markers



Physical assist

Verbal coaching

Hesitation over 5 seconds

Multiple starting attempts

Leg movement or step

Rapid or held breath

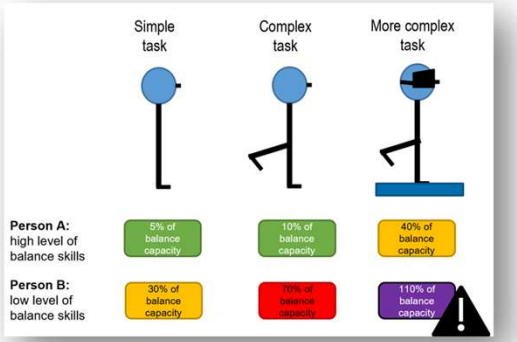
Arm movement or grab

Hesitation to start

Appears unsteady

Bracing or stiffness

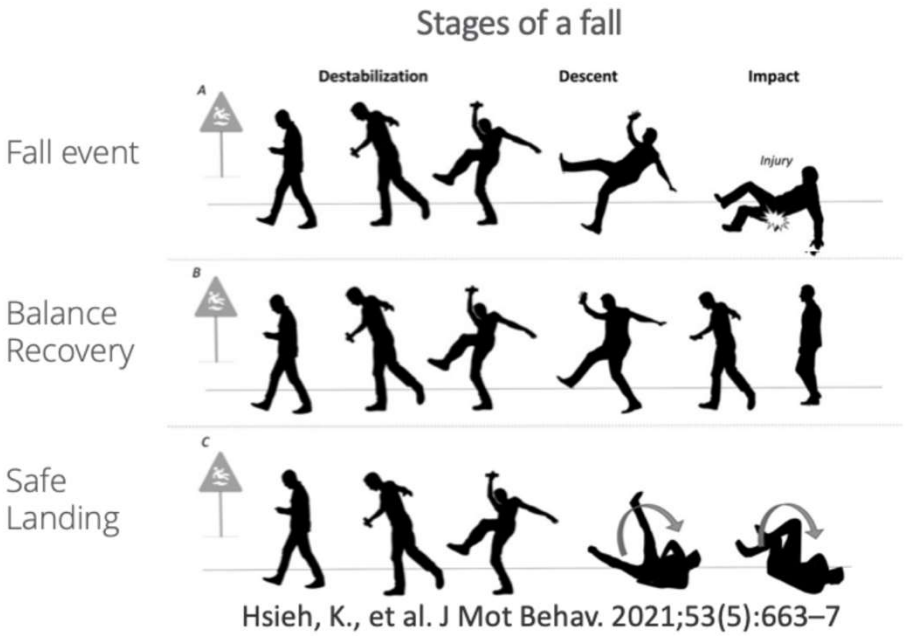
Any postural reaction



Low intensity → Moderate intensity → High intensity

Simulation-based training

Evidence for Safe Landing Strategies (Steven Phu, Mini-Review 2025)

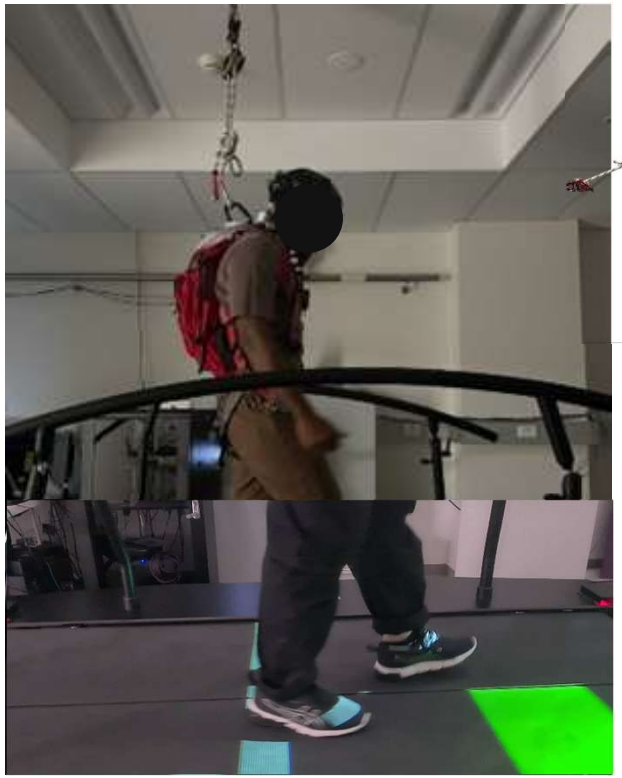


Hsieh, K., et al. J Mot Behav. 2021;53(5):663–7

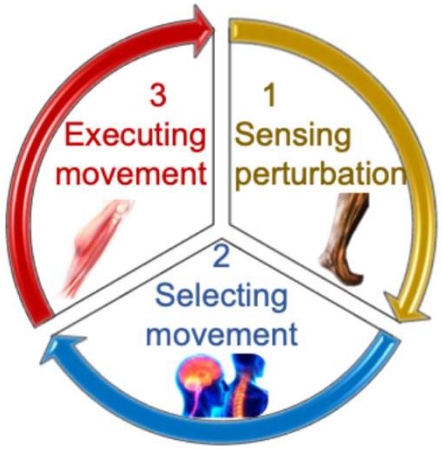
- Safe landing techniques, particularly those derived from martial arts, can be learned in an effective manner to reduce impact forces among older people
- Safe landing techniques may complement proven interventions such as balance and functional strength exercises to deliver a comprehensive approach to reducing fall-related injuries
- Further evidence required to determine:
  - The real-world effectiveness of safe landing techniques on fall-related injuries in the long-term
  - The ideal population for training safe landing
  - Ideal training protocols for safe landing across different directions

Simulation-based training

Gait adaptability



Perturbation



Virtual Reality

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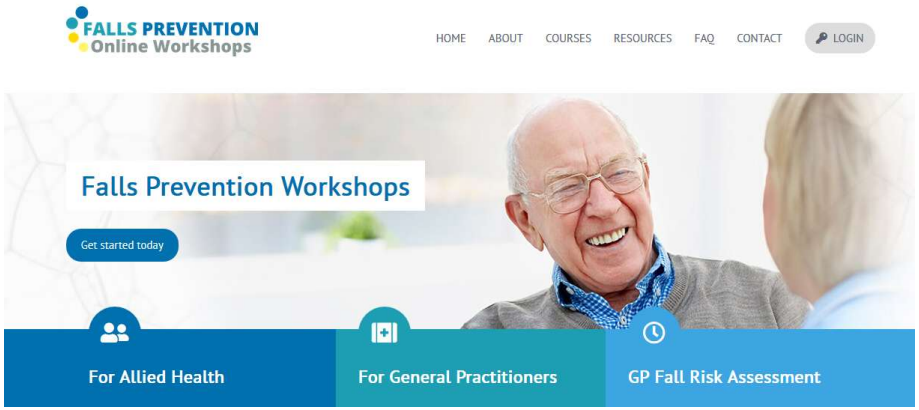
Medical and caregiver training

iSolve

- GPs changed practice - provided a structure
- Both intervention and control patients engaged in fall prevention activities – embedded trial contamination
- GPs were receptive to fall prevention
- AHPs were active in fall prevention – enhanced the nature of their practice but not frequency



Change strategy	Description
Environmental Restructuring	• Decision tools • Efficient and simple system • Can be used repeatedly • Embedded within GP software or paper based
Training and skills	• Up to date knowledge and resources • Case-based learning – face to face or on-line module?
Enablement	• Linking and mapping AHPs • Communication and networking
Relationships	• Having the conversation - patient • AHP 'you are not alone'
Reflective motivation	• Broaden focus to prevention
Modeling	• Videos with key messages, roles
Incentives	• Funding options • Easy access to on-line training module/decision tool/skilled AHPs • CPC audit points

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Medical and caregiver training

Caregiver training

App Features:

- Seven modules focused on different home areas (living room, kitchen, bathroom, etc.).
- Delivered via video, images, audio, and text.
- Included interactive quizzes (50% pass required to progress).
- Designed with user-friendly features for ease of use by caregivers.

Control Brochures:

- Similar educational content but no digital interactivity, monitoring, or reinforcement.

- A randomised controlled trial involving 62 older caregivers (31 per group).
- Used over 4 weeks, with remote monitoring and mid-program follow-up calls.
- The Home Safety Self-Assessment Tool (HSSAT) was used pre- and post-intervention to measure accident risk management across seven home zones.
- App significantly improved accident risk management in homes, more so than brochures.
- Interaction (time × group): $F(1, 60) = 6$, $p = 0.015$, Partial $\eta^2 = 0.095$.

STOPPFall:
A consensus list of FRIDs and deprescribing tool

- Benzodiazepines
- Benzodiazepine-related drugs
- Antiepileptics
- Antipsychotics
- Antidepressants
- Opioids
- Alpha-blockers used as antihypertensives
- Diuretics
- Central antihypertensives
- Vasodilators used in cardiac diseases
- Anticholinergics
- Urinary frequency and incontinence medication
- Antihistamine
- Alpha-blockers for prostate hyperplasia

- Withrawal when & how?
- Follow-up?
- Monitoring for symptoms?

Link to the tool

SCAN ME

Seppala et al. 2020. Age Ageing.

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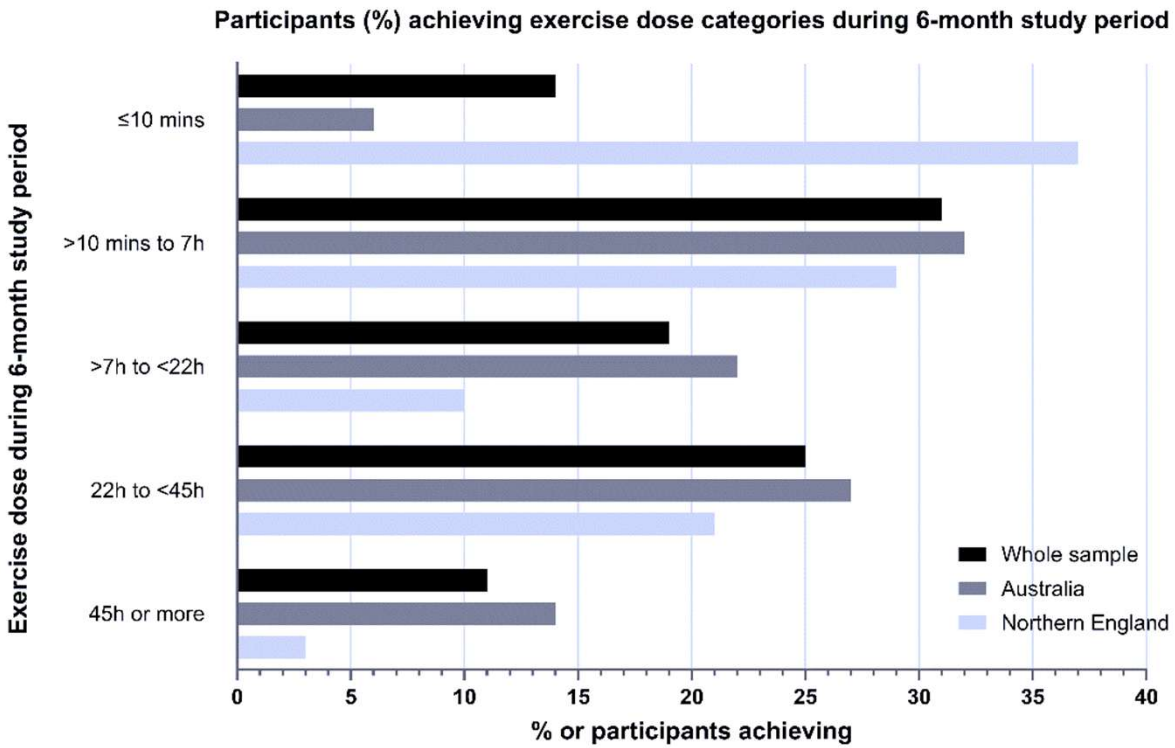
Population-level approaches

The implementation challenge for digital interventions …



Facilitators:

- Evidence-based and user-friendly design
- Affordable with improved accessibility, allowing home use, especially during restrictive periods like the COVID-19 pandemic.
- Aligns with internal motivations for fall prevention and complements existing healthcare services, offering a smooth transition from supervised programs.

Barriers:

- Personal challenges such as health issues and competing commitments
- Technical and equipment requirements pose challenges for those with limited resources or digital literacy.
- Initial hesitancy due to being a research project rather than a readily available solution.
- Successful adoption requires broad support across all levels of healthcare and government, often constrained by resource limitations.

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Key Take Aways and Future Research Directions

- 20–30% of falls can be prevented with targeted, evidence-based strategies
- Population-level interventions lack robust RCTs; current evidence is low-certainty
- Integration into clinical workflows remains a major implementation barrier
- Scalable delivery models are needed across community, hospital and aged care
- Digital tools demonstrate strong feasibility and engagement
- Hybrid models combining traditional and digital approaches hold promise
- Implementation science is essential to bridge the gap from trial to real-world impact
- Stronger alignment between primary care, policy and local services is critical for scale and sustainability, supported by funding to ensure sustainability.

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RESEARCH TO IMPLEMENTATION

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