World Falls Guidelines and Cognition

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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 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 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[‡]

New World Falls Guidelines published on September 30th 2022

Worldfallsguidelines.com

1st World Congress on Falls and Postural Instability

Kuala Lumpur, Malaysia (December 2019)

- At the first World Congress on Falls and Postural Instability in Kuala Lumpur, Malaysia, in December 2019, a **worldwide task force of experts in falls was assembled**

Need for this Initiative

- Current clinical approaches and advice from falls guidelines **vary substantially between countries** and settings, warranting a **standardized approach.**

Global initiative

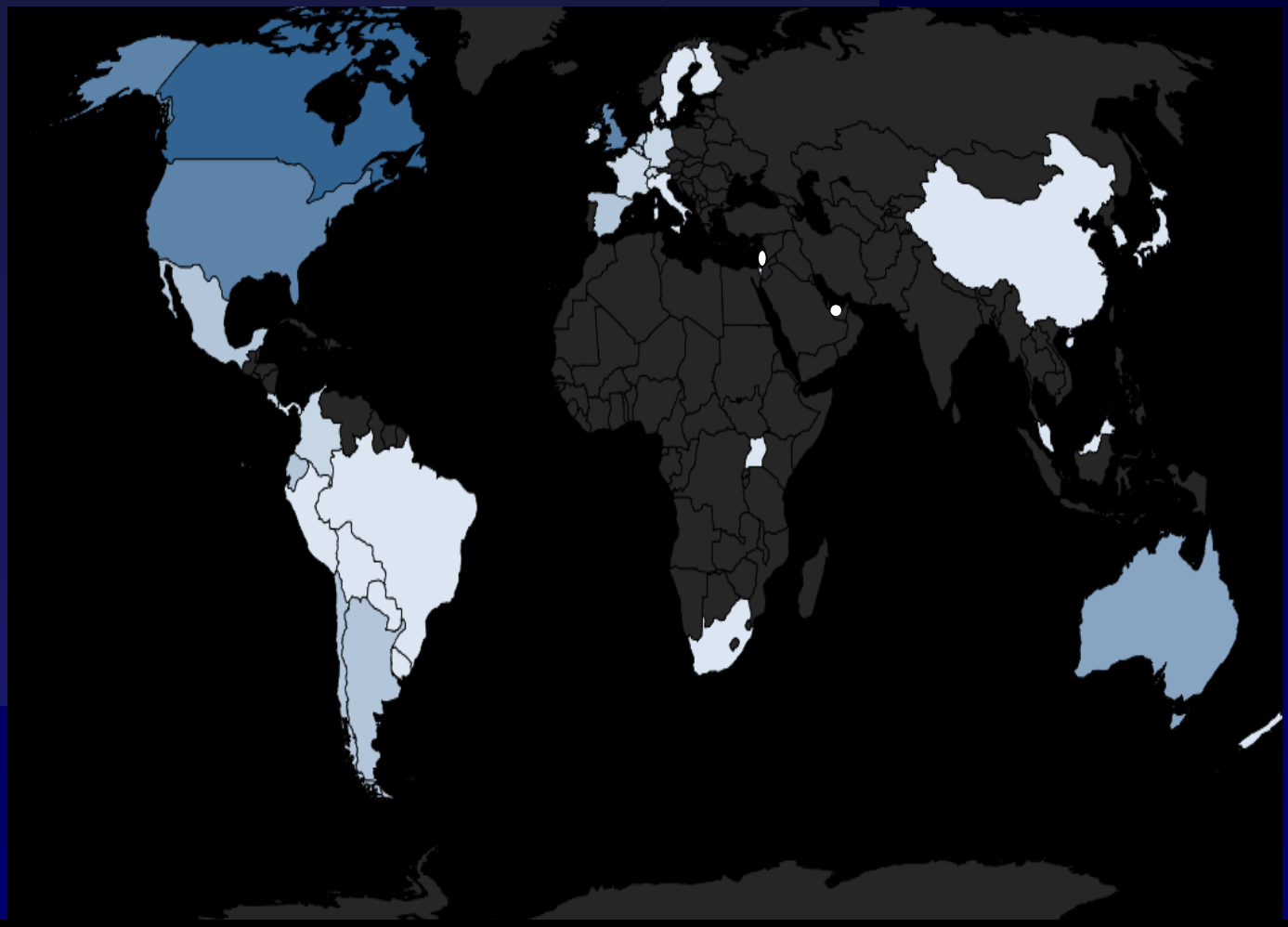
- ***26*** *steering committee members*
- ***11*** *working groups + 1 cross-cutting theme + 10 ad-hoc groups*
- ***96*** *world experts*
- ***39*** *countries involved*
- ***36*** *geriatric societies/agencies collaborating*

Steering Committee

Alphabetical by Last Name

Clemens Becker (Germany)
Hubert Blain (France)
Lindy Clemson (Australia)
Jacqueline Close (Australia)
Leilei Duan (China)
Ellen Freiberger (Germany)
David A. Ganz (United States of America)
David B. Hogan (Canada)
Susan Hunter (Canada)
Rose Anne Kenny (Ireland)
Lewis Lipsitz (United States of America)
Pip Logan (United Kingdom**)**
Stephen R. Lord (Australia)
David R. Marsh (United Kingdom)
Finbarr C. Martin (United Kingdom)
Tahir Masud (United Kingdom)
Koen Milisen (Belgium)
Manuel Montero-Odasso (Canada)
Jose Fernando Gomez-Montes (Colombia)
Mirko Petrovic (Belgium)
Jesper Ryg (Denmark)
Cathie Sherrington (Australia)
Dawn Skelton (United Kingdom)
Chris Todd (United Kingdom)
Maw Pin Tan (Malaysia)
Nathalie van der Velde (The Netherlands)
Joe Verghese (United States of America

A team of world experts on falls prevention and management



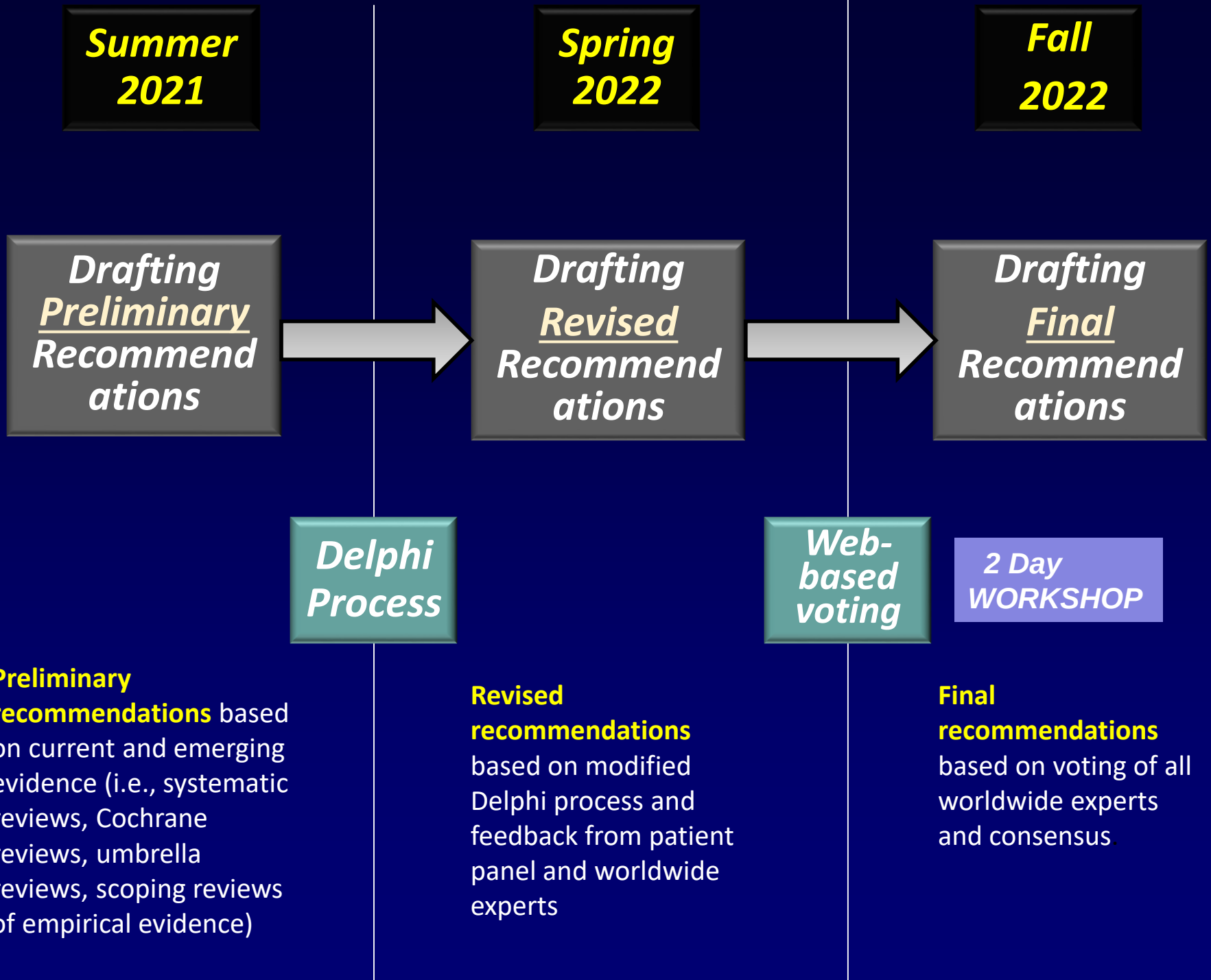
Global Representation

This map shows our level of representation from countries across the globe (darker shades of blue indicate higher representation)

Conceptual Framework

5 core elements:

1. **Overall Objective:** Recommendations to reduce the risk of falling for older adults
2. **Risk Stratification:** to identify appropriate and individualized assessment tools which can measure the risk of falls
3. **Assessment**: to assess individual's unique and modifiable fall risk factors by applying a person-centered approach
4. **Interventions**: to evaluate available and feasible interventions for reducing fall risk
5. **Personalized approach**: to customize diagnosis and management of fall risk based on patient comorbidities, values, preferences, and individual needs


Summer 2021
Spring 2022
Fall 2022
Drafting Preliminary Recommend ations
Drafting Revised Recommend ations
Drafting Final Recommend ations
Delphi Process
Web-based voting
2 Day WORKSHOP
Preliminary recommendations based on current and emerging evidence (i.e., systematic reviews, Cochrane reviews, umbrella reviews, scoping reviews of empirical evidence)
Revised recommendations based on modified Delphi process and feedback from patient panel and worldwide experts
Final recommendations based on voting of all worldwide experts and consensus.

GRADE: Grading of Recommendations , Assessment, Development and Evaluation

Table 1. Modified GRADE System description

Strength of Recommendation	1	**Strong**: benefits clearly outweigh undesirable effects
	2	**Weak, or conditional**: either lower quality evidence or desirable and undesirable effects are more closely balanced
Quality of evidence	A	**High**: "further research is unlikely to change confidence in the estimate of effect"
	B	**Intermediate**: "further research is likely to have an important impact on the confidence in the estimate of effect and may change the estimate"
	C	**Low**: "further research is very likely to have an important impact on the confidence in the estimate of effect and is likely to change the estimate"
No evidence Available	E	**Experts**: "When the review of the evidence failed to identify any quality studies meeting standards set or evidence was not available, recommendations were formulated expert consensus"

Working Groups

Working Group 1. Gait and Balance Assessment Tools to Assess Risk for Falls

Leaders:
Dr. Tahir Masud and Dr. Jesper Ryg

Working Group 2. Polypharmacy, Fall Risk Increasing Drugs, and Falls

Leaders:
Dr. Mirko Petrovic, Dr. Louise Mallet, and Dr. Nathalie van der Velde

Working Group 3. Cardiovascular Risk Factors for Falls

Leaders:
Dr. Lewis Lipsitz and Dr. Rose Anne Kenny

Working Group 4. Exercise Interventions for Prevention of Falls

Leaders:
Dr. Stephen Lord, Dr. Catherine Sherrington, and Dr. Dawn Skelton

Working Group 5. Falls in Hospitals and Nursing Homes

Leaders:
Dr. Gustavo Duque, Dr. Koen Milisen, Dr. Cathy Said, Dr. Meg Morris, and Dr. Ellen Vlaeyen

Working Group 6. Cognition and Falls

Leaders:
Dr. Neil B. Alexander, Dr. Susan Hunter, Dr. Manuel Montero-Odasso, and Dr. Joe Verghese

Working Group 7. Falls in Parkinson's Disease + Related Disorders

Leaders:
Dr. Richard Camicioli, Dr. Jeffrey Hausdorff, and Dr. Alice Nieuwboer

Working Group 8. Falls and Technology

Leaders:
Dr. Tischa van der Cammen, Dr. Ervin Sejdic, and Dr. Clemens Becker

Working Group 9. Falls in Developing Countries

Leaders:
Dr. Maw Pin Tan and Dr. Jose Fernando Gomez-Montes

Working Group 10. Multifactorial Interventions

Leaders:
Dr. Manuel Montero-Odasso, Dr. Pip Logan, Dr. Mark Speechley, Dr. Nathalie van der Velde, Dr. Jennifer Watt, and Dr. Ian Cameron

Working Group 11
Cross cutting theme on patient perspectives
(leader David Hogan)

Working Group 12
Concerns about (fear of) Falling
(Leaders: Ellen Freiberger)

Ad-hoc Expert Groups:

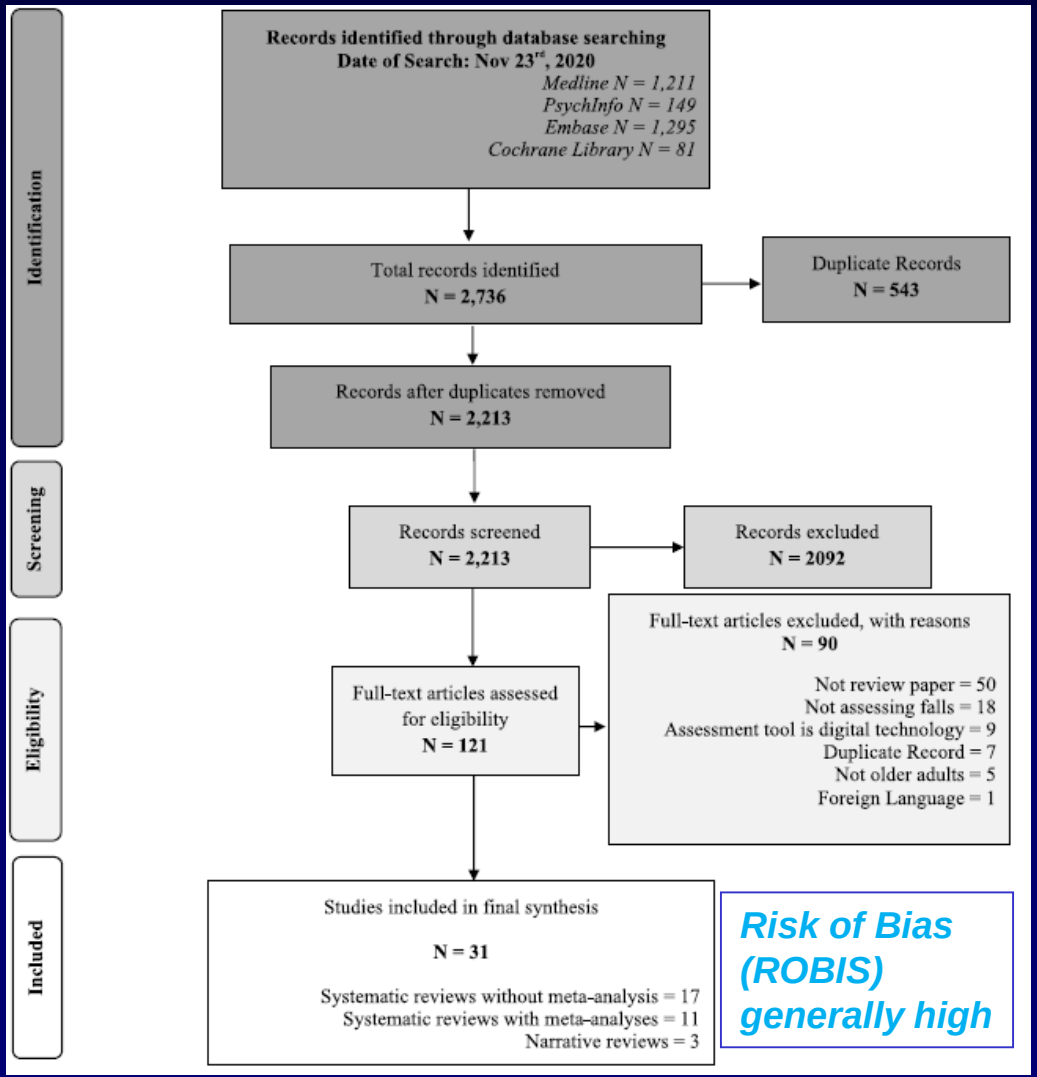
- ***Dizziness & vestibular***
- ***Vision***
- ***Environment***
- ***Vit D & Nutrition***
- ***Depression***
- ***Frailty***
- ***Sarcopenia***
- ***Delirium***
- ***Pain***
- ***Urinary Symptoms***

RESEARCH BMC Geriatrics 2022 Open Access

Predicting falls in older adults: an umbrella review of instruments assessing gait, balance, and functional mobility

D. Beck Jepsen[1,2†], K. Robinson[3,4*†], G. Ogliari[3], M. Montero-Odasso[5,6,7], N. Kamkar[5], J. Ryg[1,2], E. Freiberger[8] and Masud Tahir[1,3]

Working Group 1: Gait & Balance



Risk of Bias (ROBIS) generally high

RECOMMENDATION 1 (Risk Stratification)

- *We recommend including Gait Speed for predicting falls risk. GRADE 1A*
- *As an alternative the Timed Up and Go Test can be considered, although the evidence for fall prediction is less consistent. GRADE 1B*

RECOMMENDATION 2 (Assessment)

- *We recommend that Gait and Balance should be assessed as part of the risk assessment of falls. GRADE 1B*

WG 1: Falls Prediction (Risk Stratification)

(Recommendation Details)

The most frequently reported gait, balance, and physical functional assessments for falls prediction included:

- ***Gait speed***
- ***Timed Up and Go Test***
- ***Berg Balance Scale***
- ***Chair stand Test***
- ***Dual Task tests***
- ***Functional Reach test***
- ***One Leg Stand***
- ***Tandem Gait***

Gait speed the only one with consistent predictive value (7/10 studies +)

Other tests showed inconsistent findings for falls prediction so cannot be recommended as single predictive tests

Some evidence that Timed up and Go Test has falls prediction value in lower functioning adults

Recommended cut-offs:
Gait Speed : ≤ 0.8 m/s
Timed Up and Go test: ≥ 15 seconds

Summary table of Gait Speed in Falls Prediction (10 reviews)

First author	Type	Setting	Risk of bias	Interpretation
Ambrose	NR	Unclear	**High**	Unclear
Abellan Van Kan	SR	Community	**High**	**Favourable**
Pamoukdjian	SR	Community	**High**	**Favourable**
Lee	SR	Mixed	**High**	**Favourable - stroke patients**
Scott	SR	Mixed	**High**	**Not favourable**
Dolatabadi	SR	Dementia	**Unclear**	**Favourable**
Chantanachai	MA	Community Cognitive lmp.	**Low**	**Not favourable**
Ganz	MA	Community	**Low**	**Favourable**
Marin-Jiminez	SR	Community	**Low**	**Favourable**
Menant	MA	Mixed	**Low**	**Favourable**

NR=narrative review; SR=Systematic Review without metaanalysis; MA =metaanalysis

WG1: Falls Risk Assessment
(Recommendation Details)

Physical function tests of gait and balance can help choose fall prevention exercises, prescribe level of difficulty and dose, and monitor progress.

Commonly used useful Gait and Balance Assessment tools include:

- ***Timed Up and Go (TUG) test,***
- ***Untimed Get Up And Go Test (GUAG)***
- ***Berg Balance Scale (BBS),***
- ***Tinetti test/POMA (balance and gait subscales)***
- ***Chair Stand test (CST)***
- ***Short Physical Performance Battery (SPPB)***

The choice of test will also depend on equipment availability, resources, space, and time available as well as familiarity and training.

The Rehabilitation Measures Database provides a useful description of options and their clinimetric properties (www.sralab.org/rehabilitation-measures)

A structured assessment of gait by a trained clinician can be helpful in directing investigations for underlying conditions that may increase falls risk by impairing gait

(Alexander NB 1996, Lindemann U 2020)

WG6: Falls In Cognitive Impairment

Dementia
and Geriatric
Cognitive Disorders

Dement Geriatr Cogn Disord 2013;36:20–35
DOI: 10.1159/000350031
Accepted: February 1, 2013
Published online: May 23, 2013

1420–8008/13/0362–0020$38.00/0
www.karger.com/dem

Review Article

The Relationship between Executive Function and Falls and Gait Abnormalities in Older Adults: A Systematic Review

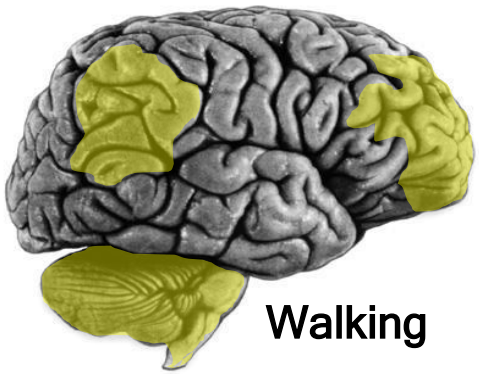
Fiona C. Kearney[a] Rowan H. Harwood[a, b] John R.F. Gladman[a]
Nadina Lincoln[a] Tahir Masud[a, b]

[a]University of Nottingham, and [b]Nottingham University Hospitals, NHS Trust, Nottingham, UK

- ***Executive dysfunction associated with increased falls risk and reduced gait speed***
- ***Future research should focus on executive dysfunction as a training target for falls prevention***

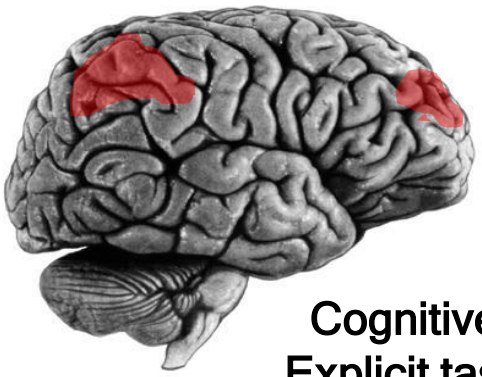
Dual-Task Paradigm – How Does it Work?

Activation level while walking, talking, and walking and talking



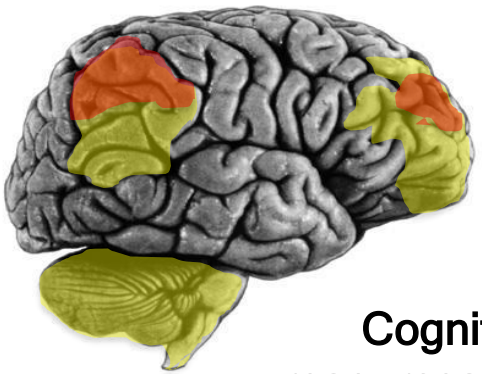
Walking

Simple Task



Cognitive
Explicit task

Simple Task



Cognitive
resources shared

Dual-Task

Pashler, H. (1994) Dual-task interference in simple tasks: data and theory. Psy

Effect of music-based multitask training on gait, balance, and fall risk in elderly people: a randomized controlled trial.

Trombetti A[1], Hars M, Herrmann FR, Kressig RW, Ferrari S, Rizzoli R.

Arch Intern Med 2011

Table 4. Falls at the 6-Month Follow-up

Outcomes	Early Intervention (n=66)	Delayed Intervention (n=68)	Unadjusted	Adjusted[a]	Method
Falls, rate[b]	24 (0.7)	54 (1.6)			
IRR (95% CI)			0.46 (0.27-0.79)[d]	0.49 (0.27-0.91)[c]	Negative binomial regression model
Participants with ≥1 fall, No. (%)	19 (28.8)	32 (47.1)			
RR (95% CI)			0.61 (0.39-0.96)[c]	0.69 (0.44-1.07)	Log-binomial regression model
Participants with multiple (≥2) falls, No. (%)	3 (4.6)	16 (23.5)			
RR (95% CI)			0.19 (0.06-0.63)[d]	0.21 (0.06-0.67)[d]	Log-binomial regression model
Survival analysis					
HR (95% CI)			0.53 (0.30-0.94)[c]	0.55 (0.31-0.99)[c]	Cox proportional hazards model
HR (95% CI)			0.46 (0.27-0.78)[d]	0.46 (0.27-0.79)[d]	Andersen-Gill model

Abbreviations: CI, confidence interval; HR, hazard ratio; IRR, incidence rate ratio; RR, relative risk.

[a] Adjusted for age, history of falls over the previous 12 months, simplified Tinetti test performance, and total number of frailty criteria (according to Fried et al[21]) met.

[b] Fall rates per person per year.

[c] $P < .05$.

[d] $P < .01$.

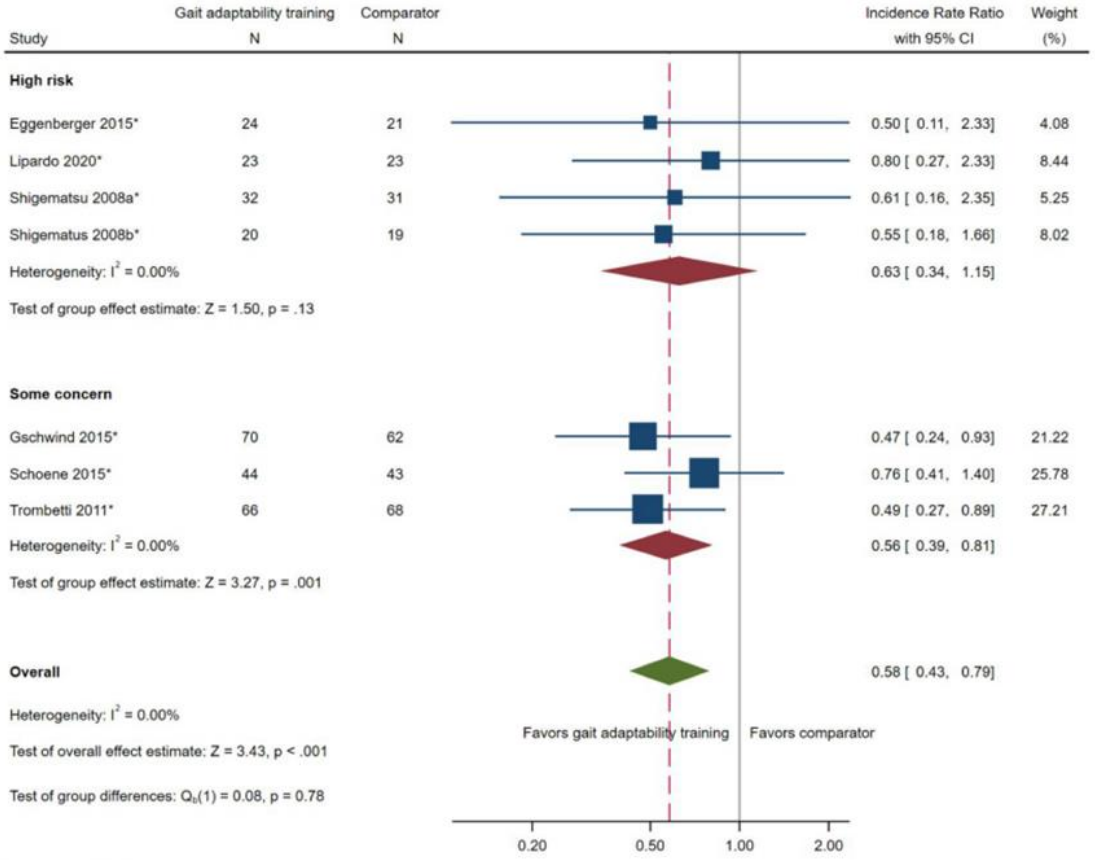
Jaques-Dalcroze eurhythmics

Gait Adaptability

Age and Ageing 2021; 1–11
doi: 10.1093/ageing/afab105

SYSTEMATIC REVIEW

Effects of gait adaptability training on falls and fall-related fractures in older adults: a systematic review and meta-analysis



…REASEN[5,6],

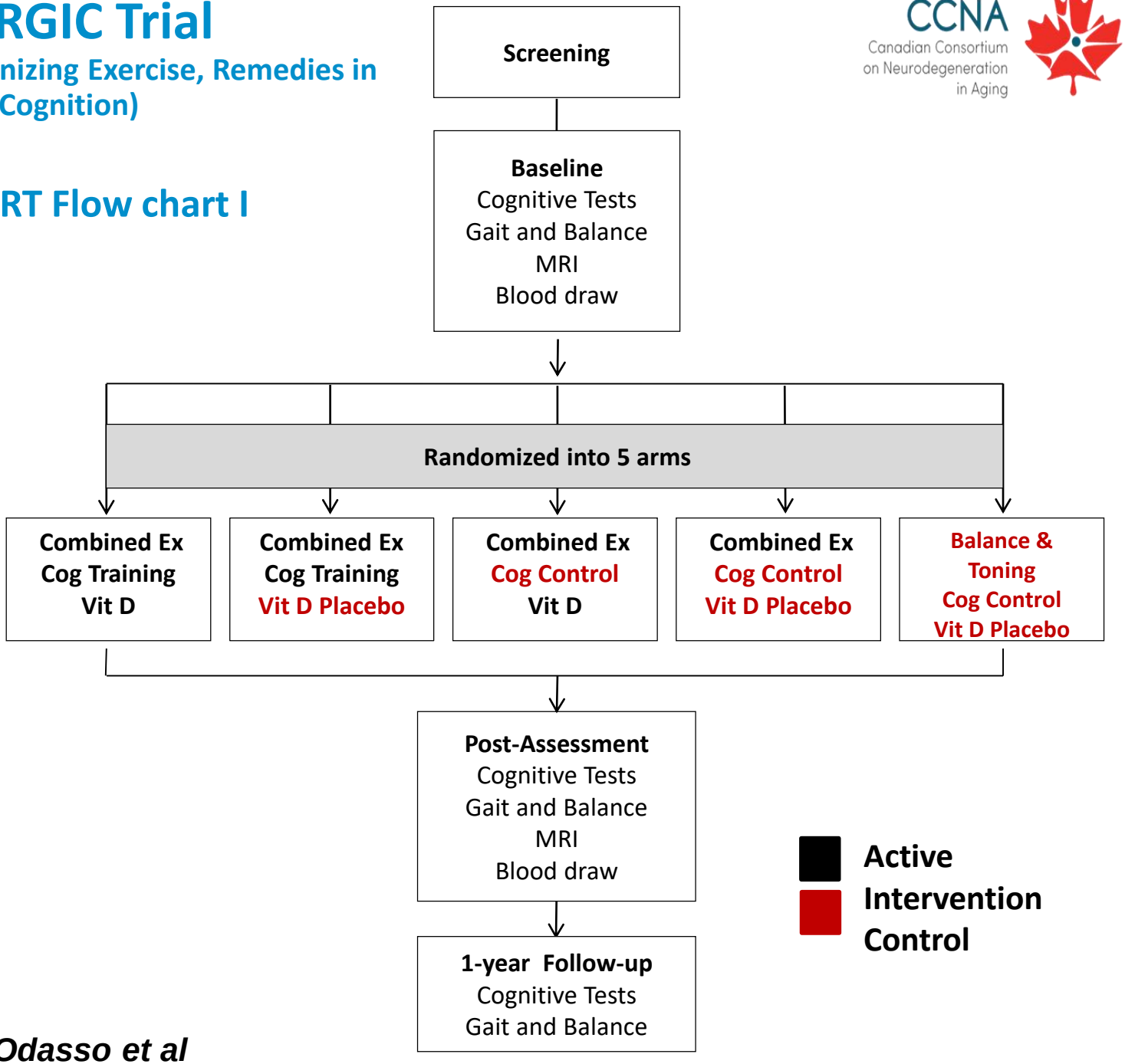
…oluntary adjustments …ges

44% ↓
Fall rates

SYNERGIC Trial

(SYNchronizing Exercise, Remedies in Gait and Cognition)

CONSORT Flow chart I



Montero-Odasso et al

WG6: RECOMMENDATIONS ABOUT COGNITION (1)

Routine assessment of cognition should be included as part of multifactorial falls risk assessment in older adults. GRADE 1B.

- ***Cognitive impairment increases risk of falls by 30%, but it also increases the risk of falls-related injuries by 100% including hip fractures, fractures of the arm, and head injuries.***

- ***Low cognition, particularly of executive function, even in the absence of a known cognitive impairment or formal diagnosis of dementia, is associated with an increased risk of falls, justifying cognitive testing as part of multifactorial falls risk assessment in all older adults.***

Montero-Odasso M, van der Velde N, Martin FC et al. World guidelines for falls prevention and management for older adults: a global initiative, *Age*

WG6+4: RECOMMENDATIONS ABOUT COGNITION (2)

Community older adults with mild cognitive impairment and mild to moderate dementia should be offered an exercise programme to prevent falls. GRADE:1B.

- ***Physical activity is feasible to perform by older adults with MCI or mild or moderate dementia***
- ***Stand-alone exercises are balance training (e.g. Tai Chi) and multicomponent exercise (resistance + balance training)***
- ***Clinicians can promote better adherence to a care plan designed to reduce falls in older adults with cognitive impairment by involving caregivers***

Montero-Odasso M, van der Velde N, Martin FC et al. World guidelines for falls prevention and management for older adults: a global initiative, *Age*

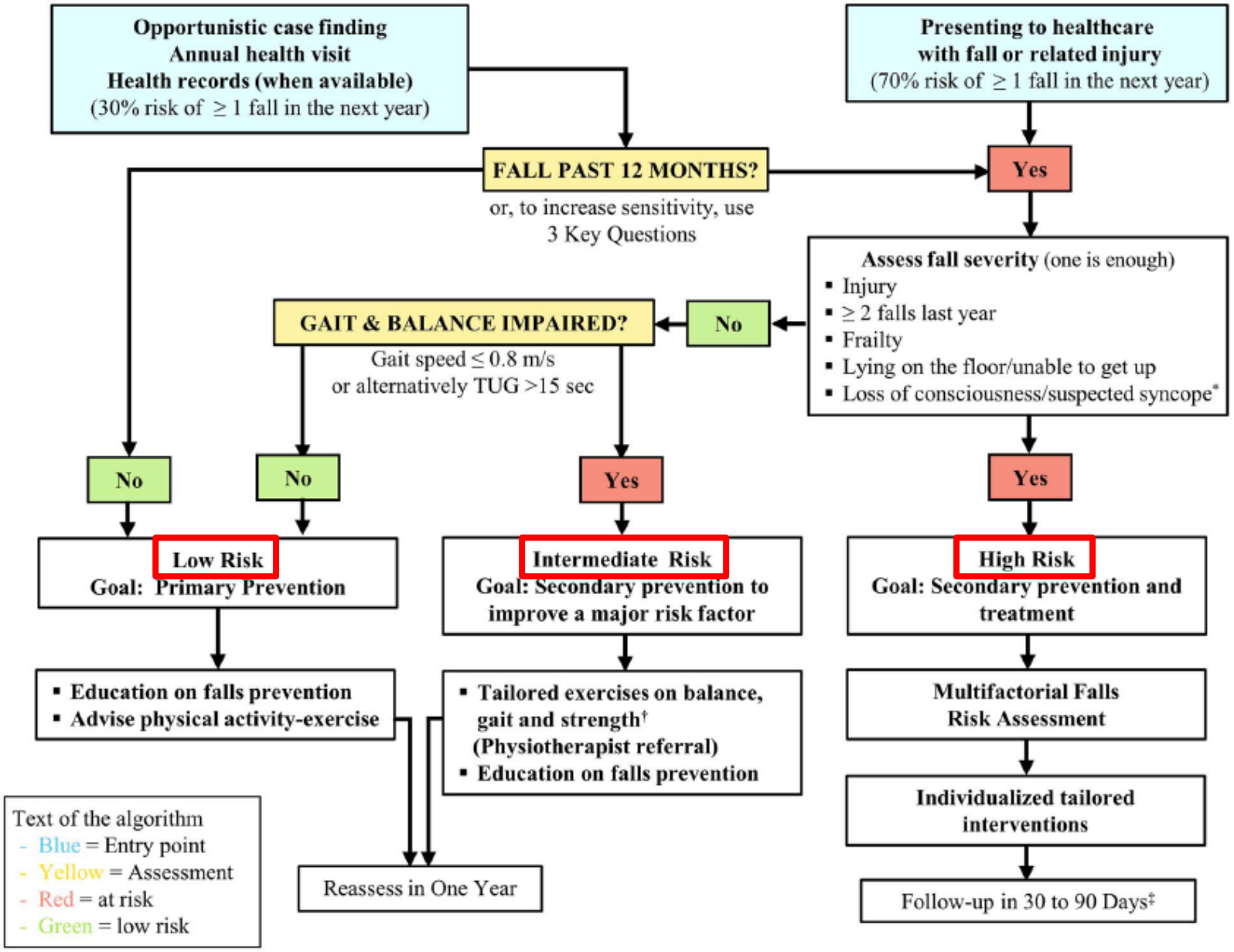
WG6: RECOMMENDATIONS ABOUT COGNITION (3)

Both older adults and caregiver's perspective should be included when creating falls prevention care plans for adults with cognitive impairment. This strategy has shown better adherence to interventions and outcomes. GRADE 1C.

- ***Involve caregivers when 1) identifying and modifying environmental falls risk factors; 2) modifying lifestyle in terms of diet/nutrition and exercise routines to reduce falls risks; and 3) detailed recording of falls incidents.***
- ***When older adults and caregivers were involved, adherence to programmes improved.***
- ***When individual preferences were incorporated in the intervention selection, falls outcomes improved.***

Montero-Odasso M, van der Velde N, Martin FC et al. World guidelines for falls prevention and management for older adults: a global initiative, *Age*

World guidelines for falls prevention and management for older adults



Summary paper in Age and Ageing

- *Links to e-supplements*

Also

- *Multifactorial WG*
- *Exercise WG*
- *Environment ad hoc Group*
- *Technology WG*
- *Parkinson's Disease WG*
- *Stroke, Frailty, Sarcopenia, Continence, Vestibular, Vision*
- *Concerns about Falling (Fear of Falling)*
- *Patient input WG*

Opportunities and Challenges

“The greatest glory in living is not in never falling, but in rising every time we fall”

Nelson Mandela
(1918–2013)

Thank you for your attention