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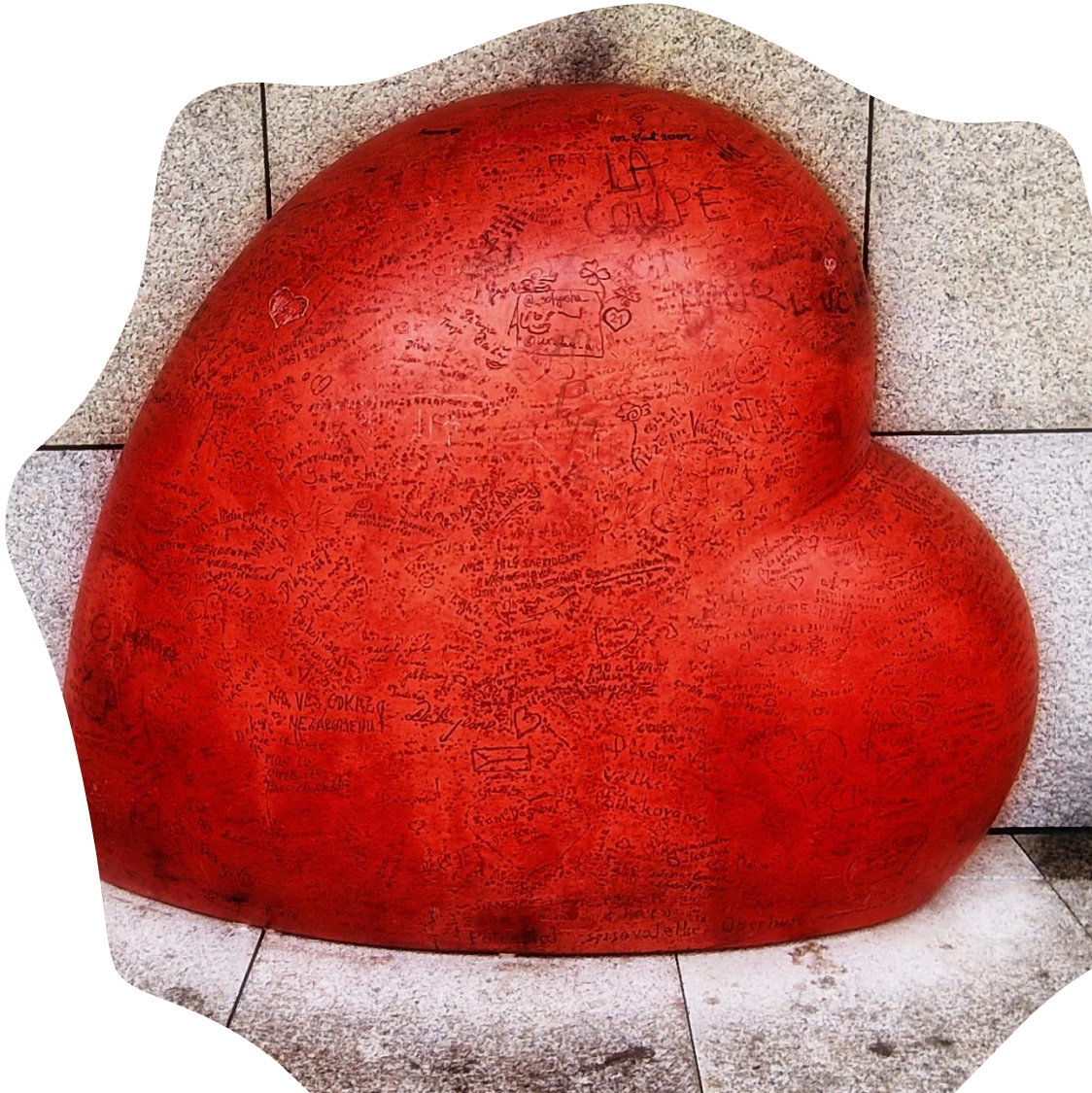
Older adult's home-based rehabilitation and Nordic Walking. What is the evidence?

Marja Äijö, PhD, Physiotherapist

Principal lecturer of gerontology and rehabilitation, Savonia –UAS, Kuopio, Finland

Content

- Aging and functional ability
- Older adult's home-based rehabilitation - what is the evidence?
- Nordic walking
- Conclusion



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Aging

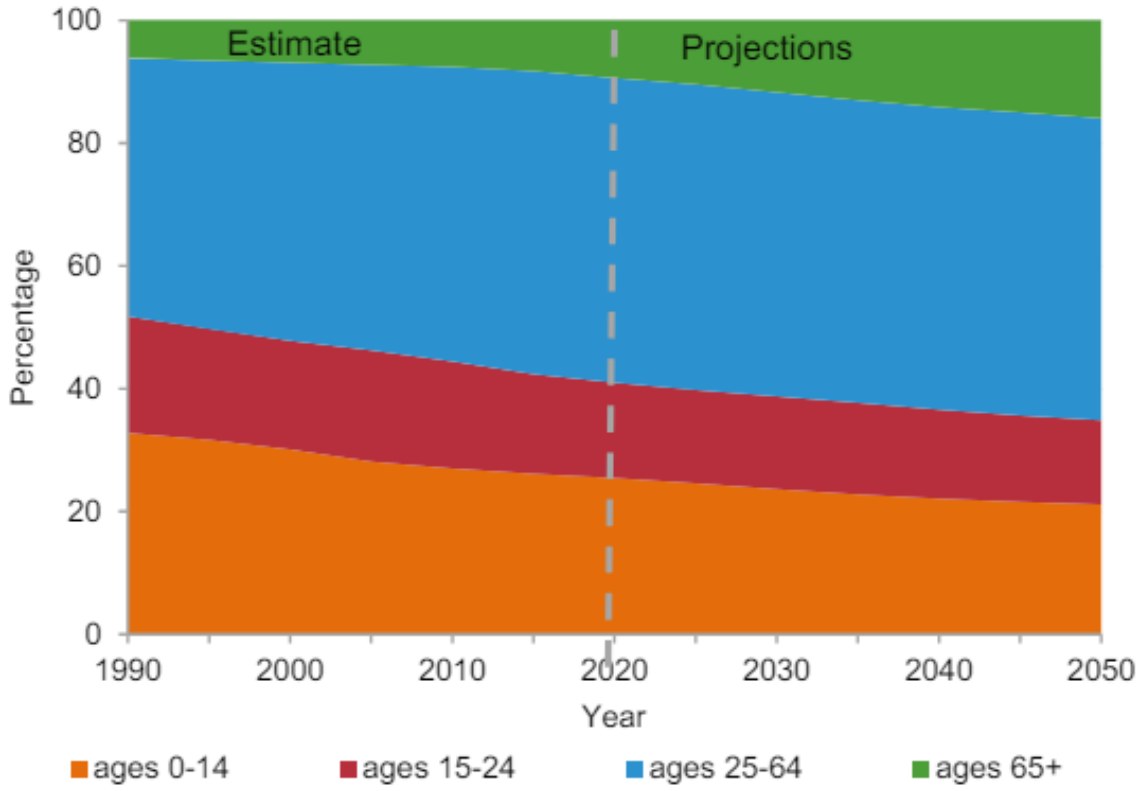
Definitions:

- “Aging is the progressive accumulation of diverse, deleterious changes with time that increase the chance of disease and death” (Harman 2006)
- “Ageing is usually defined as the progressive loss of function accompanied by decreasing fertility and increasing mortality with advancing age” (Kirkwood & Austad 2000). Global distribution of population by broad age group, 1990-2050i

Free radical theory of **aging**: an update: increasing the functional life span.
Harman D.
Ann N Y Acad Sci. 2006 May;1067:10-21. doi: 10.1196/annals.1354.003.

(Kirkwood, TBL, Austad SN. 2000. Why do we age? Nature, 408: 233-238

Global distribution of population by broad age group, 1990-2050

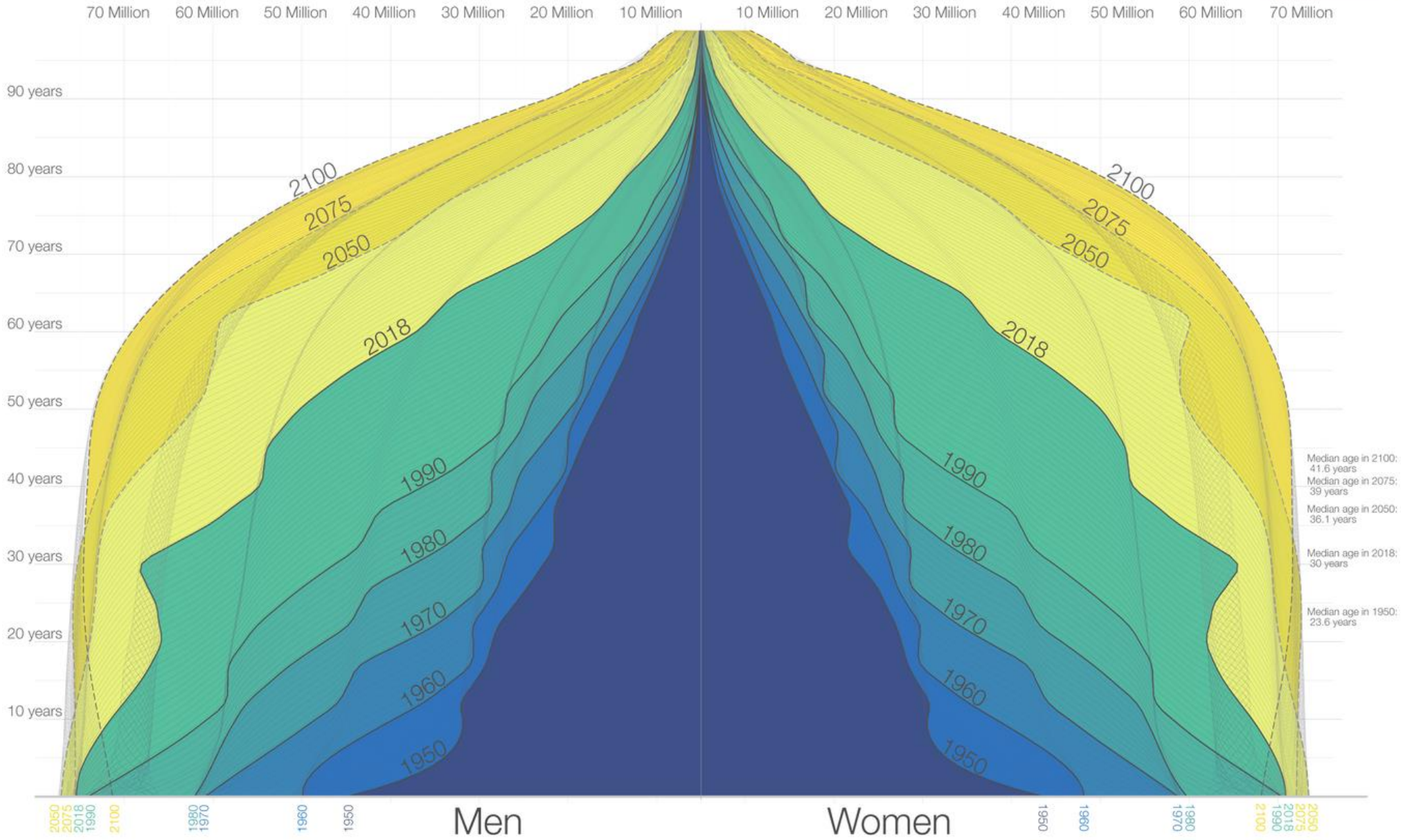


United Nations 2020. World Population Ageing 2019. United Nations. New York.
In available: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Report.pdf)

The Demography of the World Population from 1950 to 2100

Shown is the age distribution of the world population – by sex – from 1950 to 2018 and the *UN Population Division*'s projection until 2100.

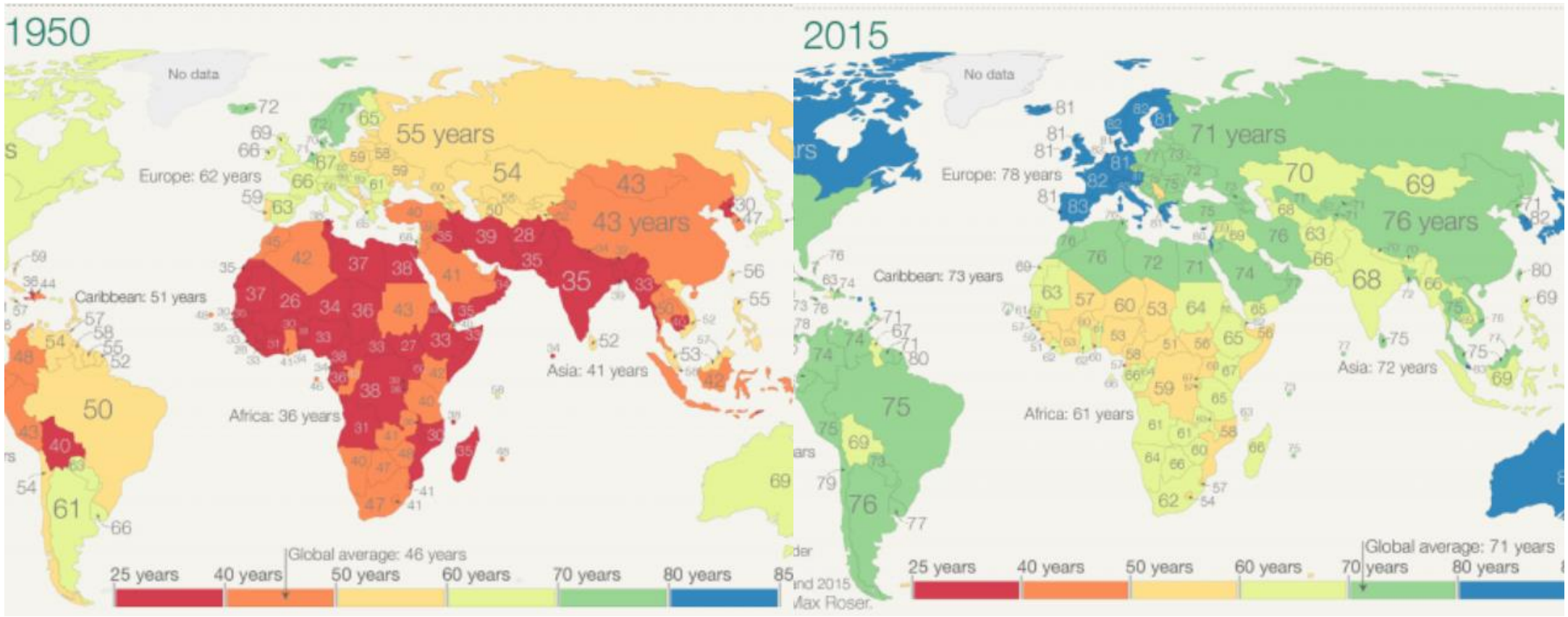
Our World in Data



Data source: United Nations Population Division – World Population Prospects 2017; Medium Variant.
The data visualization is available at OurWorldinData.org, where you find more research on how the world is changing and why.

(https://ourworldindata.org/global-population-pyramid)

Global perspective: Life expectancy in a year 1950 and 2015

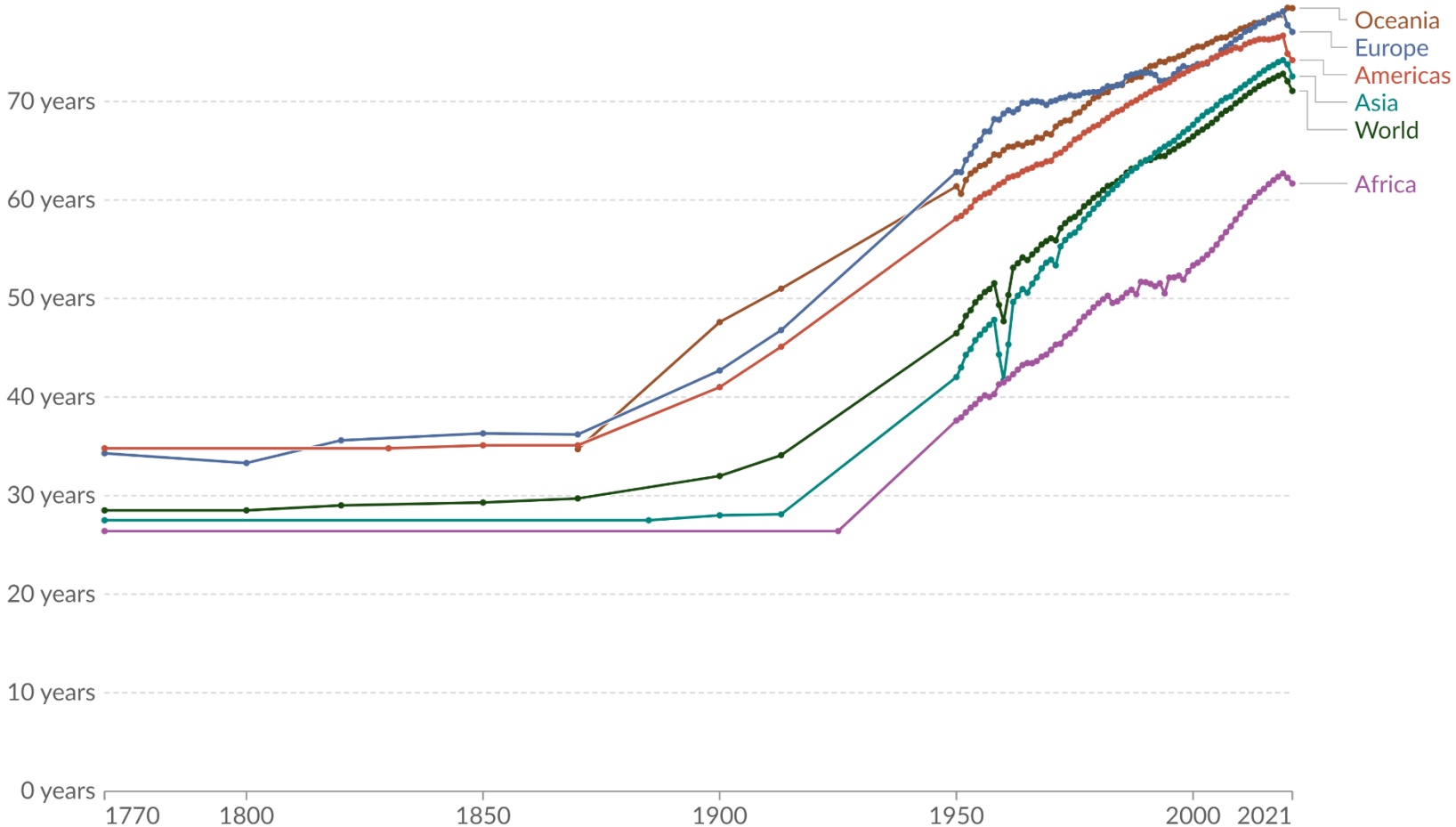


(Max Roser (2018) - “Twice as long – life expectancy around the world” Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/life-expectancy-globally' [Online Resource])

Life expectancy

The period life expectancy[1] at birth, in a given year.

Our World in Data



Data source: UN WPP (2022); HMD (2023); Zijdeman et al. (2015); Riley (2005)

OurWorldInData.org/life-expectancy | CC BY

1. Period life expectancy: Period life expectancy is a metric that summarizes death rates across all age groups in one particular year. For a given year, it represents the average lifespan for a hypothetical group of people, if they experienced the same age-specific death rates throughout their whole lives as the age-specific death rates seen in that particular year. Learn more in our article: "Life expectancy" – What does this actually mean?

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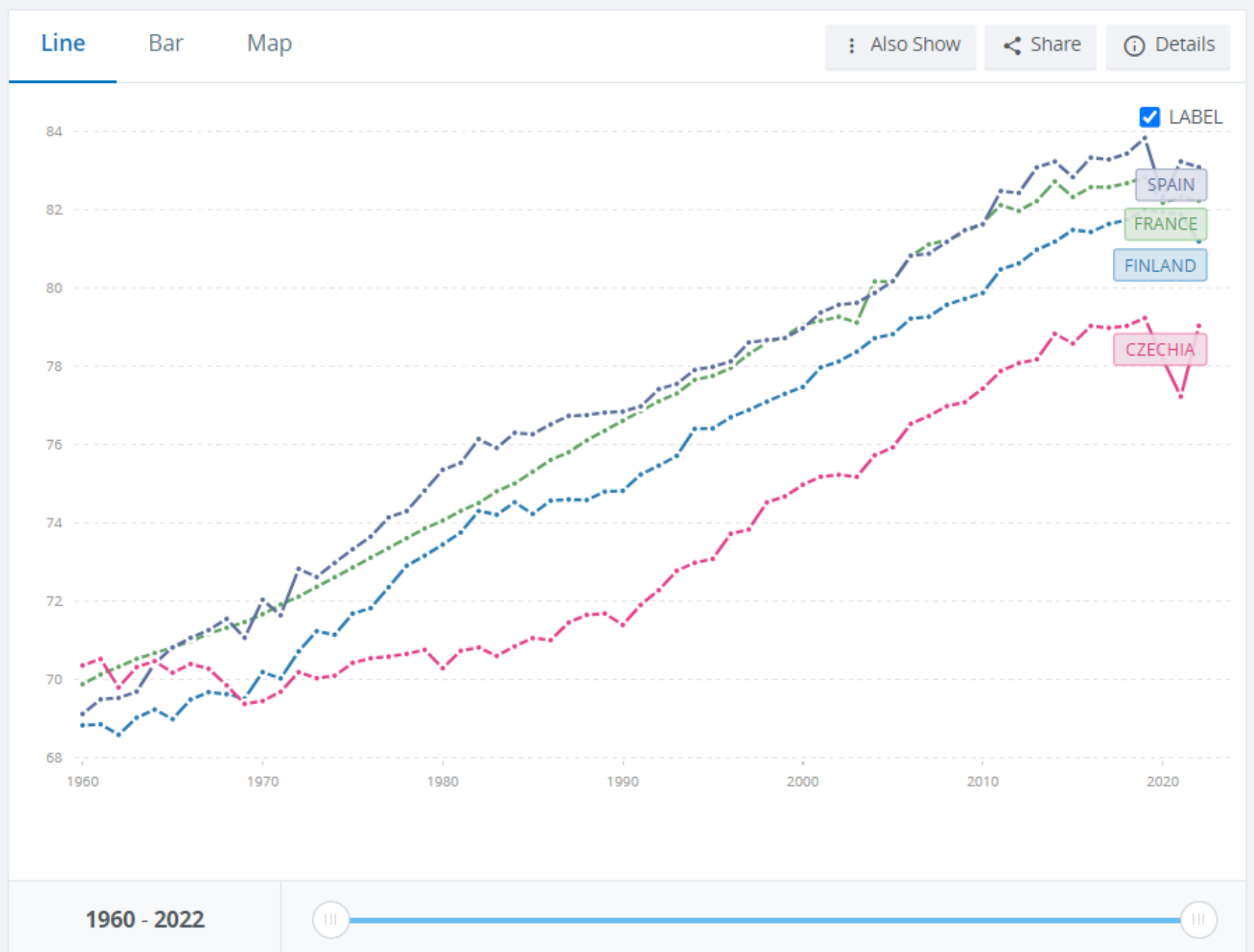
Life expectancy at birth, total (years) – Finland, France, Spain and Czechia



(https://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=FI-FR-ES-CZ)

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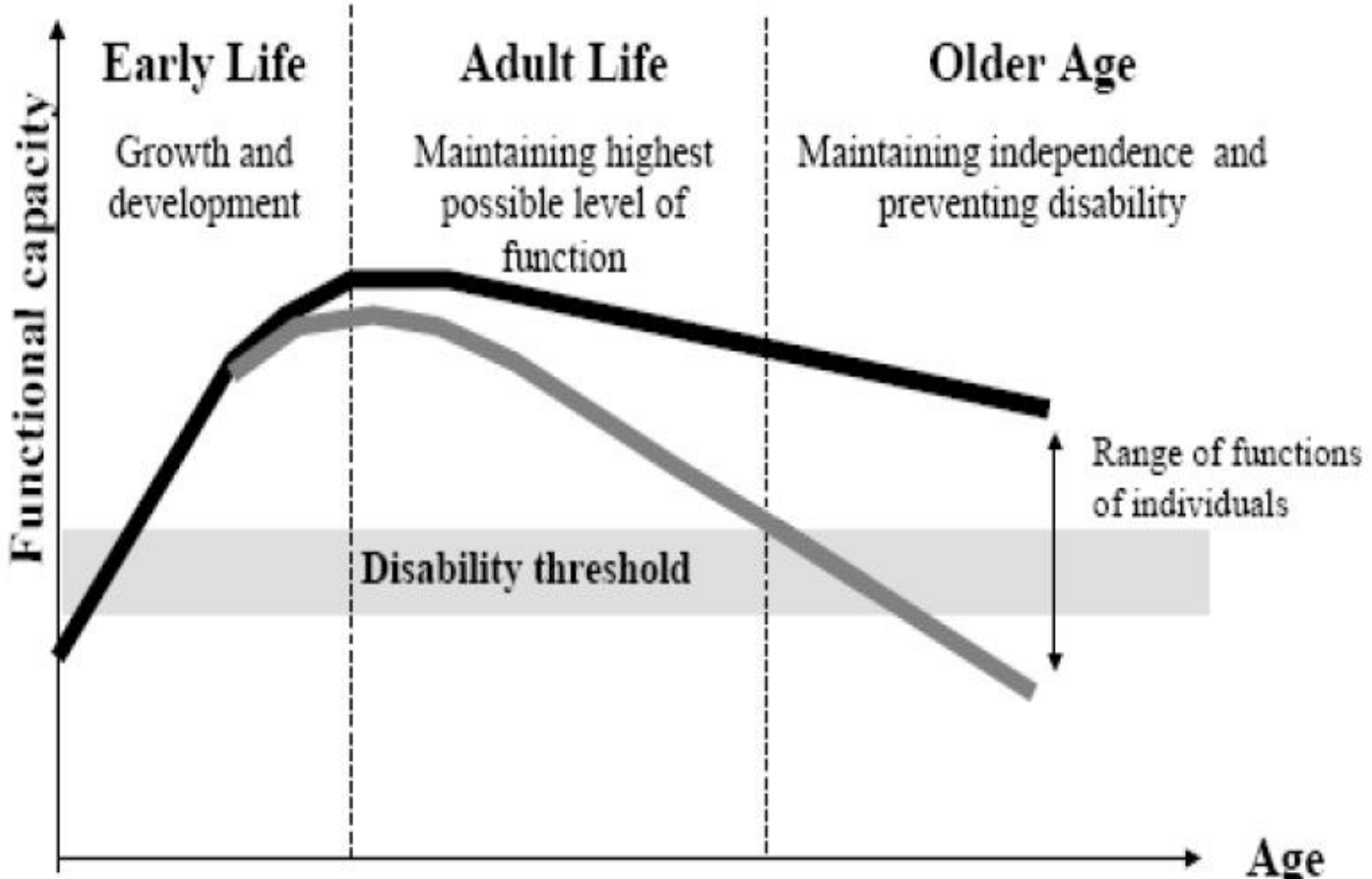
Functional Capacity over the Life Course



(World Health Organisation, Ageing and Life Course Programme, 2000, activeageing@who.int)

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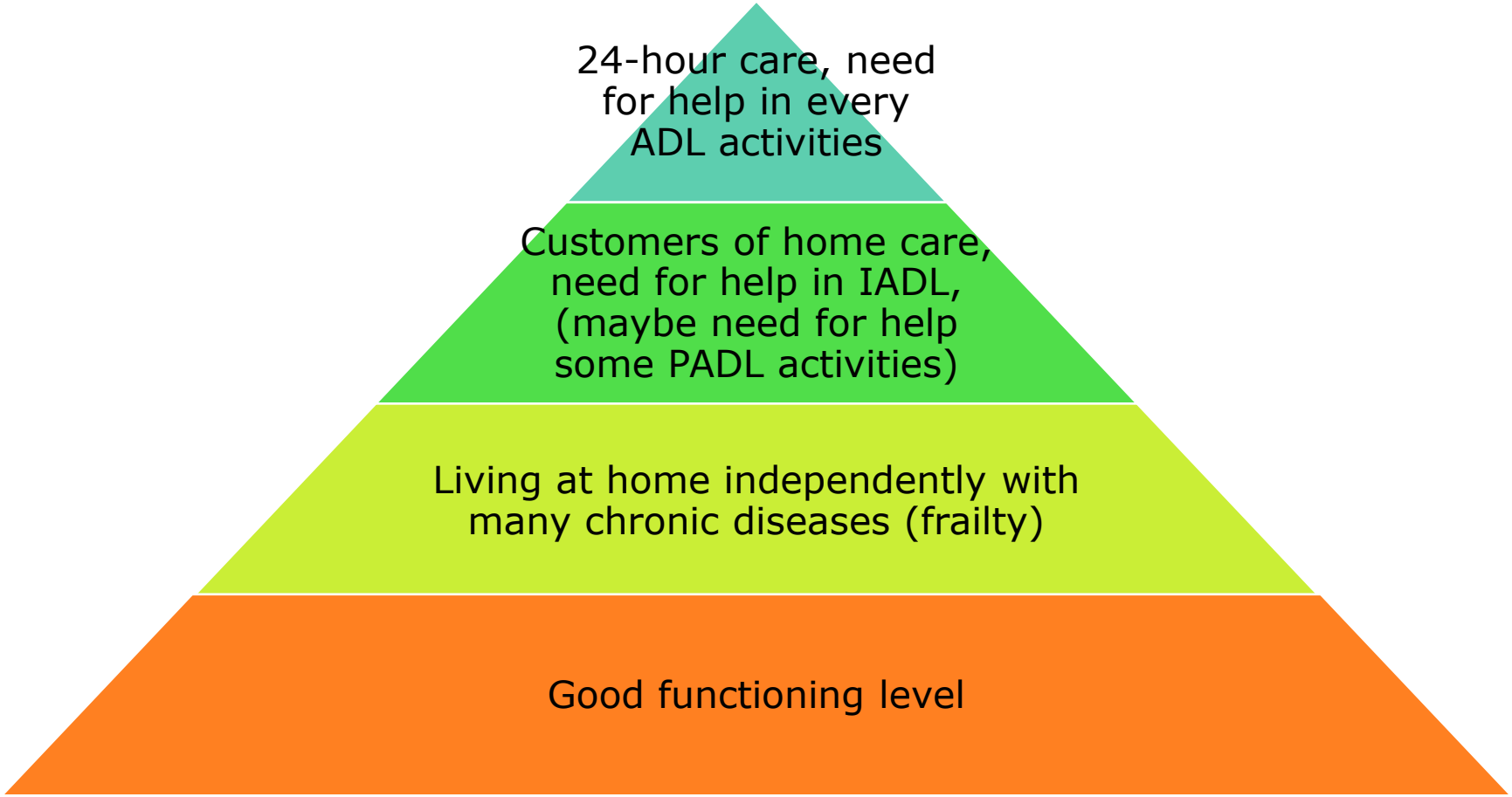
Older adult's home-based rehabilitation – what is the evidence?

Marja Äijö, PhD, Physiotherapist

Principal lecturer of gerontology and rehabilitation, Savonia –UAS, Kuopio, Finland

Theoretical description of older people according to functional ability and health



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Definitions: Community physiotherapy

- Emphasis: “where” the treatment takes place
- it is physiotherapy services “in the community”
- “*The physiotherapist visits the patient in the community and offers treatment*.”
- Community:
  - patient’s home
  - residential care facility where the patient resides

Health Promot Perspect. 2017; 7(2): 50–51.
Published online 2017 Mar 5. doi: 10.15171/hpp.2017.10
PMCID: PMC5350549
PMID: 28326283

Community physiotherapy or community-based physiotherapy

Pavithra Rajan [1, 2, *]

Home-based rehabilitation: 3 starting points

1. Early intervention

   For example: Health and functional ability controls

2. After acute situation
   home rehabilitation intervention

   For example: After hospitalization

3. Work method for rehabilitating home care

   For example: Home care customers and everyday rehabilitation

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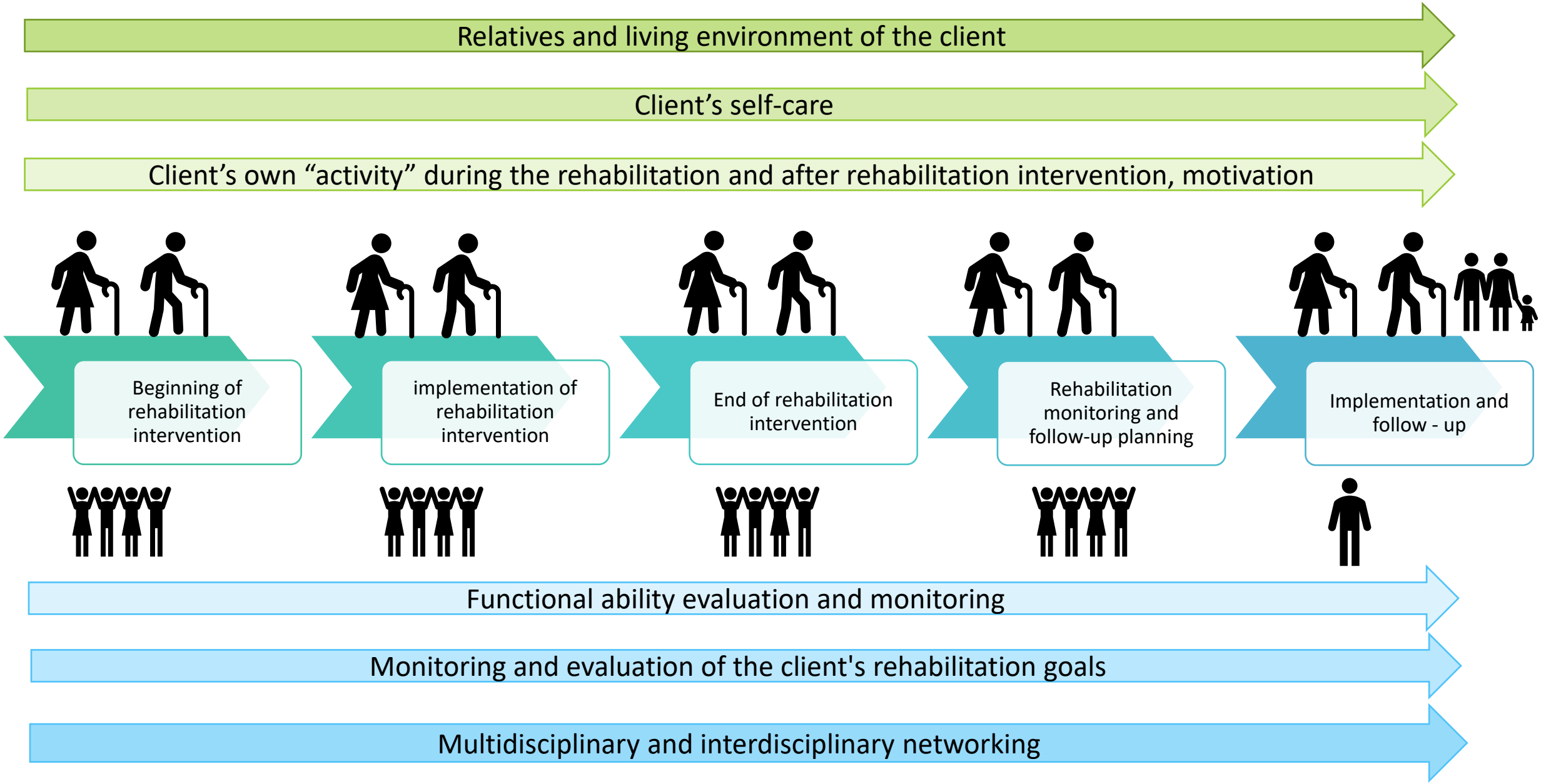
Home-based rehabilitation: 3 starting points, 2

2. After acute situation
Home rehabilitation intervention

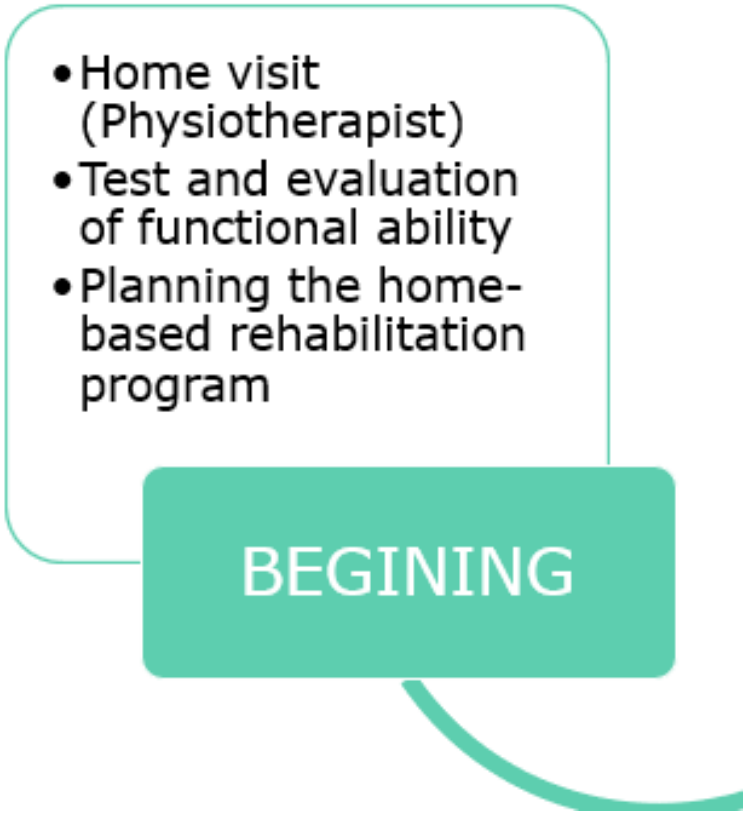
For example: After hospitalization

- Physiotherapist: design and implementing
- Content: Physiotherapy intervention
- Environment:
  - Older adult´s own home
- Rehabilitation team for example physiotherapist and nurse or physiotherapist and occupational therapist

Rehabilitation process



Individual rehabilitation plan



- Information: health care professional and customer
- Evaluation of rehabilitation needs
- Goal/goals setting
- Measures towards to goals
- Social security and social services
- Follow the rehabilitation process
- Communication: motivation!

(WHO 2017: http://www.who.int/topics/rehabilitation/en/)

Evaluation of functional ability

ADL

- Resident Assessment Instrument, RAI
- Katz index
- IADL index
- The Barthel index
- RAVA™-mittari (Only in Finland)

Physical function

- Hand grip strength
- Rivermead mobility index
- Short physical performance battery, SPPB
- Time up and go test, TUG
- Chair stand, 5 or 10 times
- The 6-Min Walk Test
- Berg Balance Scale, BBS
- Functional balance test
- Dynamic Gait Index
- The Activities-Specific Balance Confidence (ABC) Scale

(https://www.terveysportti.fi/dtk/tmi/koti)

Evaluation of functional ability

Psychological function

- Geriatric Depression Scale, GDS-15
- Beck Depression Inventory, BDI
- The Center for Epidemiologic Studies Depression Scale, CES-D
- Alcohol Use Disorders Identification Test, AUDIT

(https://www.terveysportti.fi/dtk/tmi/koti)

Social function

- The Social Provisions Scale
- Perceived loneliness
- EUROHIS-Qol 8-item index

Evaluation of functional ability

Cognitive function

- Mini-Mental State Examination (MMSE)
- MoCa
- Consortium to Establish a Registry for Alzheimer´s Disease CERAD

Quality of life

- EUROHIS-Qol 8-item index

(https://www.terveysportti.fi/dtk/tmi/koti)

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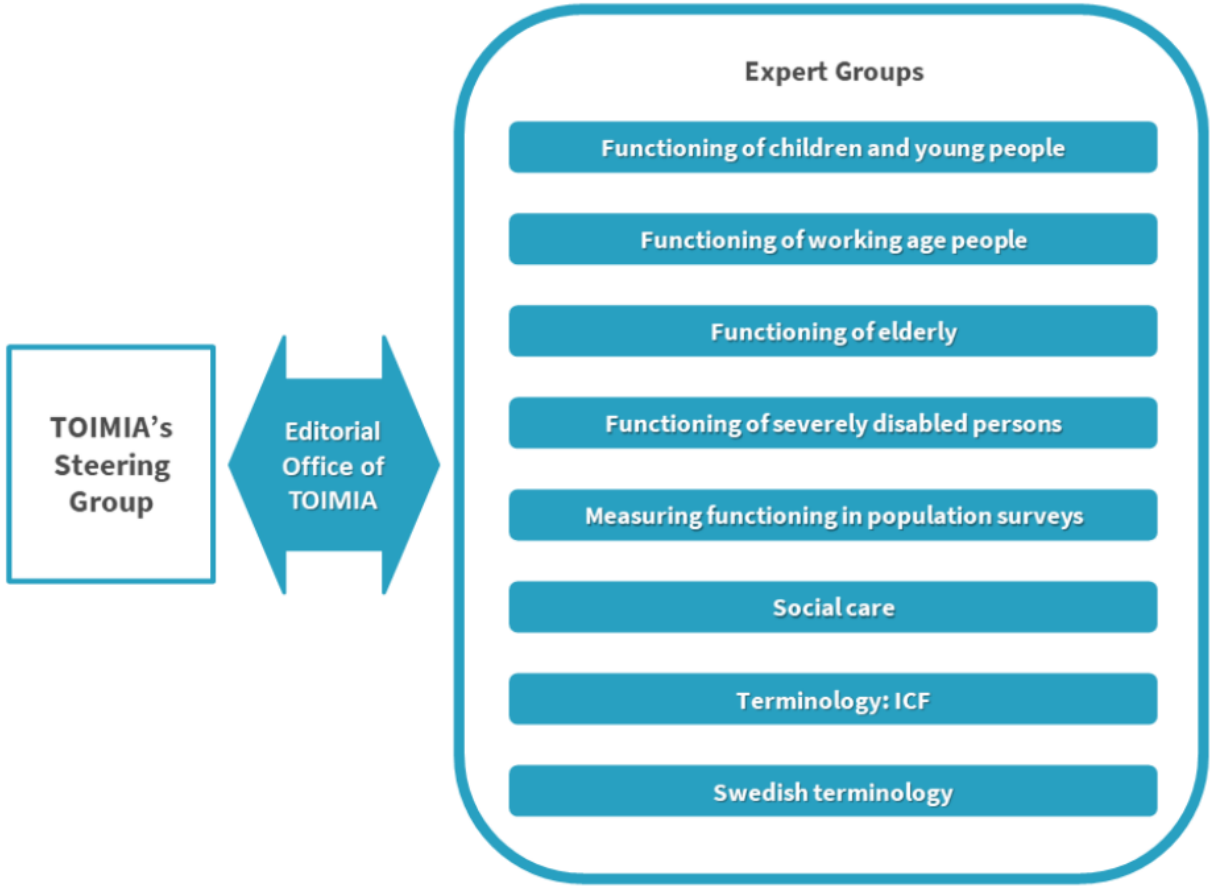
TOIMIA Functioning Measures Database

TOIMIA FUNCTIONING MEASURES DATABASE

TOIMIA Functioning Measures Database

- The TOIMIA Functioning Measures Database is an open access free-of-charge tool in Finnish designed for experts and professionals interested in how to measure functioning in clinical practice and research. The database contains:
  - basic descriptions of functioning measures
  - assessments of psychometric properties and feasibility of these measurement instruments for different purposes
  - guidelines and recommendations by experts concerning the measuring of functioning in different situations and contexts



(https://thl.fi/en/web/functioning/toimia-functioning-measures-database and https://www.slideshare.net/THLfi/the-toimia-national-expert-network-on-measurement-of-functioning)

INTERVENTION

- Active home-based rehabilitation with physiotherapist
- Individual goals
- Evaluation of home environment
- Advise family members, caregivers and practical nurses

- Physiotherapist or occupational therapist
- After the hospital period and acute situations for example: hip surgery, acute illnesses, heart attack, suddenly declined functional ability
- Content:
  - intensive therapy with advising
  - Increase activity of daily living
- During 6–8 weeks, 3 x in a week, 1 h /session
- Important:
  - Support home care and caregiver
  - Continuity
  - Do collaboration with other organizations for example The Alzheimer Society of Finland

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BMC Geriatr. 2018; 18: 232.
Published online 2018 Oct 1. doi: 10.1186/s12877-018-0916-y
PMCID: PMC6167829
PMID: 30285645

Effects of 12-month home-based physiotherapy on duration of living at home and functional capacity among older persons with signs of frailty or with a recent hip fracture - protocol of a randomized controlled trial (HIPFRA study)

Paula Soukkio,[✉#1] Sara Suikkanen,[#1] Sanna Kääriä,[4] Hannu Kautiainen,[3] Sarianna Sipilä,[2] Katriina Kukkonen-Harjula,[1] and Markku Hupli[1]

Content of home-based physiotherapy

	Warm-up	Strength exercises	Flexibility exercises	Balance exercises	Functional exercises
Modes of activities	Various activities	Orientation 2–3 weeks: based on the Otago exercise program [31] (5 leg muscle strengthening exercises with up to 4 levels of difficulty). Muscle strength, power and endurance periods, each 8 weeks, repeated twice during 12 months	Various flexibility exercises for large joints and the spine to enlarge the ROM	Otago [31] exercises (12 balance exercises with up to 4 levels of difficulty)	Flexibility, strength and balance exercises combined with IADL activities and walking outside
Intensity	Low to moderate	Moderate to vigorous (12–17 of RPE) [36]	Moderate	Challenges to the individual's balance abilities	Challenges to the individual's functional abilities
Progression	Changing intensity and activities according to physical condition	Using extra weights, increasing the level of difficulty	Changing activities	Selecting more advanced balance exercises (e.g. static, dynamic, dual task)	Selecting more advanced functional exercises
Frequency	2 times / week	2 times / week	2 times / week	2 times / week	One time / week
Duration	Approx. 5–10 min	Approx. 30 min	Approx. 10 min	Approx. 20 min	Integrated to other exercises
Assessment	Shortness of breath	SPPB [28, 56], RPE [36]	ROM	Time (s), observation	Task accomplishment

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PICO

Patient Problem, (or Population)

- What are the patient's demographics such as age, gender and ethnicity? Or what is the or problem type?

Intervention

- What type of intervention is being considered? For example, is this a medication of some type, or exercise, or rest?

Comparison or Control

- Is there a camparison treatment to be considered? The comparison may be with another medication, another form of treatment such as exercise, or no treatment at all.

Outcome

- What would be the desired effect you would like to see? What effects are not wanted? Are there any side effects involved with this form of testing or treatment?

(Schardt, C., Adams, M. B., Owens, T., Keitz, S., & Fontelo, P. (2007). Utilization of the PICO framework to improve searching PubMed for clinical questions. *BMC Medical Informatics and Decision Making*, 7, 16. doi: http://dx.doi.org/10.1186/1472-6947-7-1
Fineout-Overholt, E., & Johnston, L. (2005). Teaching EBP: asking searchable, answerable clinical questions. *Worldviews On Evidence-Based Nursing*, 2, 157-160.)

Review > Sports Health. 2024 May-Jun;16(3):377-382. doi: 10.1177/19417381231175665.

Epub 2023 Jun 16.

Home-Based Indoor Physical Activity Programs for Community-Dwelling Older Adults: A Systematic Review

Isis Kelly Dos Santos [1], Ricardo Ney Cobucci [2], Jason Azevedo de Medeiros [1], Gilmara Gomes de Assis [3], Rafaela Catherine da Silva Cunha de Medeiros [4], Maria Irany Knackfuss [4], Breno Guilherme de Araújo Tinoco Cabral [5], Ronaldo Vagner Thomatieli Dos Santos [6], Paulo Moreira Silva Dantas [7]

Affiliations + expand

PMID: 37329120 PMCID: PMC11025514 DOI: 10.1177/19417381231175665

Context: Home-based exercise programs are a good strategy to promote benefits to health for people who cannot visit gyms, clinics, or have limited time for physical activity outside.

Objective: To synthesize the effect of home-based indoor physical activity on psychosocial outcomes and mobility in community-dwelling older adults.

Data Sources: A comprehensive search was conducted in the MEDLINE, PubMed, Embase, SPORTDiscus, Cochrane Library, Scopus, and Google Scholar databases.

Study Selection: A total of 11 studies (13 publications) were included involving a total of 1004 older adults.

Study Design: A systematic review of randomized controlled trials was conducted using the aforementioned 7 databases. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed.

Level of Evidence: Level 2.

Data Extraction: Two authors independently selected studies, extracted data, and determined the risk of bias and evidence level using the Grading quality of evidence and strength of recommendations (GRADE) guidelines. We conducted a synthesis without meta-analysis (SWiM) to assess the outcome.

Results: There is moderately certain evidence that home-based exercise programs reduced the fear of falling. Psychosocial (mental health and quality of life) and mobility outcomes may improve after participating in the intervention inside the home.

Conclusion: The review found very low to certain evidence that home-based exercises programs improved psychosocial outcomes (mental health and quality of life) and walking speed (mobility). Moderately certain evidence suggests that home-based exercises improved fear of falling.

Protocol Register Number: CRD42020182008.

Meta-Analysis > BMC Geriatr. 2024 Oct 1;24(1):800. doi: 10.1186/s12877-024-05393-4.

The effectiveness of unsupervised home-based exercise for improving lower extremity physical function in older adults in Western and Eastern cultures: a systematic review and meta-analysis

Ian Ju Liang [1 2], Oliver J Perkin [1 2], Polly M McGuigan [1], Bruno Spellanzon [1], Molly Robb [1], Chien-Yu Liu [3], Linda L Lin [4], Dylan Thompson [1 2], Max J Western [5 6]

Affiliations + expand

PMID: 39354428 PMCID: PMC11443890 DOI: 10.1186/s12877-024-05393-4

Background Ageing leads to decreased physical function, which can impact independent living and raise health risks, increasing demand on healthcare resources. Finding affordable and accessible exercise to improve physical function is necessary for a population seemingly resistant to strength and balance training in leisure settings. This review aimed to evaluate whether unsupervised home-based exercises improve lower extremity function in older adults.

Methods We systematically searched for randomised controlled trials (RCTs) and cluster RCTs investigating unsupervised home-based exercises' effects on physical function in older adults through English and Mandarin databases. Studies' methodological quality was assessed using the Cochrane's Risk of Bias Tool. Meta-analyses were conducted on lower extremity functions outcomes.

Results Of the 6791 identified articles, 10 English studies (907 participants) were included, 8 studies (839 participants) were used for final meta-analysis, with no Mandarin studies. Studies were largely based in Europe with mostly moderate risk of bias. Most interventions were multicomponent lasting 10–40 min/session, 3 times/week. Meta-analysis showed no statistically significant differences in 5 sit-to-stand ($p=0.05$; $I^2=0\%$), maximal knee extension strength ($p=0.61$; $I^2=71\%$), 10 m maximal walking speed ($p=0.22$; $I^2=30\%$), timed-up-to-go ($p=0.54$; $I^2=0\%$), and short physical performance battery ($p=0.32$; $I^2=98\%$) between exercise and control groups.

Conclusions This meta-analysis suggests that unsupervised home-based exercise programmes have little impact on lower extremity functions in older adults. This review is limited by the small number of included studies, sample sizes, and high heterogeneity. There is a need to understand why this format lacks efficacy, and design more beneficial home-based exercise programmes.

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J Nutr Health Aging. 2021;25(7):824-853
Published online July 30, 2021, http://dx.doi.org/10.1007/s12603-021-1665-8

Special Article

International Exercise Recommendations in Older Adults (ICFSR): Expert Consensus Guidelines

M. Izquierdo[1,2], R.A. Merchant[3,4], J.E. Morley[5], S.D. Anker[6], I. Aprahamian[7], H. Arai[8], M. Aubertin-Leheudre[9-10], R. Bernabei[11], E.L. Cadore[12], M. Cesari[13], L.-K. Chen[14], P. de Souto Barreto[15,16], G. Duque[17,18], L. Ferrucci[19], R.A. Fielding[20], A. García-Hermoso[1,2], L.M. Gutiérrez-Robledo[21], S.D.R. Harridge[22], B. Kirk[17,18], S. Kritchevsky[23], F. Landi[11], N. Lazarus[22], F.C. Martin[24], E. Marzetti[11], M. Pahor[25], R. Ramírez-Vélez[1,2], L. Rodriguez-Mañas[2,26], Y. Rolland[15,16], J.G. Ruiz[27], O. Theou[28], D.T. Villareal[29], D.L. Waters[30], C. Won Won[31], J. Woo[32], B. Vellas[15], M. Fiatarone Singh[33,34]

https://link.springer.com/content/pdf/10.1007/s12603-021-1665-8.pdf

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Exercise recommendations for optimal ageing and maintenance of functional capacities in older adults

	Resistance Training	Aerobic Exercise Training	Balance Training
Frequency (days per week)	2 – 3	3 – 7	1 – 7
Volume	1–3 sets of 8–12 repetitions, 8–10 major muscle groups	20 – 60 minutes / session	1 – 2 sets of 4 – 10 different exercises emphasizing static and dynamic postures
Intensity	Start at 30-40% of 1RM and progress to heavier loads of 70–80% 1 RM (15–18 on Borg Scalea) 1-3 min rest between sets Power training at 40 – 60% of 1RM	12–14 on Borg Scale[a] (55–70% heart rate reserve or maximum exercise capacity)	Progressive difficulty as tolerated[b] Narrowing the base of support Perturbation of ground support Decrease in proprioceptive sensation Diminished or misleading visual inputs Movement of the centre of mass of the body away from the vertical or stationary position Dual tasking: adding a cognitive distractor or secondary physical task while practising a balance task
Specific Physiological adaptations	• Strength • Power • Hypertrophy • Endurance • Maximal aerobic capacity	• Maximal aerobic capacity • Sub-maximal endurance • Cardiac contractility/stroke volume • Peripheral oxygen extraction • Arterial stiffness • Heart rate variability	• Dynamic stability
Exercise examples	• Multiple and single joint exercises (free weights and machine) with slow to moderate lifting velocity • Bench press and squat • Knee extensions and knee curls • Exercise selection can be varied through alterations in body posture, grip, hand and foot stance, unilateral vs bilateral exercises • Once body weight no longer serves as a sufficient source of overload, additional resistance can be provided by machines or free weights as needed to ensure progression.	• Dancing • Cycling • Hiking • Jogging / long distance running • Swimming • Walking with change in pace and direction • Treadmill walking • Stair climbing • Step-ups • Seated stepping • Recumbant cycling May start with 5-10 mins and progress to 15-30 mins. The intensity is proportional to heart rate and/or perceived exertional scales if on B blockers or has pacemaker and can be increased from moderate to vigorous depending on fitness.	• Tai Chi • Standing yoga or ballet movements • Tandem walking • Standing on one leg, stepping over objects, climbing slowly up and down steps • Turning • Standing on heels and toes, walking on a compliant surface such as foam mattresses • Maintaining balance on a moving vehicle, such as a bus or train • Dual-tasking: adding cognitive distractor while maintaining balance Many conditions in older adults require balance training before aerobic exercise/ gait retraining

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Exercise recommendations targeting optimal body composition for older adults

Exercise recommendations	Decreased adipose tissue mass and visceral/central deposition	Increased muscle mass and function	Increased bone mass and density and reduced fracture risk
Modality	• Aerobic or resistance training	• Resistance training	• Resistance training • High-impact activities (e.g. jumping using weighted vest during exercise) if tolerated by joints. Not recommended for people with vertebral osteoporosis • Balance training
Frequency	• Aerobic: 3–7 days/week • Resistance: 3 days/week	• 3 days/week	• Resistance training: 3 days/week • Balance training: up to 7 days/week
Volume	• Aerobic: 30–60 min/session • Resistance: 2–3 sets of 8–10 repetitions of 6–8 muscle groups	• 2–3 sets of 8–10 repetitions of 6–8 muscle groups	• 2–3 sets of 8–10 repetitions of 6–8 muscle groups • 50 jumps per session for high impact[a] • 2–3 repetitions of 5–10 different static and dynamic balance postures
Intensity	• Aerobic: 60–75% of maximum exercise capacity (VO2 max or maximum heart rate) or 13–14 on the Borg Scale of perceived exertion • HIIT training: 85-95% peak heart rate; 1 to 4 intervals of 4 min, 3 days/week • Resistance: 70–80% of maximum strength (one repetition maximum) exertion	• 70–80% of maximum capacity (one repetition maximum)	• 70–80% of maximum capacity (one repetition maximum) as load • 5–10% of body weight in vest during jumps; jumps or steps of progressive height • Practice the most difficult balance posture not yet mastered

a. Thus far proven only in premenopausal women and adolescents or when combined with resistance training/multi-modality exercise in older adults; HIIT: High-intensity interval training

- Test and evaluation of functional ability
- Evaluation of home-based rehabilitation process
- If need. New home-based rehabilitation program or update it
- Future plan

END & FOLLOW

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EBP and Nordic Walking

Marja Äijö, PhD, Physiotherapist

Principal lecturer of gerontology and rehabilitation, Savonia –UAS, Kuopio, Finland

Pole walking and Nordic walking

- **Pole walking (sauvakävely):**
  - Any form of exercise that uses one or two handheld poles
  - as support walking can be considered to pole walking
- **Nordic walking (suomalainen sauvakävely):**
  - Nordic walking has its roots in the summer training of cross country skiers (from 1930 ?) and poles which were ski poles applied to walking, running and leaping, especially uphill)
  - 1997 Nordic walking becomes its own discipline when Excel made first poles for sale
  - At the same time Suomen Latu begin comprehensive marketing of the discipline and instructions of Nordic walking
  - 1998 there were 160 000 regular pole walkers and over 500 000 had tried it

Iivo Niskanen in February 2019

(https://www.nordicwalkingcouncil.com/eng/statements.html)

Comment > Br J Sports Med. 2014 Nov;48(21):1577-8. doi: 10.1136/bjsports-2013-093294.
Epub 2014 Feb 6.

Health benefits of Nordic walking; a systematic review

Stephanie Mathieson [1], Chung-Wei Christine Lin [1]

Affiliations + expand

PMID: 24505040 DOI: 10.1136/bjsports-2013-093294

Context: Modern lifestyle, with its lack of everyday physical activity and exercise training, predisposes people to chronic diseases such as diabetes mellitus, obesity, hypertension, and coronary artery diseases. Brisk walking as a simple and safe form of exercise is undisputedly an effective measure to counteract sedentary lifestyle risks even in the most unfit and could lead to a reduction of the prevalence of chronic diseases in all populations. The purpose of this review is to systematically summarize, analyze, and interpret the health benefits of Nordic walking (walking with poles), and to compare it to brisk walking and jogging.

Evidence acquisition: A systematic and comprehensive literature search was performed between November 2010 and May 2012. Data were analyzed between April 2011 and May 2012.

Evidence synthesis: Sixteen RCTs with a total of 1062 patients and 11 observational studies with 831 patients were identified. The current analysis revealed that with regard to short- and long-term effects on heart rate, oxygen consumption, quality of life, and other measures, Nordic walking is superior to brisk walking without poles and in some endpoints to jogging.

Conclusions: Nordic walking exerts beneficial effects on resting heart rate, blood pressure, exercise capacity, maximal oxygen consumption, and quality of life in patients with various diseases and can thus be recommended to a wide range of people as primary and secondary prevention.

Nordic walking in the second half of life.

Skórkowska-Telichowska K, Kropielnicka K, Bulińska K, Pilch U, Woźniewski M, Szuba A, Jasiński R.

Aging Clin Exp Res. 2016 Dec;28(6):1035-1046. doi: 10.1007/s40520-016-0531-8. Epub 2016 Jan 23.

Objectives: The objective of this article is to review the literature regarding the effectiveness and safety of Nordic walking (NW) in therapeutic rehabilitation in patients of an advanced age.

Methods: Randomized studies comparing NW with different patterns of long-lasting physical rehabilitation in older adults (average age 65 years) were selected for the review. Studies were identified through a Medline database search covering the last 21 years.

Results: Seventy-four studies on this subject were identified, 37 of them fulfilled the required criteria and 27 of these were analyzed in this review.

Discussion: Nordic walking provides a safe and effective way to enhance physical activity in the elderly. It could also serve as a method of rehabilitation that improves fitness, the performance and the exercise capacity of aged persons with diseases associated with an advanced age: cardiovascular diseases due to atherosclerosis; metabolic syndrome without diabetes; early stage Parkinson's disease; chronic obstructive pulmonary disease and lowering depression in women with Sjögren's Syndrome.

Influence of **Walking** as Physiological Training to Improve Respiratory Parameters in the Elderly Population.

Novotová K, Pavlů D, Dvořáčková D, Arnal-Gómez A, Espí-López GV.

Int J Environ Res Public Health. 2022 Jun 29;19(13):7995. doi: 10.3390/ijerph19137995.

Walking as physiological training is reported to be an effective activity in order to beneficially influence and slow the onset of aging in healthy elderly people. However, insufficient evidence exists on how walking influences lung function in seniors. In our study, we aim to evaluate the effect of different types of walking on lung function in healthy seniors. The PubMed, Web of Science, Scopus and EBSCO Essentials databases were searched, while the methodological quality was assessed by the RoB2 tool. A total of seven studies (RCTs) published between 2002-2022 that met the eligibility criteria were analysed in this review. All participants were older adults without any specific associated disease, aged 60 and above. The interventions included structured physical activity; a high/moderate exercise program; long-term regular walking; walking as a part of functional movement training; walking sideways, backward and forward as a part of aerobic training; fast walking; Stepper walking; walking on a treadmill combined with incentive spirometry; and Nordic walking. Overall, most of the mentioned types of walking led to improved lung function in healthy elderly subjects. However, the prescribed Stepper walking program did not improve lung function in healthy seniors.

23.

The Effects of **Walking** or **Nordic Walking** in Adults 50 Years and Older at Elevated Risk of Fractures: A Systematic Review and Meta-Analysis.

Rodrigues IB, Ponzano M, Butt DA, Bartley J, Bardai Z, Ashe MC, Chilibeck PD, Thabane L, Wark JD, Stapleton J, Giangregorio LM.

J Aging Phys Act. 2021 Oct 1;29(5):886-899. doi: 10.1123/japa.2020-0262. Epub 2021 Feb 11.

Walking is a common activity among older adults. However, the effects of walking on health-related outcomes in people with low bone mineral density (BMD) are unknown. The authors included randomized controlled trials comparing walking to control in individuals aged ≥50 years with low BMD and at risk of fractures. The authors identified 13 randomized controlled trials: nine multicomponent interventions including walking, one that was walking only, and three Nordic walking trials. Most studies had a high risk of bias. Nordic walking may improve the Timed Up-and-Go values (1.39 s, 95% CI [1.00, 1.78], very low certainty). Multicomponent interventions including walking improved the 6-min walk test (39.37 m, 95% CI [21.83, 56.91], very low certainty) and lumbar spine BMD (0.01 g/cm2, 95% CI [0.00, 0.03], low certainty evidence). The effects on quality of life or femoral neck BMD were not significant. There were insufficient data on fractures, falls, or mortality. Nordic walking may improve physical functioning. The effects on other outcomes are less certain; one may need to combine walking with other exercises to be of benefit.

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Home-based rehabilitation and Nordic Walking – What is evidence?

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Thank you! Kiitos! Gracias! Merci! Děkuji!

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