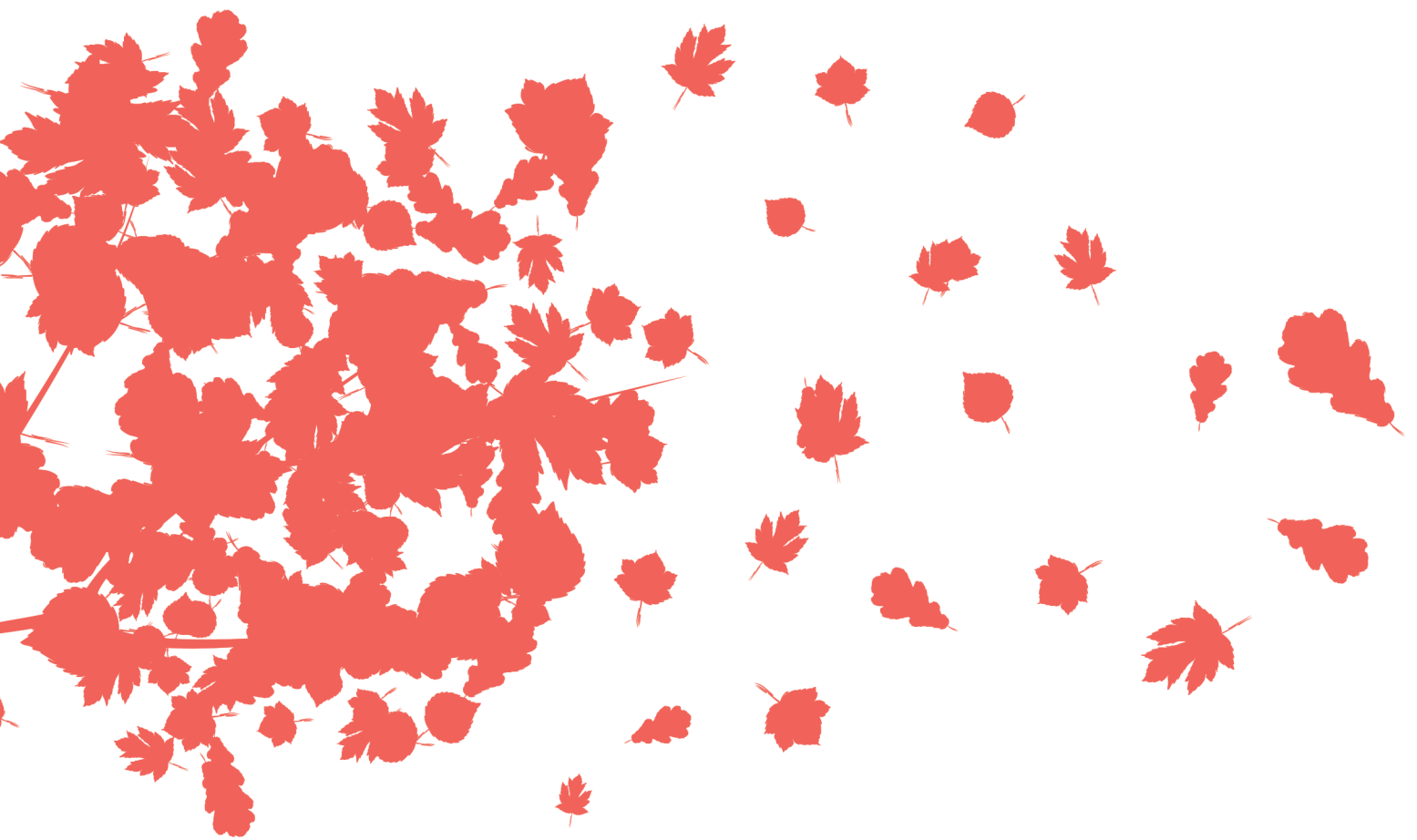




**Promoting physical
activity and healthy
diets for healthy ageing**
in the WHO European Region



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Abstract

Lifestyle and medical advances that contribute to longevity are achievements to celebrate, but they have brought considerable and unintended social, economic and health challenges as life expectancy increases faster than life-years spent in good health. In this context, healthy ageing – defined by WHO as a process of developing and maintaining functional abilities to foster well-being in older adults – not only increases the welfare of older adults, but also directly influences health-care and long-term care costs. Although health status in older ages mainly is dependent on lifestyles determined during adulthood and youth, the level of physical activity and quality of diet in older age are also important determinants of health, well-being, functional ability, mobility and independence. For most older people, healthy ageing means much more than just the absence of diseases; it also represents the maintenance of good functional ability. This report advocates for investment in promoting healthy lifestyles in the older population to encourage active healthy ageing and increase healthy life expectancy. Inspiring examples of innovations in promoting physical activity and healthy diets from across the WHO European Region are presented to support implementation and scale-up of interventions by Member States.

Keywords

AGED
EXERCISE, PHYSICAL
DIET
NUTRITIONAL REQUIREMENTS
NUTRITION POLICY

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Foreword

In recent years, the world has witnessed a profound transformation in the way we perceive and approach the concept of healthy ageing. The COVID-19 pandemic, war in Europe and other crises have served as a stark reminder that we must do more to address the vulnerabilities of our ageing population. As we reflect upon the lessons learnt from this crisis, it becomes evident that our efforts must be redoubled to ensure the well-being of older people.

This report, *Promoting physical activity and healthy diets for healthy ageing in the WHO European Region*, comes at a crucial moment, as we strive to align our actions with the United Nations Decade of Healthy Ageing, the Sustainable Development Goals (SDGs) and WHO's ambitious Triple Billion targets. The Decade of Healthy Ageing is a global collaboration aligned with the last 10 years of the SDGs to improve the lives of older people, their families and the communities in which they live. The SDGs provide a comprehensive framework for addressing the challenges faced by older people within the broader context of sustainable development. The Triple Billion targets specifically focus on universal health coverage, health emergencies and healthier populations. By emphasizing these global initiatives, we underscore the importance of prioritizing healthy ageing in our policy decisions and programmatic interventions.

The effective delivery of healthy ageing requires that the root causes of age-related diseases are addressed. Unhealthy diets, insufficient physical activity and sedentary behaviours have become pervasive issues that contribute to the burden of chronic illnesses among older people. It is imperative that we adopt a holistic approach that encourages healthy lifestyle choices and ensures access to appropriate health-care services.

Equity must be at the forefront of our programme delivery. We must strive to bridge the gaps in access to health care and social services, ensuring that all older people, regardless of their socioeconomic status, geographic location or demographic background, have equal opportunities to lead healthy and fulfilling lives. By promoting inclusivity, we can create a society that values and respects the dignity of older people.

We must also bring services closer to people. Accessibility and proximity to health care and social support are critical factors that can significantly impact the quality of life of older people. By establishing community-based care and support systems, we can ensure that older people receive the assistance they need, allowing them to remain active, engaged and connected to their communities.

This report showcases the importance of placing countries at the centre of our efforts. By strengthening local and community activities, we can empower countries to develop tailored strategies that address the unique needs of their ageing populations. Examples of successful initiatives presented in the report highlight the potential for innovation and collaboration in promoting healthy ageing.

The report serves as a call to action to embrace the principles of healthy ageing. By acknowledging the vulnerabilities exposed by the COVID-19 pandemic, aligning our efforts with the Decade, SDGs and the Triple Billion targets, addressing the root causes of diseases, empowering countries,

ensuring equity and bringing services closer to people, we can lay the foundations for a future in which all individuals can age with dignity and with positive well-being.

Together, let us embark on this journey towards healthy ageing, paving the way for a more inclusive and resilient world for generations to come.

—
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Abbreviations

BMI	body mass index
CVDs	cardiovascular diseases
EU	European Union
NCDs	noncommunicable diseases
NGO	nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
OPTIFEL	Optimised Food Products for Elderly Populations (project)
PA	physical activity
PAHA	Promoting Physical Activity for Healthy Ageing (project)
SDGs	(United Nations) Sustainable Development Goals

Executive summary

Across Europe, more people are living longer than ever before, but for many, these extra years are not necessarily healthy years. The healthy ageing concept focuses on developing and maintaining the functional ability that enables older people to preserve and improve their physical and mental health, independence, social well-being and quality of life.

WHO defines healthy ageing as a process of developing and maintaining functional abilities to foster well-being in older adults. This means having the capabilities that enable all older people to be and do all the things they have reason to value, including their ability to meet their basic needs, learn, grow, make decisions, be mobile, build and maintain social connections and continue to contribute to society.

Regular physical activity (PA) is one of the most important options older people can take to improve their physical and cognitive function, mental health and well-being. Barriers and limitations to being active are quite common for this age group, however, rendering them vulnerable to becoming physically inactive.

A healthy diet is also a key factor in reducing, preventing and (sometimes) being part of treating age-related diseases and noncommunicable diseases. Older adults, who are at higher risk of all forms of malnutrition, should be encouraged to adopt healthier eating habits.

PA

Adults aged 65 and older (of varying mental and physical capacities) should try to engage in regular PA by doing at least 150 minutes a week of moderate-intensity aerobic activity (such as brisk walking) or at least 75 minutes a week of vigorous-intensity activity (such as swimming or jogging). Older adults are also encouraged to do muscle-strengthening activities on two or more days a week. To enhance functional capacity and prevent falls, their weekly routine should include varied activities to improve balance and flexibility on at least three days.

Those who do not engage in regular activities should start with small amounts and gradually increase duration, frequency and intensity. If chronic conditions limit their ability to meet these guidelines, older people should be as active as their abilities and conditions allow.

All older adults should limit the amount of time spent being sedentary.

Healthy diet

The older adult population is a heterogenous group with unique dietary needs. Older adults should aim to follow healthy dietary patterns, particularly because of their heightened risk of all forms of malnutrition.

Most older people have lower calorie needs than younger adults as a result of participating in less PA, changes in metabolism and/or age-related loss in bone and muscle mass. Generally, older adults

can benefit from eating more fruit, vegetables and dairy foods. Older women can also benefit from eating more protein-based foods. Low hydration is an important area of concern.

Socioeconomic status, level of social support and degree of social interaction greatly affect older people's health, well-being and eating habits. Maintaining good oral and dental health is important to ensuring optimal nutritional status, quality of life and self-esteem.

Policy response

Effective healthy ageing policies need to consider the heterogeneity of the older population, address the inequalities that underlie diversity, fight against ageism (how people think, feel and act on ageing), consider the environment in which older people live and recognize the need for coherent and integrated working.

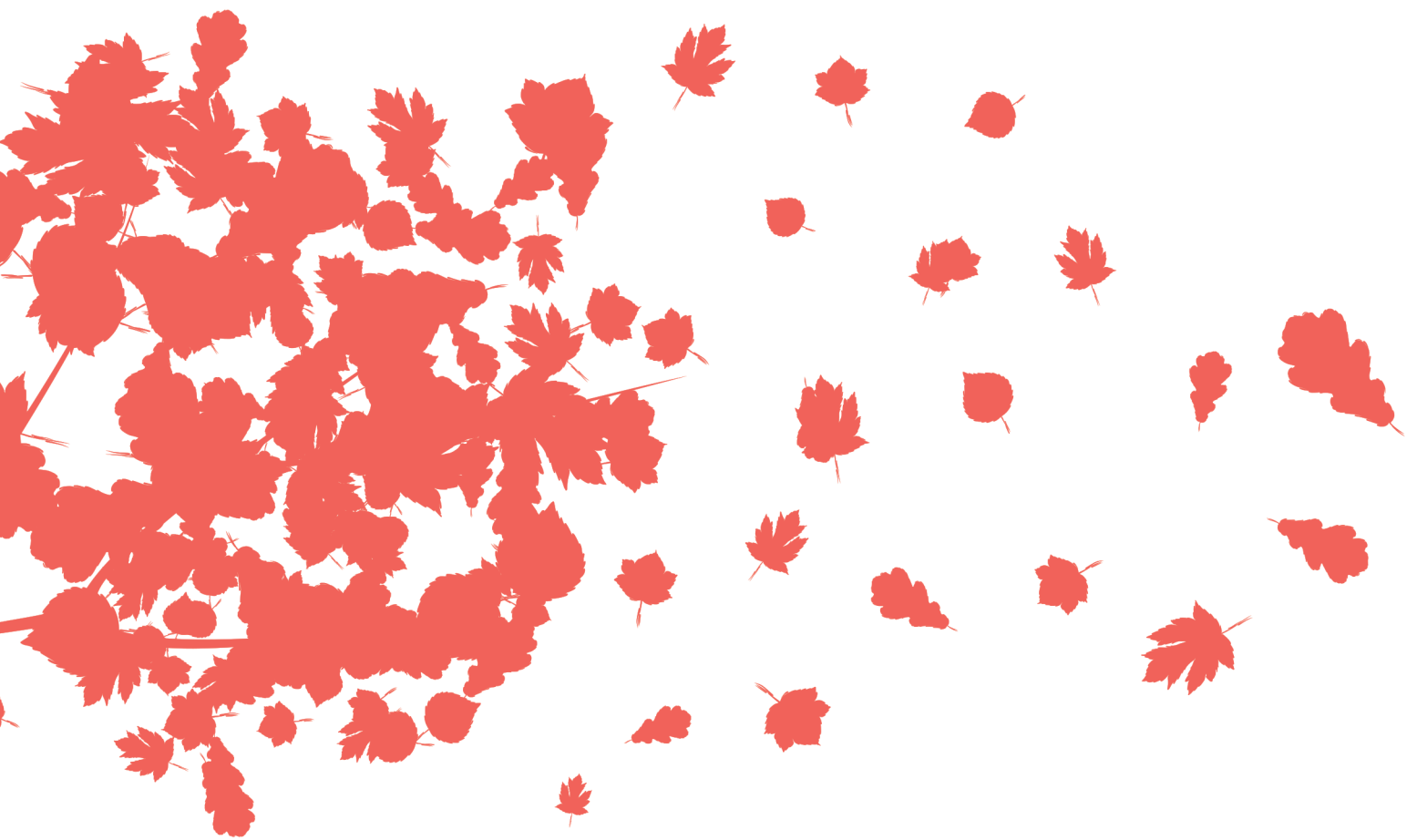
Food and nutrition policies tend to be comprehensive in nature, aiming to ensure adequate nutrition for the entire population. Most countries now have strategies for older people in place, but huge intercountry differences persist, and implementation remains far from optimal.

PA policies need to address issues such as gaps in public awareness, urban planning, transportation, health financing and social welfare systems. If successful, their impact can go far beyond achieving better health by also reducing health-care costs, making cities more liveable and attractive, reducing air pollution and revitalizing neighbourhoods.

Conclusion

Maintaining health and supporting older people to be autonomous and independent are matters of common interest for individuals and societies. Policies for healthy ageing have a crucial role in mitigating ageing-related pressure on health-care systems and economies. Those that promote healthier lifestyles are key but require changes to individual behaviour, meaning that improvements may be difficult to realize. While it is never too early and never too late to change lifestyles, it is clear that the earlier the changes are made, the higher the chances of enjoying a longer and healthier life.

The COVID-19 pandemic exposed the vulnerability of older adults and drew attention to existing gaps in policies, systems and services. Concerted actions on healthy ageing are urgently needed to ensure that older people can fulfil their potential in dignity and equality, and in healthy environments.



Introduction

Ageing is now a major societal trend, providing both challenges and opportunities for individuals and countries. This chapter presents an overview of recent demographic changes in Europe. It also introduces the healthy ageing concept and its main components. Finally, it summarizes the role of physical activity (PA) and healthy diets in the older population.

KEY MESSAGES

- Currently, life expectancy in the WHO European Region is rising faster than healthy life-years.
- The healthy ageing concept focuses on developing and maintaining functional abilities to foster well-being in older adults.
- The older population is diverse. The wide range of needs and capacities in this population needs to be considered when designing policies.
- Regular PA is one of the most important options older people can take to improve their physical and cognitive function, mental health and well-being. Barriers and limitations to being active are quite common for this age group, however, rendering them vulnerable to becoming physically inactive.
- A healthy diet is also a key factor in reducing, preventing and (sometimes) being part of treating age-related diseases and noncommunicable diseases (NCDs). Older adults, who are at higher risk of all forms of malnutrition, should be encouraged to adopt healthier eating habits.

Population ageing in Europe

The number and proportion of people aged 65 and over in the population of Europe are increasing (1). By around 2050, population trends suggest that the number of people aged 65 and over will increase by up to 25%, eventually outnumbering those under 25 (2). This change arises as a result of three demographic events: births, deaths and migrations.

Europe has the highest average life expectancy for females among the continents and third highest for males (after North America and Oceania) (3). Living longer may seem a good thing, but the number of people who can enjoy the last 15–20 years of their life in good physical and mental health differs within and between countries (4). If life expectancy continues to rise as predicted and healthy life-years do not increase at the same rate, people will spend even longer periods in ill health in the future (5). The decline in the number and share of the working-age population and the increasing proportion of older adults have profound implications for governments, policy-makers and businesses, and lead to challenges for pension, health-care delivery and long-term care costs.

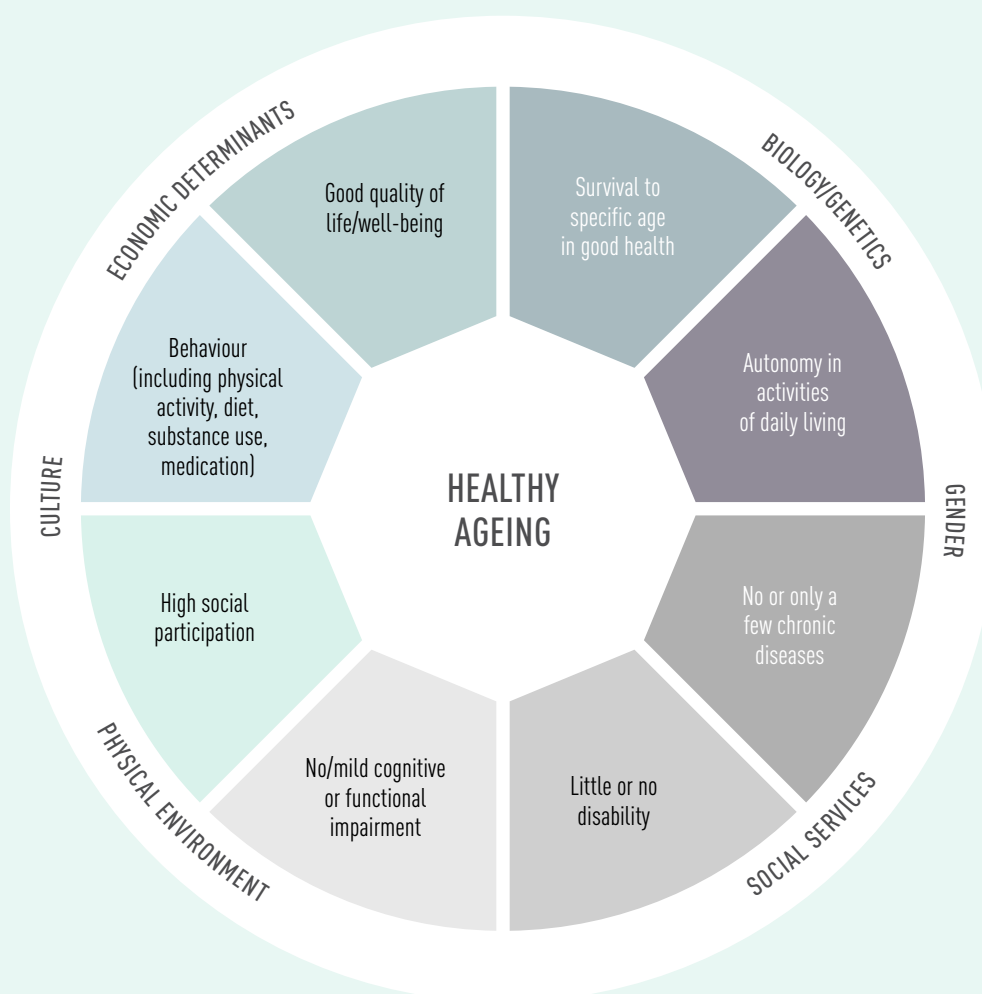
The healthy ageing concept

Globally, there is little evidence that older people today are in better health than previous generations (6). Good health in older age is not distributed equally, either between or within countries. The healthy ageing concept focuses on prevention, health promotion and functional ability to enable people to age more healthily and be in better condition to maintain active and independent lives.

WHO defines healthy ageing as a process of developing and maintaining functional abilities to foster well-being in older adults. This means having the capabilities that enable all older people to be and do all the things they have reason to value, including their ability to meet their basic needs, learn, grow, make decisions, be mobile, build and maintain social connections and continue to contribute to society (Fig. 1) (6,7).

Functional ability consists of the intrinsic capacity of the individual, relevant environmental characteristics, and the interaction between them. Intrinsic capacity comprises all the mental and physical capacities that people can draw on and includes their ability to walk, think, see, hear and remember. The level of intrinsic capacity is influenced by many factors, including the presence of disease, injuries and age-related changes (6).

Fig. 1. Components of healthy ageing



Source: Fuchs et al. (8). Reproduced with permission.

Healthy ageing is linked to environmental factors, such as strategies, systems, services (transport, housing, social protection, streets and parks), social, health and long-term care facilities, technology, social networks, care providers and positive social experiences, and their interactions (7,9). Being able to live in environments that support and maintain people’s intrinsic capacity and functional ability is key to healthy ageing.

A healthy lifestyle is an essential component of the healthy ageing concept. Healthy behaviours, such as having adequate nutrition and taking regular PA across the life-course, are associated with the prevention and control of NCDs, including cardiovascular diseases (CVDs), diabetes, cancer, osteoporosis, dementia and mental health problems, and other conditions such as sarcopenia and mobility limitations (9,10). The healthy ageing concept can be an effective tool for improving and changing unhealthy behaviours and social–environmental factors, helping older adults attain and maintain healthy, autonomous and independent lives (6). With good health, older people can continue to be active members of their communities, producing a positive knock-on effect on society (Example 1).

EXAMPLE 1

Strength in Old Age: the Finnish national policy programme for older people’s PA

The National Board on Health Promoting Exercise, which is appointed by the Finnish Government, suggested that the Executive Board of the national Strength in Old Age health programme (Fig. 2) (11) should design a national policy programme (12,13) to increase older people’s PA. The policy programme was developed in cooperation with the European Union (EU)-funded PASEO project (14) and was carried out over three time periods: 2005–2009, with participation from nongovernmental organizations (NGOs); 2010–2015, with 38 municipalities; and 2016–2021, with 48 municipalities. The fourth period started in 2021 and is now ongoing.

Fig. 2. Strength in Old Age programme, Finland



The target group of the programme includes: older people who do not get enough exercise for their health; people aged 65 and above who are retiring; people aged 75 and over who are living independently and having early mobility problems; and older people in home services, service housing or long-term institutional care. The starting point is to increase everyday activity and PA independently or under guidance.

The policy programme offers recommendations in six areas: cross-sectoral cooperation and division of activity; environment and facilities; exercise counselling and activities; public awareness, attitudes and expertise; dialogue between research and development; and coordination, follow-up and evaluation of the programme.

The programme is coordinated and mentored by the Age Institute of Finland and provides exercise counselling, guided strength and balance training, opportunities for daily and outdoor exercises, and online training. Activities are organized locally, with municipalities chosen based on their application to the programme. Currently, around 100 municipalities are participating, most of them having formed a cross-sectoral collaboration group to coordinate local PA, and 250 trainers have been instructed in disseminating PA good practices among the older population. Local joint exercise councils of older adults and decision-makers are also in place.

The Older People on the Move activities (15) started in 2019 as a continuation of the policy programme from the preceding Finnish Government. The Strength in Old Age health programme served as the model for activities and will continue in its current form. Municipalities and NGOs all over the country have participated, benefitting from skills training for exercise instructors, ideas for implementation at local level and the launch of a national mass media campaign.

Diversity of the older population

Older people's capacities vary enormously. One 70-year-old could have physical and mental capacities similar to a 40-year-old, while another could experience significant decline. This wide range in needs and capacities has to be taken into account when designing policies or interventions. Such diversity, however, is not completely random. Much can be explained by people's physical and social environments, economic status and health behaviours. A comprehensive public health response must address this heterogeneity and aim to reduce inequality in opportunities for healthy and active ageing (16).

Role of PA in older adults

PA refers to all movements produced by skeletal muscles that result in energy expenditure. It includes exercise, sport, and activities carried out as part of daily living, occupation, leisure or active transportation (walking, cycling or using public transport) (17). Regular PA is strongly linked with better physical and cognitive function and increased life expectancy.

Older adults, however, may be affected by the onset of diseases and loss of intrinsic capacity, including physical and mental capacity, that may negatively affect their life satisfaction. Older adults have specific needs as they progress through a complex process of physical, psychological and social changes. Not surprisingly, those who have difficulty in walking and need help for personal care

and household tasks are more inactive (18). Herein lies a paradox for older adults with disability: they cannot engage in PA due to their functional limitation, but cannot improve their functional performance if they do not engage in PA. Limitations in performing activities of daily living or walking are quite common among older populations, who are among the groups most vulnerable to becoming physically inactive (19). It therefore is crucial to develop PA programmes tailored to address barriers to mobility, improve functional performance and increase mobility outcomes (Example 2).

EXAMPLE 2

From strategy to local actions: the Spanish National Health System's prevention and health promotion strategy

This strategy (20) aims to progressively develop interventions that improve health and prevent diseases, injuries and disabilities. It was developed within the framework of the implementation plan for the strategy for addressing chronic disease across the Spanish National Health System.

For the population over 50 (one of the two priority target groups), the strategy encourages active and healthy ageing through the comprehensive integration of healthy lifestyles and safe physical activities in coordination with the health-care system, families and communities. The goal is to prevent functional impairment and promote health and emotional well-being within the age group. It also includes a plan for prevention and intervention for frailty in line with the European Innovation Partnership on Active and Healthy Ageing (21).

The strategy's action plan includes an online training programme for professionals that is offered free of charge and was developed through partnerships with the education, environment and sports sectors. Joint working with the sports sector included developing the "Activate: advise health" course, which focuses on PA for health and is aimed at health-care professionals, the education sector and communities. A website promoting healthy lifestyles has been developed for the public.

Local implementation of the strategy is taken forward through municipality commitments to creating an intersectoral working group and resources to help citizens improve their health. These resources are then added to the online resource Localiza Salud [Locate Health] (22), which was created to facilitate the visibility of community resources for preventing diseases and promoting health. The purpose was to reinforce interventions in a harmonized way across the fields of PA, healthy eating, and emotional health and well-being.

The negative health outcomes that result from insufficient PA can be avoided and the number of deaths reduced by adopting measures to incentive older adults to engage more regularly in PA. Member States of the WHO European Region are advised to promote PA as their best buy by endorsing the WHO Global Strategy on Diet, Physical Activity and Health (23), which is a framework for action to prevent and control sedentary behaviours, obesity and NCDs. The aim is to improve older adults' health outcomes and reduce the current heavy burden on health-care systems.

WHO acknowledges that PA is a major contributor to successful ageing and suggests regular moderate-to-vigorous intensity aerobic PA with limited sedentary activities for older adults to delay and prevent the onset of age-related illnesses such as osteoporosis, sarcopenia and CVDs (24) (Box 1). For additional health benefits, people can do more aerobic activities and incorporate

muscle-strengthening exercises and multicomponent activities that involve balance training and stretching. If older adults cannot follow the guidelines because of chronic conditions, they should be as active as their ability and conditions allow.

BOX 1

Physical Activity Strategy for the WHO European Region 2016–2025

The strategy (24) promotes PA as a contributing factor to health and well-being throughout the life-course. One of its priorities is to persuade governments and stakeholders to prioritize the promotion of PA among older adults. The aim is to increase current levels of PA by improving health professionals' advice on promoting PA, encouraging governments to provide infrastructure and suitable environments, and designing policies that facilitate easier access to affordable activities for older adults.

Physical inactivity is common among older adults. On average, they spend only 20% of their time in some level of PA, while the number of hours spent in sedentary behaviour is quite high (25). Sixty per cent of older adults are not able to achieve the recommended minimum of 150 minutes per week of moderate-to-vigorous PA (26). To attain benefits, exercise should be sustained. Successful maintenance of PA typically requires substantial support and supervision. Evidence suggests that older adults are motivated to take part in PA when encouraged by the media, clinicians, family or friends, and when activities are affordable and easily available (27) (Example 3).

EXAMPLE 3

Integrating more movement into daily routines: the Everyday training programme in Germany

The Everyday training programme (28) encourages adults aged 60 and over to include more PA in their everyday lives by sustainably integrating more movement into their daily routines. Participation is free of charge.

The programme advises older adults to use everyday activities as workouts. Trainers highlight typical everyday situations, such as climbing stairs, getting up (from bed or a chair), carrying, lifting and sitting down, and suggest a variety of simple exercises. The conscious application of various gait methods serves to improve participants' balance and they can use everyday items such as bottles of water and shopping bags to strengthen muscles. The group training atmosphere makes PA a fun activity. Exercises that aim to motivate greater movement in people's everyday life are also presented in the form of 25 cards in the programme's movement pack (29).

Positive health outcomes resulting from engaging in PA are beneficial for older adults (30) and increase with the volume of PA (26,31). Adults aged 60+ who comply with the current recommendation of 150 minutes per week of moderate-to-vigorous intensity PA reduce their risk of all-cause mortality by 28%, while those performing more PA can reduce their risk by 35% (26). The risk for many diseases and falls is reduced even for those who engage in less PA, and several other health benefits also accrue (17,32) (Fig. 3).

Fig. 3. Health benefits of exercise for older adults



Sarcopenia is defined as low muscle mass in combination with low muscle strength and/or low physical performance, which is often considered a hallmark of ageing and inactivity. Sarcopenia is a progressive and generalized disorder that is associated with increased likelihood of adverse outcomes, including falls, fractures, physical disability and mortality (33). It affects 30% of adults aged over 60 and more than 50% of those aged 80 and above. Resistant exercises have been found to be effective in reducing risk factors of developing cardiovascular and metabolic diseases, obesity, falls, osteoporosis and sarcopenia (30).

In addition to the physical benefits, older adults who engage in regular PA may improve their mental health, emotional, psychological and social well-being, and cognitive function (17). Evidence suggests that regular PA is associated with reducing the effects of cognitive decline and the risk of dementia and Alzheimer's disease. It also provides a positive effect on brain ageing and functions as a protective factor against depressive symptoms (34,35). Insufficient PA engagement is more prevalent among people with dementia and Alzheimer's disease (36).

Evidence shows that social network size and the volume and intensity of PA are important for gaining more positive health outcomes (27). PA may prevent the reduction of social networks among older adults, allowing them to remain socially active for longer. Social networks play a positive role in

mental health and cognitive functioning by providing a sense of meaning that incentivizes older adults to engage in PA (27,37).

In summary, exercise is the best preventive medicine for older age and reduces significantly the risk of dependency (Example 4).

EXAMPLE 4

National network of senior walking clubs in Hungary

In 2017, a walking programme for older adults in Hungary evolved into a nationwide network of senior walking clubs (38). Older people participate actively in more than 100 registered senior walking clubs across the country. All instructors have been trained to provide counselling on PA, and in many cases health professionals lead the walks.

Introducing walking as a community activity encourages older adults to maintain social relationships and peer contacts while promoting mental health and reducing the risk of falls. Municipalities and other civil organizations fund the programme, with some funding also offered by the Ministry of Health. Though the programme has very low financial requirements, resources are required to promote the programme and acquire media publicity to build enthusiasm among the population. An annual meeting allows network members to share experiences and increase their knowledge by listening to presentations from invited speakers and mentors (39).

The role of a healthy diet

A healthy diet is a key factor in reducing, preventing and sometimes treating age-related diseases and NCDs (40). Encouraging older adults to adopt healthier diets is key to improving and maintaining good health for as long as possible (41). Diets consisting of energy-dense foods and with high intakes of salt, saturated fat and sugar and low intakes of fruit, vegetables and vegetable oils result in earlier onset of CVDs, type 2 diabetes and cognitive decline among older adults (42).

Nutrition plays an important role throughout people's lives, but having a healthy diet becomes even more important for older adults, who are at higher risk of all forms of malnutrition, including overweight and obesity (43). Starting from the age of 60, total daily energy expenditure, adjusted for fat-free mass, gradually decreases (44). Overall, older people require fewer calories than their younger counterparts. In addition, as described above, PA decreases and sedentary behaviours increase with age. Obesity in older age is associated with limitations in activities of daily living, functional impairments and an increased risk of chronic diseases.

Nutritional deficiencies and weight loss due to reduced food intake and low dietary diversity are also prevalent among older people (45). Evidence suggests that food intake can decline by up to 25% in adults aged 70 and older (46). A wide range of factors can cause reduced food consumption, including impaired appetite (anorexia of ageing), lower access to food due to mobility limitations, and oral health problems that affect chewing and swallowing (47) (Table 1). People with Alzheimer's disease experience sensory impairment that reduces interest in eating and drinking due to loss of taste and smell (45). Medications commonly taken by older adults may also have a negative effect on

dietary intake due to their impacts of reducing appetite, creating a dry mouth, and causing cramping, drowsiness, forgetfulness and nausea (48). Lack of appetite and reduction in food intake makes it more difficult for older adults to meet nutritional and micronutrient requirements to maintain a healthy mind and body (49).

Table 1. Main reasons for malnutrition among older adults

Reasons	Signs and symptoms
Dementia	Not remembering to eat Inability to prepare meals Disturbances in sleep
Dentition	Poor oral hygiene Inability to chew
Depression	Decreased motivation to eat Reduced social interaction during mealtimes
Diarrhoea	Diarrhoea lasting more than four weeks Chronic discomfort Weight loss
Disease	Negative impacts on nutritional status Increased nutritional demands
Drugs	Adverse effects and interactions Reduced nutrient absorption
Dysfunction	Immune disorders Impaired wound healing Impairment to activities of daily living
Dysgeusia (taste disorder)	Reduced sense of taste Decreased appetite Lack of pleasure from eating
Dysphagia (difficulty swallowing)	Inability to eat and drink Increased anxiety about inability to swallow

Source: based on Haines et al. (47).

Reductions in food consumption, food quality and food diversity are associated with a decline in the intake of nutrients such as vitamins C, D and E, proteins, a number of antioxidants, carotenoids and selenium. In turn, this contributes to decreases in muscle mass and strength, bone mass, immune response, cognitive function and anaemia, with a consequent decline in physical capability and mobility in older age (46). Functional decline and comorbidities therefore are both causes and consequences of chronic undernutrition for older adults.

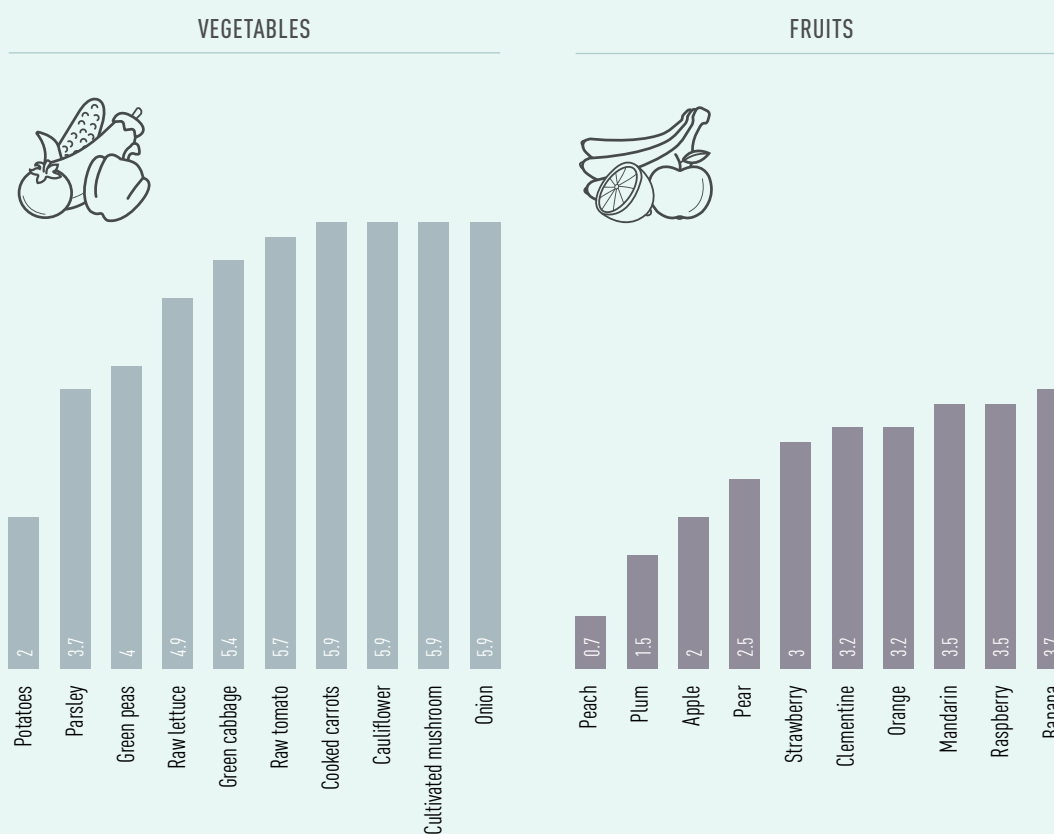
Nutritional intake in older adults can be increased by improving the eating environment (eating with family members or being motivated by caregivers), providing dietary advice, eating small but frequent high-energy and high-protein meals, and using fortified meals and oral nutritional supplements (50), which may provide key micronutrients such as vitamins D, B2 and B12, iron, folate and calcium (51). Vitamin D supplements, for instance, may improve muscle strength in people aged 65 and older (52), especially for those with vitamin D deficiency due to low intake or reduced sun exposure (Example 5).

Optimized food products for older populations: the OPTIFEL project

The Optimised Food Products for Elderly Populations (OPTIFEL) project (53) was a food research programme funded by the EU’s 7th Framework Programme for Research scheme between 2013 and 2017. It aimed to define and propose foods that would improve older people’s nutrition and eating pleasure by developing innovative vegetable- and fruit-based products. The target population was older adults who were still cooking at home or using meal-delivery services. The project took into consideration factors such as pleasure, food safety, adapted packaging and environmental impact and used sensory and preference trials to improve the texture of foods and develop products suitable for meeting nutritional needs, food preferences and physical capacities.

The main objective of OPTIFEL was to tackle malnutrition in older adults by providing more attractive and easy-to-eat foods and nutrient-dense food products. The products primarily were based on fruit and vegetables that are linked to improving overall health outcomes (Fig. 4).

Fig. 4. Older people’s preferences on fruit and vegetables: average percentage of older people disliking selected fruit and vegetable products



Source: OPTIFEL (54). Reproduced with permission.

Based on the project findings, the OPTIFEL partners developed a specification for the food industry that includes information about product development for older people. It consists of three sections: nutritional guidelines; functional guidelines; and guidelines for packaging.

The Mediterranean diet, considered to be an example of a balanced diet, has the potential to supply the required amount of energy, protein and nutrients needed for healthy ageing (55). Older adults will benefit from greater consumption of fruit and vegetables, as they are important sources of fibre, micronutrients and vitamins (56). The Mediterranean diet offers high intake of foods such as fruit, vegetables, cereals and legumes. It is low in saturated fatty acids and trans-fatty acids due to its low content of animal meats and processed foods, and contains nutrients like zinc, iron, vitamins B12 and D, calcium, folic acid and omega 3 fatty acids, which may play a role in improving cognitive function and lowering the risk of Alzheimer's disease (55). Observational studies support the suggestion that older adults with higher adherence to the Mediterranean diet have a more balanced nutrient profile and reduced risks of various age-related diseases (55). For better health outcomes, nutritional interventions should be combined with regular PA (52) (Example 6).

EXAMPLE 6

New dietary strategies addressing the specific needs of older people: the NU-AGE project

NU-AGE (57) was a large multidisciplinary partnership running from 2011 to 2016 which hypothesized that a one-year Mediterranean diet designed to meet the nutritional needs of older people would reduce inflammation in participants aged 65–79 and would have systemic health benefits. Impacts were assessed through a series of cellular and molecular parameters and the general health status of the participants.

The project had 1150 participants, who received nutritional advice, fortified foods and other support to adjust their diets to match the NU-AGE 65+ food pyramid. Results of the project proved that older people are able to change their dietary habits to derive benefits for specific health outcomes. The volunteers who adhered most closely to the NU-AGE diet decreased their plasma levels of C-reactive protein, one of the main inflammatory markers, and improved their lipid profile. The gut microbiota diversity was preserved in volunteers following the NU-AGE diet.

Eight new advanced traditional foods tailor-made for over-65 consumers and six tailored food prototypes – including a seed oil high in omega-3 and fortified with vitamin D, an olive oil high in polyphenols, a low-salt salami, and a symbiotic functional ultra-high-temperature processed milk that is lactose-free, hyperproteic (5%), low fat (1%) and enriched with fructo-oligosaccharides, long-chain omega-3 polyunsaturated fatty acids, vitamins and mineral salts – have been designed within the framework of the project.

NU-AGE introduced new dietary guidelines for adults aged over 65 and sought to contribute to the implementation of legislation related to nutritional and health claims for older adults in Europe.

Dehydration is a frequent cause of morbidity and mortality in older people. As older people are less sensitive to thirst and tend to have reduced food intakes, dehydration is common and is often overlooked (58). Offering older adults small quantities of water and liquids regularly throughout the day can be beneficial.

PA in older age

Older adults should aim to be physically active every day. This chapter outlines the frequency, intensity, type and duration of PA recommended for this age group. It also: describes the benefits of an active lifestyle on self-esteem and well-being and on reducing the risk of falls and cognitive disorders; looks at the barriers to PA in the older population; and introduces the concept of age-friendly spaces and cities.

KEY MESSAGES

- Adults aged 65 and older (of varying levels of mental and physical capacities) should try to engage in regular PA by doing at least 150 minutes a week of moderate-intensity aerobic activity (such as brisk walking) or at least 75 minutes a week of vigorous-intensity activity (such as swimming or jogging).
- Older adults are also encouraged to do muscle-strengthening activities on two or more days a week. To enhance functional ability and prevent falls, their weekly routine should include varied activities to improve balance and flexibility on at least three days.
- Those who do not engage in regular activities should start with small amounts and gradually increase duration, frequency and intensity. If chronic conditions limit their ability to meet these guidelines, older people should be as active as their abilities and conditions allow.
- All older adults should limit the amount of time spent being sedentary.

PA for older adults

Evidence shows that regular exercise can minimize the impact of an otherwise sedentary lifestyle and extend active life-years by limiting the development and worsening of chronic diseases and disabling conditions (59). Evidence of significant psychological and cognitive benefits of regular PA in older adults is also emerging. Ideally, exercise prescription for older adults should include aerobic exercise, muscle-strengthening exercises, balance training and flexibility exercises.

Health conditions in older age arise mainly as a result of lifestyles adopted during adulthood and youth, but the level of PA in older adults is an important determinant of their fitness, functional ability, mobility and independence. Continued PA has positive effects on physical, psychological and social health. It therefore could be beneficial for all older adults (65 and over) to engage in regular PA by doing 150–300 minutes of moderate-intensity aerobic PA, or 75–150 minutes of vigorous-intensity aerobic PA, or an equivalent combination of moderate- and vigorous-intensity activity over the course of the week (60).

For additional health benefits, older adults are encouraged to do muscle-strengthening activities at moderate or greater intensity that target all major muscle groups on two or more days a week. To enhance functional capacity and prevent falls, their weekly PA routine should include varied multicomponent PA that focuses on functional balance, flexibility and strength training at moderate

or greater intensity on three or more days a week. Older adults who do not engage in regular PA should start with small amounts and gradually increase duration, frequency and intensity over time (60,61). Those who cannot engage in regular PA due to chronic conditions should be as physically active as their functional ability and conditions allow and should adjust their level of effort for PA relative to their level of fitness.

All older adults should limit the amount of time spent being sedentary. Replacing sedentary time with PA of any intensity (including light intensity) provides health benefits. To help reduce the detrimental effects of high levels of sedentary behaviour on health, older adults should aim to break up long periods of sitting or lying down with some activity.

Mobility and fall prevention

Age-related loss of strength contributes to impaired mobility and increases the risk of falls (62). Each year, more than 30% of people aged 65 or older living in the community have falls, many more than once, and the risk of falling increases with age (63). Although only 3–10% of these falls result in serious injury, the severity of fall-related complications increases with age.

Exercise – particularly endurance, strength and balance training – strengthens muscles, reduces body fat, slows down the loss of bone density and improves flexibility, which results in better capacity to walk and a decreased risks of falls and fractures (64). Regular PA prevents the risks of falls for older adults, particularly among those who engage in activities ranging from low intensity (such as walking) to more robust sports/resistance exercises (30).

When falls occur, older adults who exercise regularly are less likely to suffer a bone fracture, as their bones are stronger and have higher bone-mineral density. Walking 5–7 days per week is beneficial, potentially reducing mobility impairment risks by 50–80% (30). PA programmes that offer a combination of moderate-intensity aerobic and strength exercise seem to be most effective in reducing the risk of fall-related injuries and fractures and increasing quality of life for postmenopausal women (65,66) (Example 7).

EXAMPLE 7

From a European joint action to a national strategy: the Romanian strategic plan for frailty 2020–2023

The strategic plan for frailty for 2020–2023 was developed in Romania to address the poor representation of frailty in national policies and strategic documents. The process was facilitated by the EU's ADVANTAGE Joint Action, which aimed to determine a frailty prevention approach that would reflect a common European model to tackle frailty and indicate what actions should be prioritized at European, national and regional levels. The aspiration was to enable a common management approach to older people in the EU who are frail or at risk of developing frailty to emerge.

The development process started with a roadmap that was prepared by three Romanian ADVANTAGE Joint Action partners with support from a multisectoral working group. The strategy upholds the concept of healthy ageing and seeks to promote a frailty-prevention approach for older adults. It reflects commitments from stakeholders across the country to promote PA among older adults, particularly activities that prevent frailty and falls.

An awareness-raising campaign on the topic of frailty was introduced as part of implementation, providing informative materials for health professionals, stakeholders and decision-makers. Stakeholders have adopted the vision of healthy ageing, assumed the role of spreading their vision, involved more stakeholders and set up a collaborative multisectoral working group. A collaborative framework with the ADVANTAGE Joint Action provided the ideal context to enhance the development of the national strategic plan (67).

Mental health and dementia

Interest in the benefits of PA in preserving or even improving cognitive performance in older adults with or without some degree of cognitive impairment or dementia has grown in recent years. PA plays a positive role in cognitive function and reduces cognitive disorders and negative moods/depression (35). Evidence on the beneficial effects of PA on various cognitive functions, such as executive functions, attention, cognitive speed, working memory and episodic memory, is increasing (68). The latest review by the Cochrane Foundation, however, did not find convincing evidence that aerobic activity is beneficial to cognitive function in older people without known cognitive impairment (69), and evidence regarding the efficacy of PA training for people with dementia is insufficient.

Personal social networks are also important for cognition, as they can reduce people's stress and have been shown to have a strong association with lessening the risk of Alzheimer's disease. Implementing dementia-inclusive communities enables older adults to enjoy some sense of independence (36). PA that is socially engaging and includes nature, pets and music has been found to be beneficial for people whose circumstances predispose to physical inactivity and most beneficial for those living with dementia and Alzheimer's disease (70).

Well-being and body image

The better the perception older adults have of their bodies, the more likely they are to engage in PA (71). Maintaining a positive self-image is significantly important in adjusting to body changes that occur with age and avoiding negative effects on self-esteem, anxiety, depression and stress (72). Older adults are often embarrassed and dissatisfied with their new body image and are constantly conflicted between their self-image expectations and societal models of so-called ideal bodies (72). Women are two-to-three times as likely than men to be motivated by losing or managing weight to improve their appearance, while men are more motivated by intrinsic factors such as strength, competition and challenge (73). PA is linked with positive body-image perception, and engaging in intense levels of PA is significantly associated with positive perceptions of body image. Increasing levels of PA at any time in life can improve perception of body image for all genders (71,72).

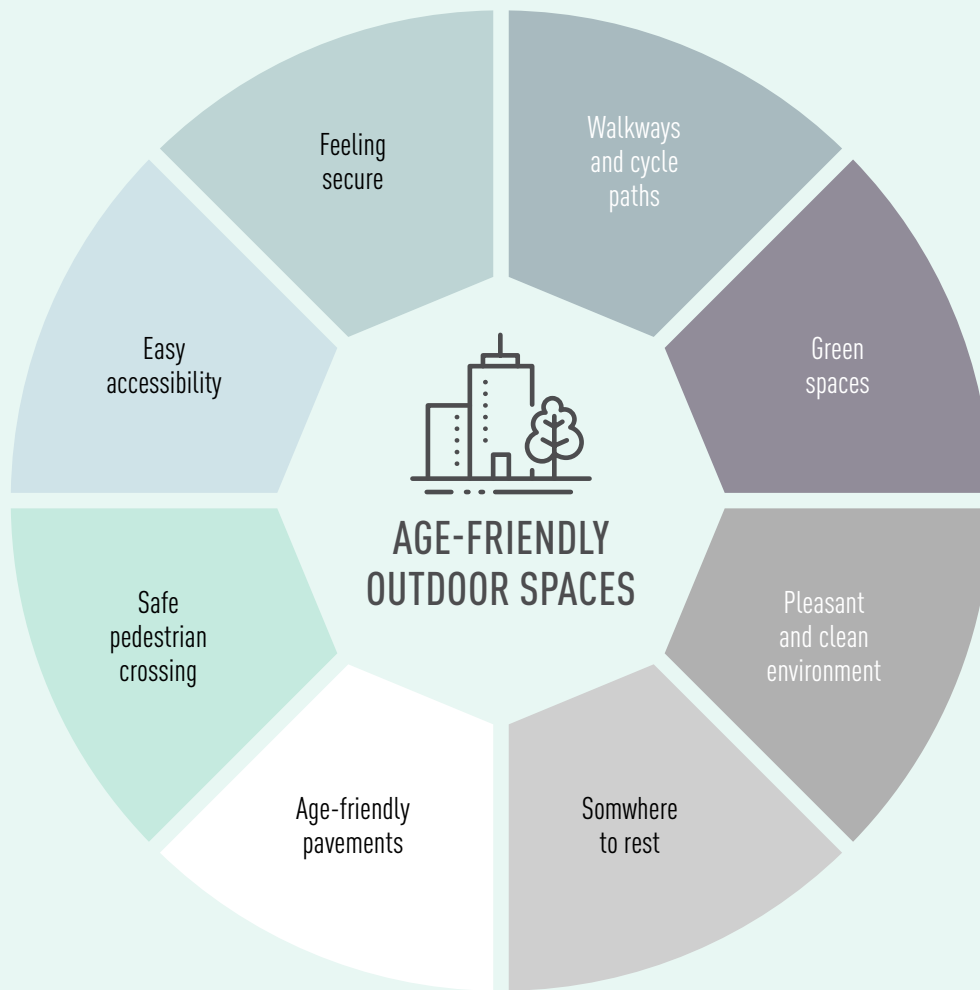
Barriers to PA

Environment

Urbanization is one of the main global trends shaping modern societies. Cities are growing, and their share of older residents is increasing. Policy initiatives such as the WHO Age-friendly Cities

and Communities recognize the importance of urban environments for increasing PA in older adults (Fig. 5) (74).

Fig. 5. The characteristics of age-friendly outdoor spaces based on the WHO Age-friendly Cities initiative



Source: WHO (75).

Age-friendly cities or communities are health-promoting and are designed to progress diversity, inclusion and cohesion across all ages and capacities. They might feature, for example, accessible and safe road and transport infrastructure, barrier-free access to buildings and houses, and public seating and sanitary facilities. Age-friendly cities and communities also enable people to stay active, keep connected and contribute to their community's economic, social and cultural life. An age-friendly city can foster solidarity among generations, facilitating social relationships between residents of all ages, and provide mechanisms to reach out to older people at risk of social isolation, falls or violence through personalized and tailored efforts (76).

Older people are more motivated to engage in PA when appropriate neighbourhood walkability, safe access to destinations and reliable services are in place. Siting PA programmes in inconvenient locations is associated with lower attendance by adults over 50, who are less inclined to travel longer distances for activities (73), but having proximity to shops, schools, cultural sites and places of social interaction encourages older adults to perform different types of PA.

Use of green spaces differs by gender. Women tend to visit public parks less frequently and avoid them if they are not safe or are neglected. Men are less concerned about safety and tend to visit parks more often (77). Older adults, especially those with difficulties in moving independently, are more likely to take part in PA like walking or cycling in the neighbourhood when places are within five minutes from home (25,74) (Example 8).

EXAMPLE 8

Reducing territorial inequalities in PA and sports participation: the French Mobil Sport initiative

This French PA initiative is led by the National Federation of Sport in Rural Areas. The project was developed to reduce territorial inequalities and raise awareness of the benefits of regular PA by offering solutions to the problem of rural areas lacking equipment and instructors.

Mobil Sport offers sport services to rural areas through a mobile structure – a van and a trailer containing various sports equipment – and a sports instructor (78). Mobil Sport settles at village squares and halls, school grounds and multisport platforms. Activities take place during a day, half day or evening, with a pre-set fee. More than 40 sports are presented from the van, including team sports and exercises to improve balance (79). The project target groups include young people, families, people with disabilities and older people.

Cognitive

PA is positively associated with reducing the risk of Alzheimer's disease and cognitive decline (35,36). Challenges to engaging in PA for older adults with Alzheimer's disease include disorientation, which makes it difficult and unsafe for them to walk or exercise on their own or in new environments, and needing to arrange transportation and a caregiver. The inability to take part in PA unsupervised is linked with a loss of identity and strong disinterest in PA (36).

Emotional

Depression hinders people from engaging in PA. Pharmacological treatments for depression affect people's energy and negatively influence the body's response to PA (35,36). Older adults with strong negative perceptions of the constraints in their lives and physical health problems are less likely to engage in PA. Those who find fatigue to be overwhelming and distressing will clearly face obstacles to participation in social activities and PA; fatigue in older adults is more common among those living in long-term care facilities. Management of fatigue symptoms and avoiding combinations of medications that can cause fatigue therefore are key to preventing sedentary behaviours among older adults (80).

Social

Reductions in social networks affect older adults' cognitive mental health and decrease significantly their motivation to perform PA (27). Socioenvironmental factors are important in enabling older adults to participate in PA (81). Reductions in social networks lessen older adults' sense of independence

and active participation in society. In contrast, social support from family members, friends, sports partners and trainers is strongly associated with PA engagement and healthy behaviours (30).

Physical

Older adults are a varied group. Many have at least one chronic condition, such as osteoarthritis, sarcopenia, type 2 diabetes, cardiovascular or cognitive diseases, or cancer. These conditions vary in severity and type. In 2014, 32.4% of adults older than 75 reported severe difficulties in walking, while 11.2% of those aged 65–74 were already facing limitations (82).

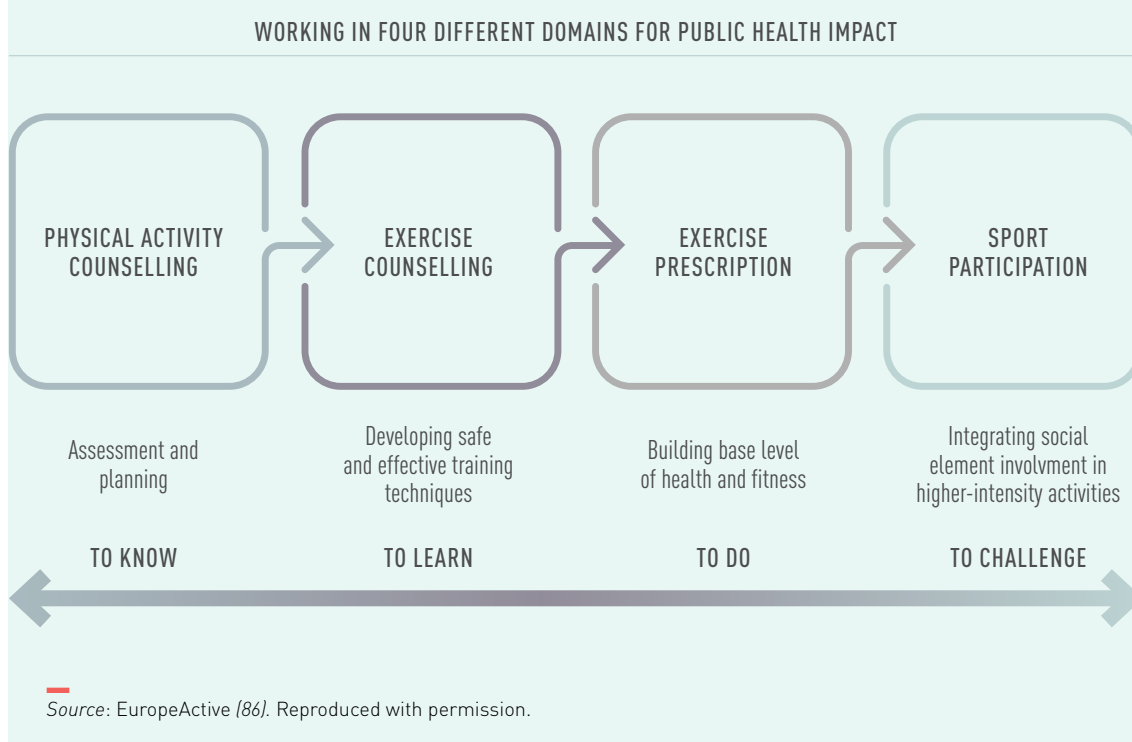
Participating in PA is one of the main means of preventing and managing diseases and maintaining good health (83). Adults who are physically inactive lose their muscle mass faster than those who are physically active. There is a strong relationship between body composition/changes and physical fitness. Engaging regularly in PA is highly recommended for the treatment and prevention of osteoporosis and falls and reducing the risk of fractures (84) (Example 9).

EXAMPLE 9

Promoting PA and health in older people through fitness clubs: the Promoting Physical Activity for Healthy Ageing (PAHA) project

The PAHA project (Fig. 6), led and managed by EuropeActive (85), aimed to convert currently inactive adults aged 55–65 into regular exercisers through specially designed trial sessions of supervised and structured exercise over six weeks. Eight countries participated in the project (Denmark, Finland, Germany, Greece, Hungary, Ireland, Portugal and the United Kingdom), with three fitness centres per country.

Fig. 6. The PAHA project



 **EXAMPLE 9 contd**

The sessions were free of charge to older adults during the trial period and participants were offered preferential arrangements to encourage them to exercise regularly. Eighty-nine per cent of participants completed the programme in 2016, with 70% continuing to exercise three months later.

Lessons learnt from the initiative were summarized in the PAHA good practice guide (86), which was developed for fitness trainers, sport coaches, club owners and organizations that promote PA and active ageing. The guide is available in four languages.

Healthy diet in older age

Healthy food and beverage choices are important throughout the life-course. This chapter provides an overview of research findings on nutrition for older people and outlines special considerations in diet at this life stage, including the importance of good oral health and social support.

KEY MESSAGES

- The older adult population is a heterogeneous group with unique dietary needs.
- Older adults should aim to follow healthy dietary patterns, particularly because of their heightened risk of all forms of malnutrition.
- Most older people have lower calorie needs than younger adults as a result of participating in less PA, changes in metabolism and/or age-related loss in bone and muscle mass.
- Generally, older adults can benefit from eating more fruit, vegetables and dairy foods. Older women can also benefit from eating more protein-based foods. Low hydration is an important area of concern.
- Socioeconomic status, level of social support and degree of social interaction greatly affect older people's health, well-being and eating habits.
- Maintaining good oral and dental health is important to ensuring optimal nutritional status, quality of life and self-esteem.

Nutrition guidelines for older people

Lifestyle choices, such as adopting healthy diets, increasing PA, hydrating more regularly, keeping the mind stimulated and stopping smoking (51,87), are significant elements in attaining and maintaining good quality of life in older age.

As appetite and food intake decline with age, it is important to ensure that older adults eat adequate amounts of nutrients and protein (88). Older adults are more likely to lose lean body mass because of decreased PA and food intake (46). There is a need for evidence-based strategies to address the reduction in food consumption and ensure adequate nutrient intake in older adults, especially those affected by age-related diseases and who are isolated.

WHO has developed a factsheet on food intake to advise adults on how they can improve their diets and have better health outcomes (89). It targets the general population, focusing on how a healthy diet can promote overall health and minimize risk of diseases. The factsheet advises the consumption of at least 400 g of fruit and vegetables per day (five portions), excluding potatoes, sweet potatoes, cassava and other starchy roots. Daily sugar consumption should be less than 10% of the total daily energy consumed and salt intake restricted to 5 g (2 g of sodium). Older adults who experience sensory impairments to taste and smell may add more salt to food to enhance its flavour, consequently increasing their salt intake. Garlic, onions and spices may provide more flavour and less salt.

The optimal energy intake from fats is 30–40%, of which not more than 10% should be of animal origin. It is healthier to consume unsaturated fats, such as those in fish, avocado, nuts, and sunflower, soybean, canola and olive oils. Saturated fats are found in fatty meat, butter, palm and coconut oil, cream, cheese, ghee and lard. Trans-fats, including those that are industrially produced and which are not nutritionally required, should be kept to less than 1%. These types of fats can be found in baked and fried foods, packaged snacks, prepared products like frozen pizza, pies, cookies, biscuits and wafers, and cooking oils and spreads. Ruminant trans-fats, found in meat and dairy foods from ruminant animals such as cows, sheep, goats and camels, should be avoided (90). Most of this advice applies to older adults, but some specific considerations also need to be included.

The older adult population is a heterogeneous group with unique dietary needs. Many older people start this life stage with excess body weight due to high consumption of energy-dense low-cost food and increasingly sedentary lifestyles adopted during their youth and adulthood (43). Most older people have lower calorie needs than younger adults as a result of participating in less PA, changes in metabolism, and/or age-related loss in bone and muscle mass. Preventing additional weight gain and achieving a healthy weight by following a healthy dietary pattern and adopting an active lifestyle can support healthy ageing.

Older people also face a heightened risk of malnutrition. Generally, older adults can benefit from eating more fruit, vegetables and dairy foods. Older women can also benefit from eating more protein-based foods (91). Approximately 50% of women and around 30% of men aged 71 and older do not get sufficient protein. Protein is an important nutrient for preventing sarcopenia with ageing. Guidelines for older adults recognize that some people are unable to adequately absorb vitamin B12. Older adults can get vitamin B12 through meats and fortified foods, but supplementation is needed in some cases. Low intake of fluids is also an important area of concern in older age (Example 10).

EXAMPLE 10

Introducing quality standards for catering and meal-delivery services for the older population: networking centres for nutrition for older people in Germany

The German national action plan IN FORM (92) aims to help individuals attain a healthy lifestyle through a well balanced diet and sufficient PA. More than 250 IN FORM projects have been taken forward in all living environments since 2008, involving policy-makers, industry, the science community and civil society. IN FORM also aims to develop quality food standards for older people and improve the catering offer in long-term care facilities.

Networking centres for nutrition for older people set up under the action plan by the Federal Ministry of Food and Agriculture have been in place nationwide since 2019 (93). These centres provide knowledge and specialized advice to improve the food currently available in retirement homes and through meal-delivery services by applying the quality standards of the German Society for Nutrition (94), which were published originally in 2020 and revised in 2022. The centres also facilitate networking among actors working to improve older people's health.

The network centres focus on: strengthening the nutritional skills of older people, carers and those responsible for catering to older people; increasing the quality of catering services in facilities for older people and the food delivered by the meals-on-wheels service through nationwide implementation of the German Society for Nutrition quality standards; improving the catering capabilities of older people who care for themselves at home or in outpatient shared flats, or who are cared for by relatives; and promoting volunteering and social

participation among older people. Increasing the use of organic and local products is also among the centres' objectives.

The Federal Ministry of Food and Agriculture and the federal states are jointly providing up to €2 million a year over the first five years to establish the centres. By mid-July 2022, networking centres had been set up and were operating in 10 federal states. In Baden-Württemberg, for instance, participating catering and meal-delivery facilities are individually supported to achieve project goals as part of on-site coaching. Exchange meetings provide opportunities for networking and sharing of experience among project participants. The findings in Baden-Württemberg state will be published in a nationwide transferable guideline in 2023.

Special considerations in diet

Socioeconomic factors

The quality of older adults' diets tends to decline with lower socioeconomic status (95). Financial resources, food-storage facilities and access to food shops influence older adults' food choices. Limited or no access to transportation hinders accessibility to healthy foods, which has a negative impact on nutritional intake.

The places people live are key determinants of health (96). People living in the most deprived areas have poorer health outcomes across the life-course than those in high-income neighbourhoods. Older adults with higher socioeconomic status are therefore more likely to purchase nutritious foods and be more conscious of the relationship between the food they eat and positive health outcomes (97). In contrast, adults at age 60 who are affected by poor socioeconomic conditions lose 4–7 years of good physical functioning, which results in disadvantageous health outcomes over the long term (98).

Social networks

The level of social support and degree of social interaction older people have can greatly affect their health, well-being and eating habits. Lack of family support and networks in older age can result in loneliness, isolation and social exclusion, all of which affect health status. The loss of a partner and consequent grief may reduce food intake and diminish the pleasure associated with eating; this kind of situation can result in depression, which further increases the risk of malnutrition (99).

People may lose the motivation to prepare and eat meals as they age. Older adults who live alone have lower motivation to change their eating habits and are more likely to eat less food than those who live with someone (88). These factors constitute barriers to improving energy intake, adopting healthy eating habits and increasing appetite. Supportive and age-friendly environments may enable the adoption of healthier lifestyles.

Unhealthy habits and oral health

The WHO European Region has the highest prevalence of both alcohol (100) and tobacco use (101) in the world. The consumption of alcohol in later life increases the likelihood of falls and bone

fractures. Smoking has been associated with premature mortality in older adults (86) and a higher incidence of Alzheimer's disease (102). Tobacco use and alcohol consumption are the main risk factors for oral cancer and other periodontal diseases (87,103).

Although moderate alcohol use is sometimes portrayed as being beneficial for cardiovascular health, especially in older age, the evidence in this area is very mixed. New studies question any potential benefits of alcohol for the heart (104). A large proportion of alcohol-attributable cancers, including oral cancers, occur at light and moderate drinking levels (103). Alcohol should not be considered part of a healthy diet at any age.

The prevention of chronic and oral diseases and the promotion of good oral health should be strengthened, especially among disadvantaged older adults, who are most at risk of developing oral diseases. Compliance with dietary guidelines is lower among older adults with poor oral and dental health. The inability to chew properly and comfortably compromises food choice and reduces consumption of high-fibre foods such as bread, fruit and vegetables. Maintaining good oral and dental health is important to ensuring optimal nutritional status, quality of life and self-esteem. Encouraging older adults to brush their teeth at least twice a day and having regular appointments with a dentist is essential to maintaining good oral health. A diet that provides adequate amounts of vitamin C, calcium and vitamin D helps to maintain healthy teeth and gums (47).

Surveillance of PA and eating habits of older adults

Despite all the benefits of regular PA and healthy diets, only a small proportion of the older population follow healthy lifestyles. This chapter describes PA levels among older European adults, explores trends and identifies risk factors for PA. It also looks at compliance with dietary recommendations and assesses the prevalence of all three forms of malnutrition (undernutrition, overweight and inadequate intake of nutrients) at this stage of life.

KEY MESSAGES

- Studies assessing older people's compliance with PA guidelines apply very different methodologies, leading to reduced comparability of findings. Studies that used objective measurements, such as accelerometers, have found very low prevalence of sufficient PA among older adults (0–20%).
- Greater age, depression, physical limitations, poor sense of meaning in life, lower social support and memory loss all pose a high risk for physical inactivity. Fewer women than men across all ages are regularly active, but some studies have found higher activity levels in females aged 70 and over. Variations between countries are large.
- Malnutrition refers to undernutrition (wasting, stunting and underweight), inadequate intake of nutrients, and overweight or obesity, with resulting diet-related NCDs. All three forms of malnutrition are prevalent in the older population.
- Almost two thirds of older European adults are overweight or obese (body mass index (BMI) \geq 25.0). Over 20 million older people in the EU – which is equivalent to the total population of Romania – are at risk of undernutrition.
- The prevalence of protein–energy malnutrition among European older adults living independently in the community is between 2.5% and 16.5%, with large variety between regions. When all settings are represented, prevalence can rise to 28% for those in hospitals and 17.5% for residential care settings. Micronutrient deficiencies are also very prevalent in older adults.

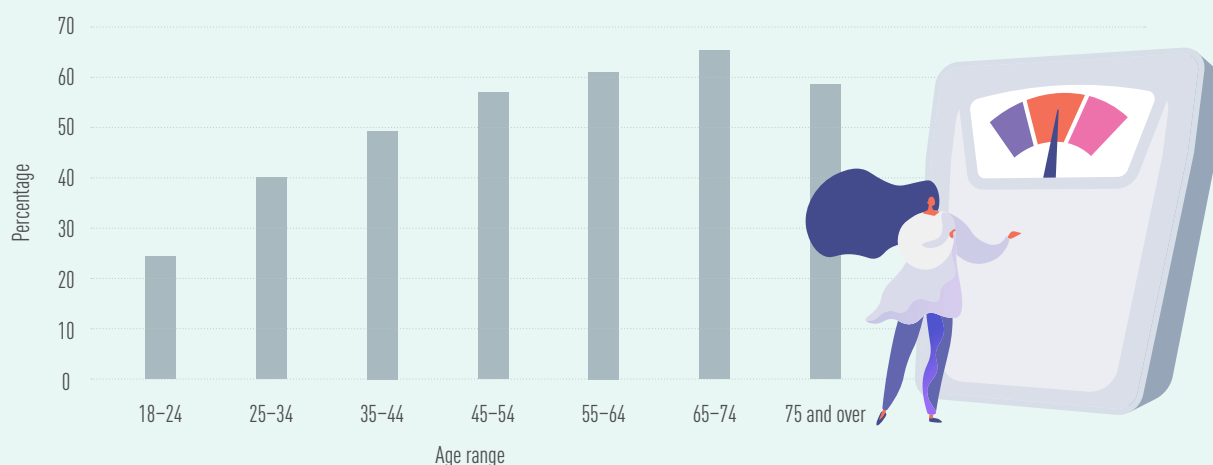
Older adults have a more sedentary lifestyle, spending more than nine hours in sedentary activities per day (105). Based on recent estimates, the overall prevalence of inactivity (defined as never or almost never engaging in moderate or vigorous PA based on self-reported data) among individuals aged 55 or older in 16 European countries is 12.5% (18). The rate varies between countries, ranging from 4.9% (Sweden) to 29% (Portugal). Increasing age, depression, physical limitations, poor sense of meaning in life, lower social support and memory loss were identified as significant variables associated with physical inactivity. In another survey in the WHO European Region, the prevalence of insufficient PA in people aged 70 and above ranged from 18.2% for males in Kyrgyzstan to 66.4% for females in Cyprus, with higher prevalence among females in almost all countries (106).

Other authors who assessed older adults' compliance with PA guidance reported 2.4–83.0% of adults meeting the optimal level (107). It has to be noted, however, that reviewed studies adopted very different methodologies. Studies applying objective measurements such as accelerometers found much lower ratios (0.0–17.2%), with one finding that no-one in a European sample of people aged 70 years and over met the optimal level of PA (108). A systematic review found that men's PA levels were higher than women's, and that older-old people were more sedentary than those classed as younger-old (107).

Physical inactivity results in approximately 1 million deaths per year in the WHO European Region and accounts for 8.3 million disability-adjusted life-years (24). Physically inactive adults cost the EU approximately €80.4 billion per year due to preventable health conditions such as NCDs, CVDs, and mood and anxiety disorders related to sedentary behaviours (109).

Malnutrition refers to undernutrition (wasting, stunting and underweight), inadequate intake of nutrients, and overweight or obesity, with resulting diet-related NCDs. All three forms of malnutrition are prevalent in the older population. The prevalence of overweight and obesity is on the rise in all age groups, and the older-age group is no exception (110). The older the age group, the higher the share of overweight people (Fig. 7). In a multinational study running in 20 European countries, older adults were significantly more overweight (42.4%) and obese (20.9%) than middle-aged and younger adults (112). Retired people accounted for a greater proportion of overweight (42.0%) and obese (21.5%) people when compared with employed and unemployed people and students. Another survey among people aged 50 and over from 10 European countries found a similar prevalence for overweight and obesity (60.3% in 2013 [95% confidence interval: 59.7–60.9%]) (110).

Fig. 7. Proportion of overweight and obesity in European adults, 2019, by age (BMI \geq 25.0)



Source: Eurostat (111). Reproduced with permission.

In parallel, over 20 million older people in the EU are at risk of undernutrition. This condition and its associated health complications are costing European health and social care systems around €120 billion per year (58). The prevalence of protein–energy malnutrition among European older adults living independently in the community is reported to be between 2.5% and 16.5%, with large variations between regions (113). When all settings are represented, prevalence rises to 28% for patients in hospital and 17.5% for those in residential care settings (114).

Older adults are particularly susceptible to deficiencies in various micronutrients due to reduced intake of foods that are rich in vitamins and minerals. The prevalence of nutrient deficiencies and undernutrition is highest among the very old, women, people with comorbidities and those in care homes, hospitals and institutions. Intakes of vitamin D, thiamine (vitamin B1), calcium, magnesium and selenium are of particular concern. Evidence shows that 90% of older adults in most European countries have low intakes of vitamin D (115). Countries such as Finland and Iceland have fortified milk and fat spreads with vitamin D, which has led to great improvements in intake levels. More than 50% of older adults across Europe do not follow calcium intake requirements (51).

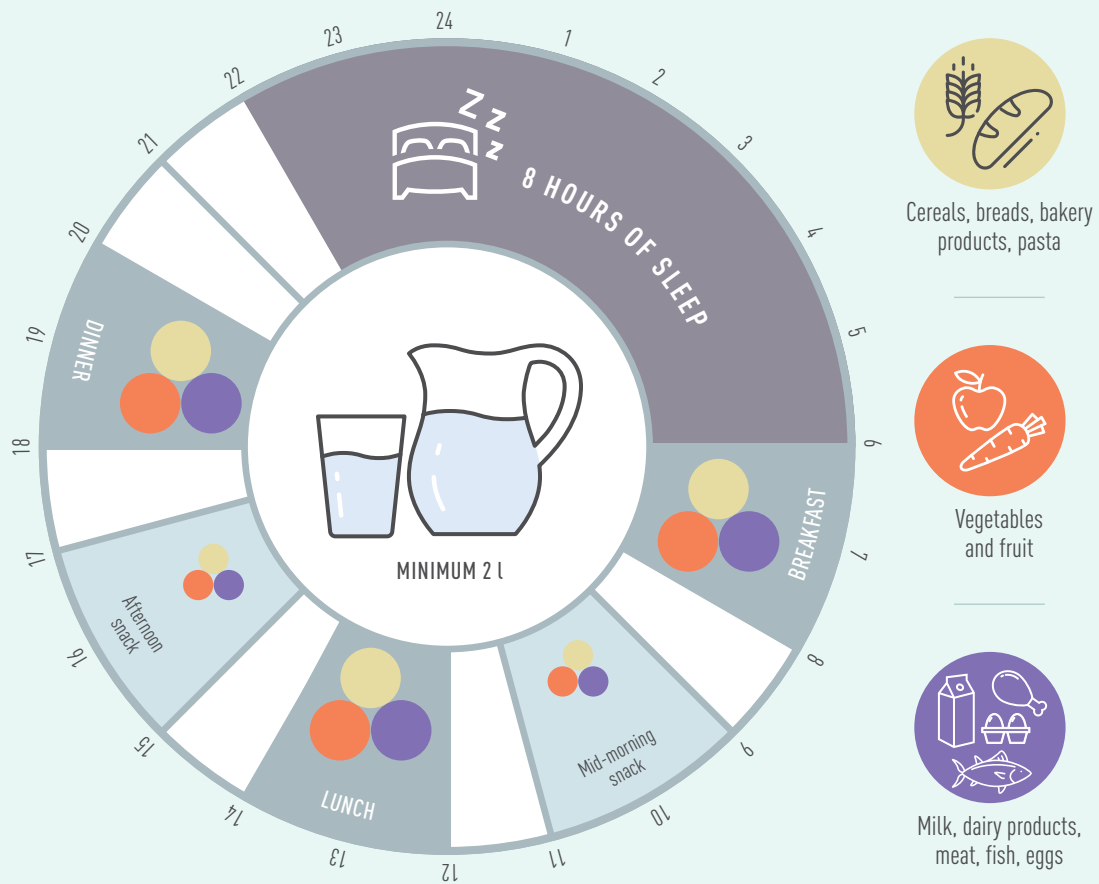
WHO recommends that intake of free sugars should be less than 10% of the total daily energy consumed but encourages less than 5%. Intakes of free sugars in older adults in Europe range from 5% of the total daily energy consumed in Spain to 11% in Netherlands (Kingdom of the) and the United Kingdom. Thirty-one per cent of adults in Netherlands (Kingdom of the) meet WHO requirements, with consumption of less than 10% of the total daily energy consumed. Salt consumption in Andorra, Austria, Denmark, France, Germany, Iceland, Netherlands (Kingdom of the) and Sweden are as high as 7–9 g per day, which is above WHO's intake recommendation. Salt intake should be limited to 5 g per day (51) (Example 11).

EXAMPLE 11

From research to action: new national dietary guidelines for older people in Hungary

The National Pharmaceutical and Food Health Institute of Hungary, supported by the Human Resources Development Operational Programme, started to conduct comprehensive dietary surveys of the older population in 2018 with the aim of developing new national dietary recommendations.

The public health survey of 2018 provided data on the dietary intake and habits of the older population. The Biomarker2019 study specifically assessed the status of the most critical vitamins and minerals in older people through testing blood and 24-hour urine samples. Based on these and previously gathered data from national diet and nutrition status surveys, the new national food- and nutrient-based dietary guideline was issued for older adults in 2020, filling a long-term gap in nutritional guidelines targeting vulnerable populations (Fig. 8).

Fig. 8. National dietary guidelines for older people in Hungary

Source: National Pharmaceutical and Food Health Institute of Hungary (116). Reproduced with permission.

Sample menus and recipes corresponding with three budget levels (low-, moderate- and liberal-cost) were prepared to support dissemination and uptake of the new recommendations, and educational material on healthy diet and promoting active ageing was distributed to the general population. A so-called tips and tricks publication based on the guidelines was developed for professionals working in public catering settings (116).

Policy response

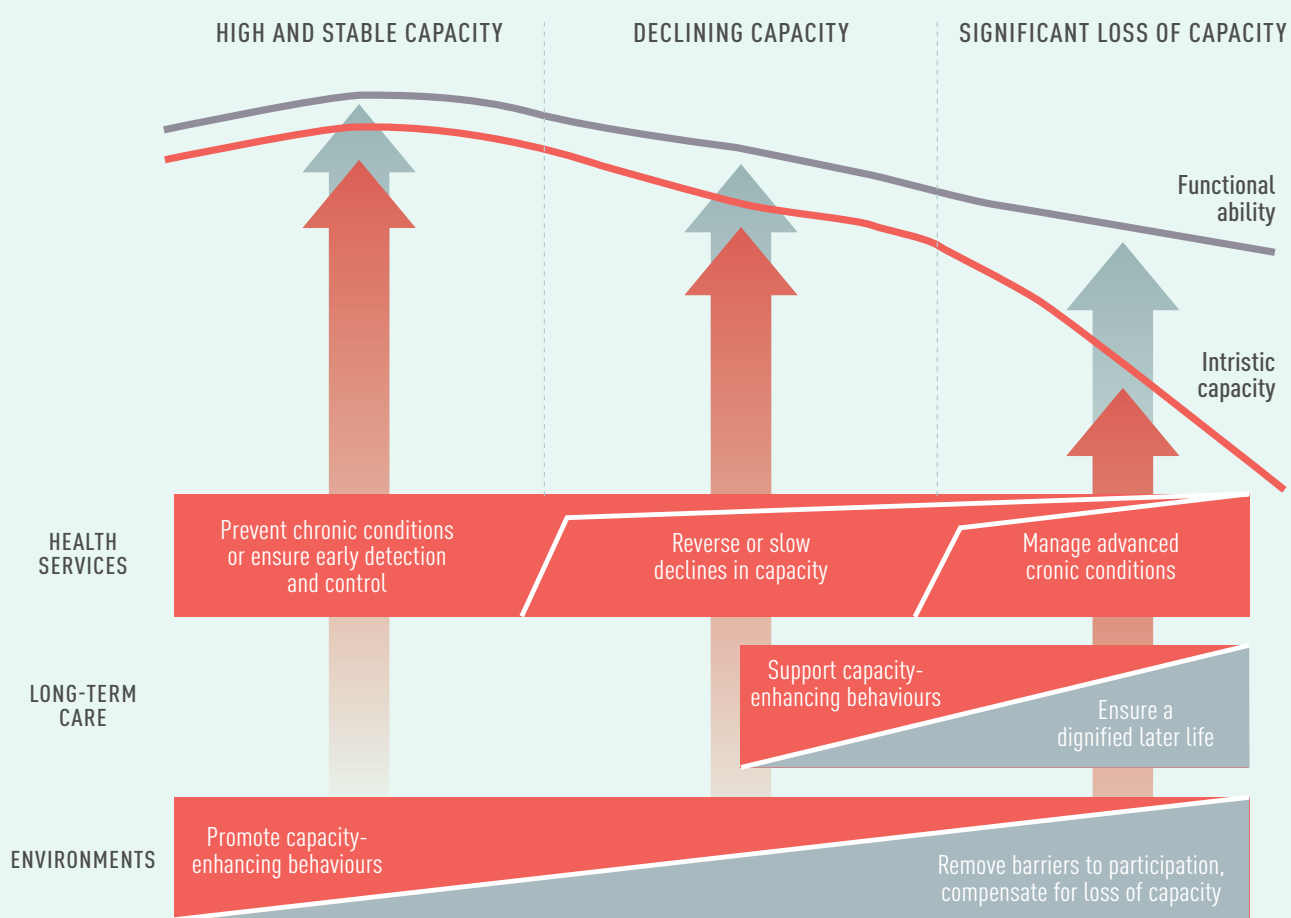
This penultimate chapter summarizes policies that promote food, nutrition and PA and references monitoring tools for assessing policy effectiveness. It provides an overview of United Nations-level actions and WHO responses in the area of ageing. Economic impact, the role of the health sector, social inclusion and monitoring and surveillance are identified as providing new opportunities for improving health and health behaviours in older age and promoting healthy ageing.

KEY MESSAGES

- Effective healthy ageing policies need to consider the heterogeneity of the older population, address the inequalities that underlie diversity, fight against ageism, consider the environment in which older people live and recognize the need for coherent and integrated working.
- Food and nutrition policies tend to be comprehensive in nature, aiming to ensure adequate nutrition for the entire population. Most countries now have strategies for older people in place, but huge intercountry differences persist, and implementation remains far from optimal.
- PA policies need to address issues such as gaps in public awareness, urban planning, transportation, health financing and social welfare systems. If successful, their impact can go far beyond achieving better health by also reducing health-care costs, making cities more liveable and attractive, reducing air pollution and revitalizing neighbourhoods.
- The United Nations Decade of Healthy Ageing (2021–2030) addresses four areas of action: developing age-friendly environments; combatting ageism; delivering person-centred integrated care; and increasing access to quality long-term care.

The complexity of ageing raises many fundamental questions for policy-makers. Effective healthy ageing policies need to consider the heterogeneity of the older population, address the inequalities underlying diversity, fight against ageism (how people think, feel and act on ageing), consider the environment in which older people live and promote integrated working (6). In 2015, WHO published a new framework for action based on what was known at that time about ageing and health. The Public Health Framework for Healthy Ageing (6) defines different intervention strategies based on older adults' functional abilities and intrinsic capacities (Fig. 9) and can guide policies and actions on the ground.

Fig. 9. Public Health Framework for Healthy Ageing



Source: WHO (6).

Healthy ageing policies can be grouped under four broad headings: improving economic and social integration; promoting better lifestyles; adapting health systems to the needs of older populations; and addressing underlying social and environmental factors (117). Although all four areas have some implications for diet and PA, this report focuses on the group of policies on promoting better lifestyles by summarizing policy options that either promote healthy diets or encourage PA.

Food and nutrition policies tend to be comprehensive in nature, aiming to ensure adequate nutrition throughout the life-course. They include reformulation of foods and beverages at industry level, increasing the availability of healthy foods across different settings, and requiring educational and informative labelling to encourage healthier food choices (41,90,118). Regulatory bans and fiscal policies (such as taxes) have achieved good results in the reformulation of foods and lead to better health outcomes for the whole population. The use of subsidies to encourage consumption of healthy foods (such as fruit and vegetables) has increased older people's interest in purchasing healthier products (119). To reduce malnutrition, food security and food safety for older people have to be addressed.

The Organisation for Economic Co-operation and Development (OECD) works with ministries of health, food and agriculture in all OECD countries to follow-up on policies implemented on dietary and nutritional issues. The OECD and WHO have designed a microsimulation model to extract

data on the impact of policies and programmes designed to prevent chronic diseases that are associated with unhealthy diets and sedentary behaviours. The model provides information on the influence of risk factors that affect people's health outcomes by collecting evidence on successful policy interventions (120). Monitoring tools such as this are important for evaluating policies and strategies to enable the development of healthier diets, and in helping Member States of the WHO European Region to meet their commitment to the healthy ageing concept.

Countries in the Region are showing some positive results in the area of food reformulation. Most countries now have strategies to reduce salt content in processed foods. A significant number nevertheless lag behind on the reduction and elimination of foods that are detrimental to people's health. Consumption of trans-fats, for instance, remains quite high in eastern Europe and central Asia. Consequently, more policies that ban the food industry from using harmful fats in foods are needed. Policies that legally limit the use of trans-fat in foods have been shown to be successful, leading to improvements in preventing CVDs and premature deaths (119).

Policies on PA should focus on opportunities for affordable, accessible and attractive activities of moderate intensity in areas that are pleasant and safe (such as safe walking areas and parks), preferably with professional support in both home and community settings. Generally, policies should be tailored to the local context and should work with older people to address gaps in public awareness, urban planning, transportation and enabling environments for PA. Culturally appropriate, population-based information and guidelines should be developed for older people, and the general public and professionals should be educated on the importance of staying active (Example 12).

EXAMPLE 12

A successful public-private partnership for healthy ageing: the Irish Age & Opportunity Active programme

The national initiative Age & Opportunity Active (121) promotes recreational sport and PA for adults aged 50 and over. The programme is built around a network of public and private partners that includes government, local authorities, health services, universities, community groups, cultural organizations and local sports groups. It provides opportunities for older people to engage in PA and remain connected to their societies.

The programme successfully ran several initiatives, including the Go for Life Games, which is part of the national programme for sport and PA for older people and is funded by Sport Ireland and the Health Service Executive. Teams from all over Ireland come together to take part in a national day of sport in June every year. Other initiatives include a telephone mentoring service called Fitline that encourages callers to start getting more active, a very popular education and peer-leadership programme that trains older people to lead sport and activity sessions in their local groups and communities, and the Azure network, comprising art institutions with specialized staff who provide guided tours for older adults living with dementia.

WHO response

Two international policies have guided actions on ageing since 2002: the United Nations Madrid International Plan of Action on Ageing (122) and the WHO active ageing policy framework (123). These documents celebrate older populations as powerful resources for future development. A review assessing the progress made globally over the 10 years since the Second World Assembly on Ageing in Madrid, Spain on 8–12 April 2002 concluded, however, that while significant differences were seen between countries, changes in policies alone are not sufficient to successfully implement commitments made to adjust societies to an ageing world, and governments alone cannot achieve the set objectives (124).

The United Nations Decade of Healthy Ageing (2021–2030) (4) responded to this challenge through a global collaboration of governments, civil society, international agencies, professionals, academia, the media and the private sector that will work to improve the lives of older adults, their families and the communities in which they live. The Decade builds on the WHO Global Strategy and Action Plan on Ageing and Health (2016–2030) (9) and the United Nations Madrid International Plan of Action on Ageing (122) and supports achievement of the United Nations Sustainable Development Goals (SDGs). It addresses four areas of action: developing age-friendly environments; combatting ageism; delivering person-centred integrated care; and increasing access to quality long-term care.

The promotion of PA is central to the attainment of the 17 SDGs by 2030 (125,126). Achieving one of the health-related targets of the SDGs – reducing the number of premature deaths due to NCDs – will be supported by promoting the United Nations Decade of Healthy Ageing (4), which is linked to the WHO Global Strategy and Action Plan on Ageing and Health (2016–2020) (9), and ensuring the involvement and active participation of governments, the private sector and civil society. Successful achievement of the SDGs is also highly dependent on financial investments by governments and the private sector in programmes that promote walking, cycling, sport, active recreation and play.

Policy actions on PA have multiple health, social and economic benefits and will directly contribute to achieving SDG 3 (good health and well-being), SDG 2 (ending all forms of malnutrition), SDG 4.1 and 4.2 (quality education), SDG 5.1 (gender equality), SDG 8 (decent work and economic growth), SDG 9.1 (industry, innovation and infrastructure), SDG 10.2 and 10.3 (reduced inequalities), SDG 11.2, 11.3, 11.6 and 11.7 (sustainable cities and communities), SDG 12.8 and 12c (responsible production and consumption), SDG 13.1 and 13.2 (climate action), SDG 15.1 and 15.5 (life on land), SDG 16.1 and 16b (peace, justice and strong institutions) and SDG 17 (partnerships) (74).

The WHO European PA strategy seeks to increase PA engagement among older adults to promote holistic well-being and successful ageing (24). The Global Action Plan on Physical Activity 2018–2030 aims to create more active societies by improving environments and opportunities for older adults and through the active promotion of walking, cycling, sport, active recreation, dance and play (127). WHO has also published a brief that summarizes the recommendations on PA and sedentary behaviour for older people to support and guide health and social care professionals and other workers who are seeking to promote PA among older people (128).

In 2007, WHO introduced the Age-friendly Cities Framework and developed a global guide (77). Based on focus groups with older people, caregivers and service providers in 33 cities in 22 countries, the guide identifies core characteristics of an age-friendly city in eight areas of urban life – community and health care, transportation, housing, social participation, outdoor spaces and buildings, respect

and social inclusion, civic participation and employment, and communication and information. The focus group sessions had highlighted older people's concerns and the issues they faced daily, enabling the guide to develop age-friendly city checklists. It encourages cities, communities and neighbourhoods to adapt their structures and services to ensure they are accessible to older people with varying needs and capacities.

Since then, WHO has been working with Member States of the WHO European Region at national and local levels to develop age-friendly cities and communities, including establishing a WHO Global Network for Age-friendly Cities and Communities in 2010. WHO has developed additional resources, including a toolkit for policy-makers (129), a national guide to developing age-friendly cities and communities (130), a handbook of domains for policy action (131) and a document examining the contribution of information systems, indicators, and monitoring and assessment to the success and sustainability of age-friendly policy initiatives (132).

Economic impact

NCDs contribute to the rise in premature death of more than 550 000 adults of working age each year across European countries, leading to a loss of 3.4 million potentially productive life-years. This also represents losses to economies, with EU countries losing €115 billion annually (133). Strategies and programmes focusing particularly on older adults' healthy diets and PA may face implementation barriers and receive insufficient commitment in some countries, usually due to restraints on resources and lack of political will (134). If adults in the United Kingdom aged 40–65, for instance, were to increase their participation in PA, life expectancy would increase by 0.23 years and health and social care expenditures would decrease by £400 per person (135). PA can lower health costs if people continue to be physically active throughout their life, with the monetary savings benefitting both individuals and the health-care system (136). The advantages of engaging in PA regularly should therefore be promoted and encouraged by governments through policy interventions and inclusive media campaigns.

The health sector

Use of e-health to deliver health information through the Internet and mobile technologies is increasing, with growth seen in recent years in the number of older adults using electronic devices such as computers, smartphones and tablets. This indicates that e-health interventions can be effective tools for promoting PA to older adults (137).

In most European countries, physicians are responsible for referring older adults to nutritional therapy or dieticians, but many health-care professionals, including physicians, nurses and therapists, have only basic knowledge of nutrition. This may lead to health-care professionals lacking positive attitudes about the health benefits nutrition can bring and consequently not making full use of diet as a preventive tool for avoiding illness and improving health outcomes. When physicians are not prepared to address the problems of malnutrition, patients may miss out on receiving important information and the opportunity to detect health problems that can be prevented by adopting healthier diets (138) (Example 13).

EXAMPLE 13

A community initiative to combat malnutrition in older people in the United Kingdom (England): the Purbeck Malnutrition Task Force pilot

The Purbeck project targets older people and is a rural initiative to reduce the prevalence of malnutrition within the communities of Dorset, United Kingdom (England). The nutritional care strategy for adults, which was launched in 2013, provides the framework for local actions.

The approach is based on nutritional care through healthy diets and educational tools. It focuses on the need for early identification of, and intervention for, malnutrition in older people and provides nutritional education to the health and social sector about implementing nutritional care pathways. Supporting forms are based on national guidelines (139).

This involves a nutrition package that includes screening (using the Malnutrition Universal Screening Tool) and targeted advice that can be adopted in other regions. The project has a new electronic database to improve monitoring and information on the reduction of malnutrition: from 368 people screened over 10 months, 107 were found to be at risk of malnutrition and 18 were referred to dietitians. The project was partly funded by the United Kingdom Malnutrition Task Force (140) as one of five pilot areas in 2014.

Traditionally, the importance of nutrition is not recognized in medical curricula. Education institutions across Europe offer few courses on nutrition, and the average time spent on nutritional content in European medical schools is only 23.7 hours over the complete education period (138). Government policies should promote and encourage institutions to include nutrition and malnutrition in older adults in undergraduate medical programmes, which could be introduced through national reform of medical licensing exams and by setting preparation in this area as a prerequisite for continuing medical studies. The present burden of preventable diseases on health-care systems calls for strategies to create awareness among future medical doctors (141).

The health-care system is lagging behind in creating settings within its own organizations that promote better nutrition (141). The most severe cases of malnutrition among the older population are found in hospitals and long-term care facilities (142). This provides an incentive for policy-makers to promote policies that encourage better health outcomes for practitioners and patients by, for example, allowing the prescription of fruit and vegetables for health promotion and disease prevention. Foods provided in health-care institutions should be nutritionally tailored for patients with chronic diseases and older adults at risk of malnutrition. Nutritional counselling during pregnancy, early childhood and for older adults is also highly endorsed (141).

The situation regarding PA counselling for older adults in primary care settings or PA referrals by health-care professionals is not much better. Primary care provides one of the most propitious settings for PA interventions, as primary care physicians are trusted by patients as a reliable source of information and there is a high number of patient–physician contacts every year. Although considerable research has shown that counselling is an effective strategy for PA promotion in primary care, it is not consistently practised (143).

Social inclusion and prevention of loneliness

Social isolation and loneliness are widespread, with some countries reporting that up to one in three older people feels lonely (144). A large body of research shows that social isolation and loneliness have a serious impact on older people's physical and mental health and quality of life, and their longevity. The effect of social isolation and loneliness on mortality is comparable to that of other well established risk factors, such as smoking, obesity and physical inactivity. In addition to facilitating an active lifestyle, PA-promoting strategies should aim to reduce social isolation and loneliness among older people, particularly as social isolation can hinder older adults' participation in exercise programmes.

Positive social support is extremely important to motivating PA involvement and participation (27). PA policies and programmes must pursue social connectedness by building meaningful sharing opportunities (127). Older adults tend to perceive social and outdoor activities as more pleasant than activities performed alone or indoors, so programmes that stimulate social inclusion are highly supported. Outdoor activities, such as supporting older adults to go to exhibitions at local museums, are found to produce more pleasure and more interest in PA, so should be encouraged (70). Community-based exercise programmes are known to contribute significantly to the health and well-being of older adults. PA policies should encourage such programmes for older adults and foster a PA culture among health practitioners to enable the number of older adults involved in PA programmes to increase (145).

Monitoring and surveillance

Technology is opening new opportunities to involve older adults in PA programmes and to track their levels of daily activity. Evidence points to the benefits of using smartphone-based m-health systems to monitor PA levels in older adults who live in care-home settings (146) (Example 14).

EXAMPLE 14

Monitoring PA and sedentary behaviour through primary health care in Portugal

Portugal implemented a national monitoring and surveillance system for PA through primary health-care services. It measures the population's PA and sedentary-behaviour levels in a standardized and systematic way. A tool allowing the brief assessment of weekly moderate-to-vigorous PA (minutes per week) and daily sitting-time (hours per day) was integrated into the platform/software SClínico Cuidados de Saúde Primários in September 2017. This platform is used as the electronic medical record in primary health-care settings to track vital signs, code health problems and support/record consultations with health professionals. It currently is used in all Portuguese primary health-care units, of which there are around 1300. The PA brief assessment tool in the primary health-care platform/software is shown in Fig. 10.

Fig. 10. PA brief assessment tool in the Portuguese primary health-care platform/software

Physical Activity Questionnaire

Help Print Save Out

Name: **MARIA JOÃO VIEIRA SANTOS** Age: **55 anos** Patient N.º: **200700010** Process N.º: **1401**

New Record Data History

1. In a usual week, how many days per week do you engage in brisk walking or other moderate-to-vigorous physical activity (e.g., gym activities, cycling, practice an active sport, swimming / water aerobics, etc.)?

Days per week: **4**

2. On average, how many minutes per day do you engage in those activities (not considering resting intervals or transitions)?

Duration in minutes: **55**

3. On a typical day regarding your routines, how much time in total do you usually spend in a sitting position? E.g., in the car or other transportation, at a desk, at the computer, watching TV, reading, chatting while seated, during meals, etc. Do not include the time spent sleeping (at night time or naps during the day).

Duration in hours: **15**

Source: Mendes et al. (147). Reproduced with permission.

A traffic-light feedback system was included to support health professionals and facilitate the interpretation of results against international cut-offs. The tool's data-history system allows health professionals to track changes in PA levels.

The tool, however, seeks to do more than record PA levels. It also aims to assist health professionals and patients to be more aware of PA patterns over time by addressing the possibility of change (becoming (or not) more active and less sedentary). This assessment is the cornerstone of the brief counselling process. At every encounter/opportunity, even when time is very limited, it is important to assess PA not just for the purpose of monitoring or assessing progress, but also as a value in its own right. Asking the question(s) opens the door to fostering the patient's reflection and self-awareness. Subsequent interventions can vary, depending on available time and resources.

Many Member States of the WHO European Region have started to implement nutrition and health surveillance systems to monitor the effectiveness of their programmes, but surveillance systems differ between countries, making it more challenging to compare data across countries and produce harmonized policies to limit unhealthy diets and sedentary behaviours for the whole Region. To identify progress in specific age groups, categories such as "children" and "older adults" need to be added (148).

The Joint Programming Initiative called Healthy Diet for Healthy Life, and the Determinants of Diet and Physical Activity knowledge hub, are multidisciplinary networks that seek to improve harmonization and collaboration in the field of nutrition, PA and sedentary behaviours. The initial steps they have taken are helping to develop more efficient and standardized monitoring/surveillance systems to track dietary, PA and sedentary-behaviour trends in the Region (149).

Conclusion

Life expectancy of older adults has significantly increased over the last decades and this trend will most likely continue. Longer life, however, is not always accompanied by good health.

Maintaining health and supporting older people to be autonomous and independent are matters of common interest for individuals and societies. Policies for healthy ageing have a crucial role in mitigating ageing-related pressure on health-care systems and economies. Those that promote healthier lifestyles are key, but they require changes to individual behaviour, meaning that improvements may be difficult to realize. While it is never too early and never too late to change lifestyles, it is clear that the earlier the changes are made, the higher the chances of enjoying a longer and healthier life.

The COVID-19 pandemic exposed the vulnerability of older adults and drew attention to existing gaps in policies, systems and services. Concerted actions on healthy ageing are urgently needed to ensure that older people can fulfil their potential in dignity and equality, and in healthy environments.

References¹

1. Population projections in the EU. In: Eurostat [online database]. Brussels: Eurostat; 2022 (<https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=497115>).
2. Department of Economic and Social Affairs. World population prospects 2019: data booklet. New York (NY): United Nations; 2019 (<https://www.un.org/development/desa/pd/news/world-population-prospects-2019-0>).
3. Average life expectancy at birth in 2022, by continent and gender. In: Statista [online database]. New York (NY): Statista; 2022 (<https://www.statista.com/statistics/270861/life-expectancy-by-continent/>).
4. UN decade of healthy ageing: plan of action 2021–2030. New York (NY): United Nations; 2020 (https://www.who.int/docs/default-source/decade-of-healthy-ageing/final-decade-proposal/decade-proposal-final-apr2020-en.pdf?sfvrsn=b4b75ebc_5).
5. Mak T, Louro Caldeira S. The role of nutrition in active and healthy ageing: for prevention and treatment of age-related diseases: evidence so far. Luxembourg: Publications Office of the European Union; 2014 (<https://publications.jrc.ec.europa.eu/repository/handle/JRC90454>).
6. World report on ageing and health. Geneva: World Health Organization; 2015 (<https://apps.who.int/iris/handle/10665/186463>).
7. Rudnicka E, Napierata P, Podfigurna A, Męczekalski B, Smolarczyk R, Grymowicz M. The World Health Organization (WHO) approach to healthy ageing. *Maturitas*. 2020;139:6–11. doi:10.1016/j.maturitas.2020.05.018.
8. Fuchs J, Scheidt-Nave C, Hinrichs T, Mergenthaler A, Stein J, Riedel-Heller SG et al. Indicators for healthy ageing – a debate. *Int J Environ Res Public Health*. 2013;10(12):6630–44. doi:10.3390/ijerph10126630.
9. Global strategy and action plan on ageing and health. Geneva: World Health Organization; 2017 (<https://apps.who.int/iris/handle/10665/329960>).
10. Liotta G, Canhao H, Cenko F, Cutini R, Vellone E, Illario M et al. Active ageing in Europe: adding healthy life to years. *Front Med*. 2018;5:123. doi:10.3389/fmed.2018.00123.
11. Strength in Old Age programme. In: Strength in Old Age [website]. Helsinki: Age Institute; 2023 (<https://www.voimaavanhuuteen.fi/en/>).
12. Strength in old age – effective model for healthy exercise [online presentation]. In: Strength in Old Age [website]. Helsinki: Age Institute; 2022 (https://www.voimaavanhuuteen.fi/content/uploads/2022/01/Presentation_Strength_in_old_age_2022.pdf).
13. Kalmari P, Karvinen E, Holmi M, Paavola L, Honkanen A, Topo P. Strength in Old Age implementation. Helsinki: Age Institute; 2018 (https://www.voimaavanhuuteen.fi/content/uploads/2018/06/Key-project-Strength-in-old-age-implementation_hires-FINAL.pdf).
14. PASEO – building political capacity to promote health through physical activity among inactive older people. In: Friedrich-Alexander-Universität [website]. Erlangen-Nürnberg; Friedrich-Alexander-Universität; 2011 (<https://www.sport.fau.eu/das-institut/forschung/public-health-und-bewegung/abgeschlossene-projekte/paseo/>).
15. Older people on the move. In: Age Institute [website]. Helsinki: Age Institute; 2016 (<https://www.ikainstituutti.fi/in-english/>).
16. Ageing and health [factsheet]. In: World Health Organization [website]. Geneva: World Health Organization; 2023 (<https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>).
17. Langhammer B, Bergland A, Rydwick E. The importance of physical activity exercise among older people. *BioMed Res Int*. 2018;2018, art. 7856823. doi:10.1155/2018/7856823.
18. Gomes M, Figueiredo D, Teixeira L, Poveda V, Paúl C, Santos-Silva A et al. Physical inactivity among older adults across Europe based on the SHARE database. *Age Ageing*. 2017;46(1):71–7. doi:10.1093/ageing/afw165.
19. Khazaei-pool M, Sadeghi R, Majlessi F, Rahimi Foroushani A. Effects of physical exercise programme on happiness among older people: physical exercise programme and happiness. *J Psychiatr Ment Health Nurs*. 2015;22(1):47–57. doi:10.1111/jpm.12168.
20. Estrategia de promoción de la salud y prevención en el SNS. Memoria de implementación 2014–2015 y evaluación preliminar [Health promotion and prevention strategy in the SNS. Implementation report 2014–2015 and preliminary evaluation]. Madrid: Ministry of Health, Social Services and Equality, Government of Spain; 2016 (<http://enfermeriacomunitaria.org/web/attachments/article/1409/Memoria%202014-2015.%20EstrategiaPSyP-SNS.PDF>) [in Spanish].
21. The European Innovation Partnership on Active and Healthy Ageing (EIP on AHA). In: European Commission [website]. Brussels: European Commission; 2022 (<https://digital-strategy.ec.europa.eu/en/policies/eip-aha>).
22. Localiza salud [Locate health]. In: Ministry of Health, Social Services and Equality, Government of Spain [website]. Madrid: Ministry of Health, Social Services and Equality, Government of Spain; 2023 (<https://localizasalud.sanidad.gob.es/maparecursos/main/Menu.action>).

1 All references accessed 4 April 2023.

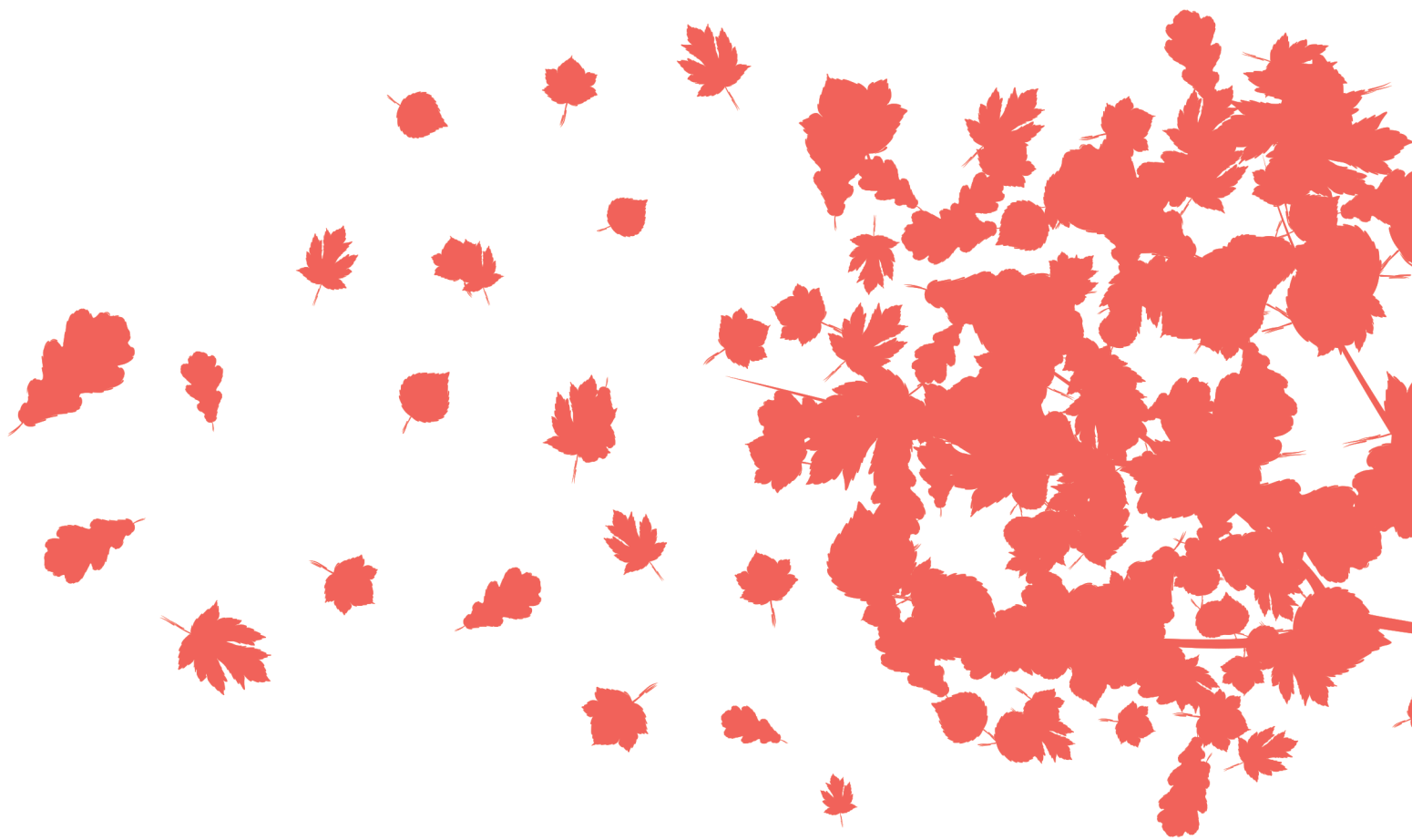
23. Global strategy on diet, physical activity and health. Geneva: World Health Organization; 2004 (<https://apps.who.int/iris/handle/10665/20142>).
24. Physical activity strategy for the WHO European Region 2016–2025. Copenhagen: WHO Regional Office for Europe; 2016 (<https://apps.who.int/iris/handle/10665/329407>).
25. Tsai L-T, Portegijs E, Rantakokko M, Viljanen A, Saajanaho M, Eronen J et al. The association between objectively measured physical activity and life-space mobility among older people. *Scand J Med Sci Sports*. 2015;25(4):e368–73. doi:10.1111/sms.12337.
26. Hupin D, Roche F, Gremeaux V, Chatard J-C, Oriol M, Gaspoz J-M et al. Even a low-dose of moderate-to-vigorous physical activity reduces mortality by 22% in adults aged \geq 60 years: a systematic review and meta-analysis. *Br J Sports Med*. 2015;49(19):1262–7. doi:10.1136/bjsports-2014-094306.
27. Litwin H, Shaul A. The effect of social network on the physical activity–cognitive function nexus in late life. *Int Psychogeriatr*. 2019;31(5):713–22. doi:10.1017/S1041610218001059.
28. Alltags Training programm [Everyday Training programme]. In: *Alter werden in Balance [Growing older well]* [website]. Cologne: Federal Centre for Health Education; 2023 (<https://www.aelter-werden-in-balance.de/atp/was-ist-atp/>).
29. Die Bewegungspackung [The movement pack]. In: *Alter werden in Balance [Growing older well]* [website]. Cologne: Federal Centre for Health Education; 2023 (<https://www.aelter-werden-in-balance.de/bewegungspackung/>).
30. McPhee JS, French DP, Jackson D, Nazroo J, Pendleton N, Degens H. Physical activity in older age: perspectives for healthy ageing and frailty. *Biogerontology*. 2016;17(3):567–80. doi:10.1007/s10522-016-9641-0.
31. de Souto Barreto P, Cesari M, Andrieu S, Vellas B, Rolland Y. Physical activity and incident chronic diseases: a longitudinal observational study in 16 European countries. *Am J Prev Med*. 2017;52(3):373–8. doi:10.1016/j.amepre.2016.08.028.
32. The benefits of senior exercise. In: *HealthStar Home Health* [website]. North St Paul (MN): HealthStar Home Health; 2023 (<https://healthstarhomehealth.net/the-benefits-of-senior-exercise/>).
33. Cruz-Jentoft AJ, Bahat G, Bauer J, Boirie Y, Bruyère O, Cederholm T et al. Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing*. 2019;48(1):16–31. doi:10.1093/ageing/afy169.
34. Tan ZS, Spartano NL, Beiser AS, DeCarli C, Auerbach SH, Vasan RS et al. Physical activity, brain volume, and dementia risk: the Framingham study. *J Gerontol A Biol Sci Med Sci*; 2017;72(6):789–95. doi:10.1093/gerona/glw130.
35. Motion for your mind: physical activity for mental health promotion, protection and care. Copenhagen: WHO Regional Office for Europe; 2019 (<https://apps.who.int/iris/handle/10665/346405>).
36. Watts AS, Mortby ME, Burns JM. Depressive symptoms as a barrier to engagement in physical activity in older adults with and without Alzheimer’s disease. *PLoS One*. 2018;13(12):e0208581. doi:10.1371/journal.pone.0208581.
37. Litwin H, Levinson M. The association of mobility limitation and social networks in relation to late-life activity. *Ageing Soc*. 2018;38(9):1771–90. doi:10.1017/S0144686X1700023X.
38. National Pedestrian Senior Club Network. In: *3-1-2 Meridian Tournament* [website]. Budapest: 3-1-2 Meridian Tournament; 2016 (<https://www.312.hu/orszagos-gyaloglo-idosek-klubhalozata-ogyik/>).
39. European Commission, WHO Regional Office for Europe. Hungary: physical activity factsheet 2018. Luxembourg: Publications Office of the European Union; 2018 (https://ec.europa.eu/sport/sites/sport/files/physical-activity-factsheet_who-hu-201811_en.pdf).
40. Bruins MJ, Van Dael P, Eggersdorfer M. The role of nutrients in reducing the risk for noncommunicable diseases during aging. *Nutrients*. 2019;11(1):85. doi:10.3390/nu11010085.
41. European food and nutrition action plan 2015–2020. Copenhagen: WHO Regional Office for Europe; 2015 (<https://apps.who.int/iris/handle/10665/329405>).
42. Denny A. An overview of the role of diet during the ageing process. *Br J Community Nurs*. 2008;13(2):58–67. doi:10.12968/bjcn.2008.13.2.28157.
43. Malenfant JH, Batis JA. Obesity in the geriatric population – a global health perspective. *J Glob Health Rep*. 2019;3:e2019045. doi:10.29392/joghr.3.e2019045.
44. Pontzer H, Yamada Y, Sagayama H, Ainslie PN, Andersen LF, Anderson LJ et al. Daily energy expenditure through the human life course. *Science*. 2021;373(6556):808–12. doi:10.1126/science.abe5017.
45. Baugreet S, Hamill RM, Kerry JP, McCarthy SN. Mitigating nutrition and health deficiencies in older adults: a role for food innovation? *J Food Sci*. 2017;82(4):848–55. doi:10.1111/1750-3841.13674.
46. Robinson S, Cooper C, Aihie Sayer A. Nutrition and sarcopenia: a review of the evidence and implications for preventive strategies. *J Aging Res*. 2012;2012, art. 510801. doi:10.1155/2012/510801.
47. Haines J, LeVan D, Roth-Kauffman MM. Malnutrition in the elderly: underrecognized and increasing in prevalence. In: *ClinicalAdvisor.com* [website]. New York (NY): Haymarket Medical; 2020 (<https://www.clinicaladvisor.com/home/topics/geriatrics-information-center/malnutrition-in-the-elderly-underrecognized-and-increasing-in-prevalence/>).
48. Pilgrim AL, Robinson SM, Aihie Sayer A, Roberts HC. An overview of appetite decline in older people. *Nurs Older People*. 2015;27(5):29–35. doi:10.7748/nop.27.5.29.e697.
49. Cox NJ, Ibrahim K, Sayer AA, Robinson SM, Roberts HC. Assessment and treatment of the anorexia of aging: a systematic review. *Nutrients*. 2019;11(1):144. doi:10.3390/nu11010144.

50. Nieuwenhuizen WF, Weenen H, Rigby P, Hetherington MM. Older adults and patients in need of nutritional support: review of current treatment options and factors influencing nutritional intake. *Clin Nutr.* 2010;29(2):160–9. doi:10.1016/j.clnu.2009.09.003.
51. Kehoe L, Walton J, Flynn A. Nutritional challenges for older adults in Europe: current status and future directions. *Proc Nutr Soc.* 2019;78(2):221–33. doi:10.1017/S0029665118002744.
52. Gabrovec B, Veninšek G, Samaniego LL, Carriazo AM, Antoniadou E, Jelenc M. The role of nutrition in ageing: a narrative review from the perspective of the European joint action on frailty – ADVANTAGE JA. *Eur J Intern Med.* 2018;56:26–32. doi:10.1016/j.ejim.2018.07.021.
53. OPTIFEL: food for elderly [website]. Avignon: OPTIFEL; 2023 (<https://www.optifel.eu/>).
54. Guidelines for the food industry: specifications for developing fruit and vegetable foods for elderly. Avignon: Optifel; 2014 (<https://www.optifel.eu/wp-content/uploads/2014/03/Plaqueette-Optifel-PDF6.compressed.pdf>).
55. Aridi YS, Walker JL, Wright ORL. The association between the Mediterranean dietary pattern and cognitive health: a systematic review. *Nutrients.* 2017;9(7):674. doi:10.3390/nu9070674.
56. Donini LM, Poggiogalle E, Piredda M, Pinto A, Barbagallo M, Cucinotta D et al. Anorexia and eating patterns in the elderly. *PLoS One.* 2013;8(5):e63539. doi:10.1371/journal.pone.0063539.
57. New dietary strategies addressing the specific needs of elderly population for healthy ageing in Europe. In: Cordis: EU research results [website]. Luxembourg: Publications Office of the European Union; 2016 (<https://cordis.europa.eu/project/id/266486/reporting>).
58. Ning Mak Tsz, Caldeira S. The role of nutrition in active and healthy ageing. For prevention and treatment of age-related diseases: evidence so far. JRC science and policy reports. Luxembourg: Publications Office of the European Union; 2014 (https://www.efad.org/wp-content/uploads/2021/11/the-role-of-nutrition-in-active-and-healthy-ageing_jr-science-and-policy-reports_ec-aug-2014.pdf).
59. American College of Sports Medicine, Chodzko-Zajko WJ, Proctor DN, Fiatarone Singh MA, Minson CT et al. American College of Sports Medicine position stand. Exercise and physical activity for older adults. *Med Sci Sports Exerc.* 2009;41(7):1510–30. doi:10.1249/MSS.0b013e3181a0c95c.
60. Bull FC, Al-Ansari SS, Biddle S, Borodulin K, Buman MP, Cardon G et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. *Br J Sports Med.* 2020;54(24):1451–62. doi:10.1136/bjsports-2020-102955.
61. Step safely: strategies for preventing and managing falls across the life-course. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/340962>).
62. Buchner DM. Preserving mobility in older adults. *West J Med.* 1997;167(4):258–64. PMID:9348757.
63. Gillespie L. Preventing falls in elderly people. *BMJ.* 2004;328(7441):653–4. doi:10.1136/bmj.328.7441.653.
64. Jantunen H, Wasenius N, Salonen MK, Perälä M-M, Osmond C, Kautiainen H et al. Objectively measured physical activity and physical performance in old age. *Age Ageing.* 2017;46(2):232–7. doi:10.1093/ageing/afw194.
65. Dipietro L, Campbell WW, Buchner DM, Erickson KI, Powell KE, Bloodgood B et al. Physical activity, injurious falls, and physical function in aging: an umbrella review. *Med Sci Sports Exerc.* 2019;51(6):1303–13. doi:10.1249/MSS.0000000000001942.
66. Felipe J, Viezel J, Reis AD, da Costa Barros EA, de Paulo TRS, Neves LM et al. Relationship of different intensities of physical activity and quality of life in postmenopausal women. *Health Qual Life Outcomes.* 2020;18(1):123. doi:10.1186/s12955-020-01377-1.
67. Ciutan M, Gălăon M, Panait CL, Bozdog ME, Pîrlög R, Cherecheș RM et al. DOMAIN 2: commitment to action on frailty. Case study: Romania develops a strategic plan for frailty. Brussels: Health Programme of the European Union, Managing Frailty: the Advantage Initiative; 2019 (http://oldph.plumpdesign.net/wp-content/uploads/2019/11/DOMAIN-2_Romanian-case-study-for-website_v2.pdf).
68. Busse AL, Gil G, Santarém JM, Jacob Filho W. Physical activity and cognition in the elderly: a review. *Dement Neuropsychol.* 2009;3(3):204–8. doi:10.1590/S1980-57642009DN30300005.
69. Young J, Angevaren M, Rusted J, Tabet N. Aerobic exercise to improve cognitive function in older people without known cognitive impairment. *Cochrane Database Syst Rev.* 2015;4:CD005381. doi:10.1002/14651858.CD005381.pub4.
70. Cabrita M, Lousberg R, Tabak M, Hermens HJ, Vollenbroek-Hutten MMR. An exploratory study on the impact of daily activities on the pleasure and physical activity of older adults. *Eur Rev Aging Phys Act.* 2017;14:1. doi:10.1186/s11556-016-0170-2.
71. Beyer A-K, Wolff JK, Warner LM, Schüz B, Wurm S. The role of physical activity in the relationship between self-perceptions of ageing and self-rated health in older adults. *Psychol Health.* 2015;30(6):671–85. doi:10.1080/08870446.2015.1014370.
72. Federici A, Ferri Marinii C, Lucertini F, Zoffoli L, Fanelli V, Capriotti A et al. The effect of physical activity on the perception of body image and well-being during aging. *J Phys Educ Sport.* 2019;19(suppl. 4):1341–8. doi:10.7752/jpes.2019.s4194.
73. van Uffelen JGZ, Khan A, Burton NW. Gender differences in physical activity motivators and context preferences: a population-based study in people in their sixties. *BMC Public Health.* 2017;17(1):624. doi:10.1186/s12889-017-4540-0.
74. Towards more physical activity in cities: transforming public spaces to promote physical activity – a key contributor to achieving the Sustainable Development Goals in Europe. Copenhagen: WHO Regional Office for Europe; 2018 (<https://apps.who.int/iris/handle/10665/345147>).

75. Global age-friendly cities: a guide. Geneva: World Health Organization; 2007 (<https://apps.who.int/iris/handle/10665/43755>).
76. Creating age-friendly cities and communities. In: World Health Organization [website]. Geneva: World Health Organization; 2023 (<https://www.who.int/activities/creating-age-friendly-cities-and-communities>).
77. Ribeiro AI, Mitchell R, Carvalho MS, de Pina M de F. Physical activity-friendly neighbourhood among older adults from a medium size urban setting in southern Europe. *Prev Med.* 2013;57(5):664–70. doi:10.1016/j.ypmed.2013.08.033.
78. Mobil'Sport Ardèche-Drôme [YouTube video]. Added by Mobil'Sport; 2021 (<https://www.youtube.com/watch?v=Y22BH221KpM>) (in French).
79. Mobil'Sport en Ardèche et en Drôme [Mobil'Sport in Ardèche and in Drôme]. In: Sport en Milieu Rural Ardèche-Drôme [Sport in rural Ardèche-Drôme] [website]. Guilherand-Grangesd (France): Comité Ardèche Drôme; 2023 (<http://www.sportrural07-26.fr/mobil sport/>) (in French).
80. Egerton T, Chastin SFM, Stensvold D, Helbostad JL. Fatigue may contribute to reduced physical activity among older people: an observational study. *J Gerontol A Biol Sci Med Sci.* 2016;71(5):670–6. doi:10.1093/gerona/glv150.
81. Hawkesworth S, Silverwood RJ, Armstrong B, Pliakas T, Nanchalal K, Jefferis BJ et al. Investigating associations between the built environment and physical activity among older people in 20 UK towns. *J Epidemiol Community Health.* 2018;72(2):121–31. doi:10.1136/jech-2017-209440.
82. Eurostat. Ageing Europe: looking at the lives of older people in the EU. 2019 edition. Luxembourg: Publications Office of the European Union; 2019 (<https://ec.europa.eu/eurostat/documents/3217494/10166544/KS-02-19%E2%80%91EN-N.pdf/c701972f-6b4e-b432-57d2-91898ca94893>).
83. Ruiz Montero PJ, Castillo-Rodríguez A. Body composition, physical fitness and exercise activities of elderly. 2016;16(3):860–5. doi:10.7752/jpes.2016.03136.
84. Rodríguez-Gómez I, Mañas A, Losa-Reyna J, Rodríguez-Mañas L, Chastin SFM, Alegre LM et al. Associations between sedentary time, physical activity and bone health among older people using compositional data analysis. *PLoS One.* 2018;13(10):e0206013. doi:10.1371/journal.pone.0206013.
85. Promoting Physical Activity for Healthy Ageing (PAHA). In: EuropeActive [website]. Brussels: EuropeActive; 2015 (<https://www.europeactive.eu/projects/paha>).
86. A good practice guide ... for an effective intervention to promote healthy and active ageing. Brussels: EuropeActive; 2016 (<https://www.europeactive.eu/sites/europeactive.eu/files/project/PAHA-Good-Practice-Guide-WEB.pdf>).
87. Gellert C, Schöttker B, Brenner H. Smoking and all-cause mortality in older people: systematic review and meta-analysis. *Arch Intern Med.* 2012;172(11):837–44. doi:10.1001/archinternmed.2012.1397.
88. Clegg ME, Williams EA. Optimizing nutrition in older people. *Maturitas.* 2018;112:34–8. doi:10.1016/j.maturitas.2018.04.001.
89. Healthy diet [factsheet]. In: World Health Organization [website]. Geneva: World Health Organization; 2020 (<https://www.who.int/news-room/fact-sheets/detail/healthy-diet>).
90. REPLACE. Trans fat-free by 2023. In: World Health Organization [website]. Geneva: World Health Organization; 2023 (<https://www.who.int/teams/nutrition-and-food-safety/replace-transfat>).
91. Dietary guidelines for Americans 2020–2025, ninth edition. Washington (DC): US Department of Agriculture, US Department of Health and Human Services; 2020 (https://www.dietaryguidelines.gov/sites/default/files/2021-03/Dietary_Guidelines_for_Americans-2020-2025.pdf).
92. IN FORM [website]. Bonn: Federal Centre for Nutrition in the Federal Agency for Agriculture and Nutrition; 2023 (<https://www.in-form.de/>) (in German).
93. Vernetzungsstellen Seniorenernährung [Networking centres for senior nutrition]. In: IN FORM [website]. Bonn: Federal Centre for Nutrition in the Federal Agency for Agriculture and Nutrition; 2023 (<https://www.in-form.de/wissen/gemeinschaftsverpflegung/vernetzungsstellen-seniorenernaehrung>) (in German).
94. DGE quality standard for catering with “meals on wheels” and in residential homes for the elderly. Bonn: Federal Centre for Nutrition in the Federal Agency for Agriculture and Nutrition, German Society for Nutrition; 2022 (https://www.fitimalter-dge.de/fileadmin/user_upload/medien/DGE-QST/DGE_QST_MealsonWheels_web.pdf).
95. Atkins JL, Ramsay SE, Whincup PH, Morris RW, Lennon LT, Wannamethee SG. Diet quality in older age: the influence of childhood and adult socio-economic circumstances. *Br J Nutr.* 2015;113(9):1441–52. doi:10.1017/S0007114515000604.
96. Petroka K, Campbell-Bussiere R, Dychtvald DK, Milliron B-J. Barriers and facilitators to healthy eating and disease self-management among older adults residing in subsidized housing. *Nutr Health.* 2017;23(3):167–75. doi:10.1177/0260106017722724.
97. Kamphuis CBM, de Bekker-Grob EW, van Lenthe FJ. Factors affecting food choices of older adults from high and low socioeconomic groups: a discrete choice experiment. *Am J Clin Nutr.* 2015;101(4):768–74. doi:10.3945/ajcn.114.096776.
98. Stringhini S, Carmeli C, Jokela M, Avendaño M, McCrory C, d'Errico A et al. Socioeconomic status, non-communicable disease risk factors, and walking speed in older adults: multi-cohort population based study. *BMJ.* 2018;360:k1046. doi:10.1136/bmj.k1046.
99. Whitelock E, Ensaif H. On your own: older adults' food choice and dietary habits. *Nutrients.* 2018;10(4):413. doi:10.3390/nu10040413.
100. Global status report on alcohol and health 2018. Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/274603>).

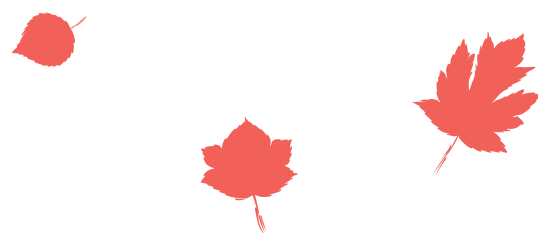
101. European tobacco use: trends report. Copenhagen: WHO Regional Office for Europe; 2019 (<https://apps.who.int/iris/handle/10665/346817>).
102. Peters R, Poulter R, Warner J, Beckett N, Burch L, Bulpitt C. Smoking, dementia and cognitive decline in the elderly, a systematic review. *BMC Geriatr*. 2008;8:36. doi:10.1186/1471-2318-8-36.
103. Alcohol and cancer in the WHO European Region: an appeal for better prevention. Copenhagen: WHO Regional Office for Europe; 2020 (<https://apps.who.int/iris/handle/10665/336595>).
104. Arora M, El Sayed A, Beger B, Naidoo P, Shilton T, Jain N et al. The impact of alcohol consumption on cardiovascular health: myths and measures. *Glob Heart*. 2022;17(1):45. doi:10.5334/gh.1132.
105. Harvey JA, Chastin SF, Skelton DA. How sedentary are older people? A systematic review of the amount of sedentary behavior. *J Aging Phys Act*. 2015;23(3):471–87. doi:10.1123/japa.2014-0164.
106. Prevalence of insufficient physical activity in older people aged 70 or over. In: World Health Organization [website]. Geneva: World Health Organization; 2016 (<https://www.who.int/data/maternal-newborn-child-adolescent-ageing/indicator-explorer-new/mca/prevalence-of-insufficient-physical-activity-in-older-people-aged-70-or-over>).
107. Sun F, Norman IJ, While AE. Physical activity in older people: a systematic review. *BMC Public Health*. 2013;13, art. 449. doi:10.1186/1471-2458-13-449.
108. Davis MG, Fox KR. Physical activity patterns assessed by accelerometry in older people. *Eur J Appl Physiol*. 2007;100(5):581–9. doi:10.1007/s00421-006-0320-8.
109. International Sport and Culture Association, Centre for Economics and Business Research. The economic costs of physical inactivity in Europe. London: Centre for Economics and Business Research; 2015 ([https://inactivity-time-bomb.nowwemove.com/download-report/The%20Economic%20Costs%20of%20Physical%20Inactivity%20in%20Europe%20\(June%202015\).pdf](https://inactivity-time-bomb.nowwemove.com/download-report/The%20Economic%20Costs%20of%20Physical%20Inactivity%20in%20Europe%20(June%202015).pdf)).
110. Peralta M, Ramos M, Lipert A, Martins J, Marques A. Prevalence and trends of overweight and obesity in older adults from 10 European countries from 2005 to 2013. *Scand J Public Health*. 2018;46(5):522–9. doi:10.1177/1403494818764810.
111. Over half of adults in the EU are overweight. In: Eurostat [website]. Luxembourg: Eurostat; 2021 (<https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20210721-2>).
112. Marques A, Peralta M, Naia A, Loureiro N, de Matos MG. Prevalence of adult overweight and obesity in 20 European countries, 2014. *Eur J Public Health*. 2018;28(2):295–300. doi:10.1093/eurpub/ckx143.
113. Crichton M, Craven D, Mackay H, Marx W, de van der Schueren M, Marshall S. A systematic review, meta-analysis and meta-regression of the prevalence of protein-energy malnutrition: associations with geographical region and sex. *Age Ageing*. 2019;48(1):38–48. doi:10.1093/ageing/afy144.
114. Leij-Halfwerk S, Verwijns MH, van Houdt S, Borkent JW, Guitoli PR, Pelgrim T et al. Prevalence of protein–energy malnutrition risk in European older adults in community, residential and hospital settings, according to 22 malnutrition screening tools validated for use in adults > 65 years: a systematic review and meta-analysis. *Maturitas*. 2019;126:80–9. doi:10.1016/j.maturitas.2019.05.006.
115. Spiro A, Buttriss JL. Vitamin D: an overview of vitamin D status and intake in Europe. *Nutr Bull*. 2014;39(4):322–50. doi:10.1111/mbu.12108.
116. EFOP [website]. Budapest: National Pharmaceutical and Food Health Institute; 2023 (<https://merokanal.hu/tag/efop/>) (in Hungarian).
117. Oxley H. Policies for healthy ageing: an overview. OECD Health Working Papers, No. 42. Paris: OECD Publishing; 2009 (<https://doi.org/10.1787/226757488706>).
118. Using dietary intake modelling to achieve population salt reduction: a guide to developing a country-specific salt reduction model. Copenhagen: WHO Regional Office for Europe; 2018 (<https://apps.who.int/iris/handle/10665/345142>).
119. Breda J, Castro LSN, Whiting S, Williams J, Jewell J, Engesveen K et al. Towards better nutrition in Europe: evaluating progress and defining future directions. *Food Policy*. 2020;96, art. 101887. doi:10.1016/j.foodpol.2020.101887.
120. Capacci S, Mazzocchi M, Shankar B, Macias JB, Verbeke W, Pérez-Cueto FJA et al. Policies to promote healthy eating in Europe: a structured review of policies and their effectiveness. *Nutr Rev*. 2012;70(3):188–200. doi:10.1111/j.1753-4887.2011.00442.x.
121. Age & Opportunity Active. In: Age & Opportunity [website]. Dublin: Age & Opportunity; 2023 (<https://ageandopportunity.ie/active/>).
122. Political declaration and Madrid international plan of action on ageing. Second World Assembly on Ageing, Madrid, Spain, 8–12 April, 2002. New York (NY): United Nations; 2002 (<https://www.un.org/development/desa/ageing/madrid-plan-of-action-and-its-implementation.html>).
123. Active ageing: a policy framework. Geneva: World Health Organization; 2022 (<https://apps.who.int/iris/handle/10665/67215>).
124. Overview of available policies and legislation, data and research, and institutional arrangements relating to older persons – progress since Madrid. New York (NY): United Nations Population Fund, Help Age International; 2011 (https://www.unfpa.org/sites/default/files/pub-pdf/Older_Persons_Report.pdf).
125. Time to deliver in Europe: meeting noncommunicable disease targets to achieve the Sustainable Development Goals. Outcome report from the WHO European High-level Conference on Noncommunicable Diseases, Ashgabat, Turkmenistan, 9–10 April 2019. Copenhagen: WHO Regional Office for Europe; 2019 (<https://apps.who.int/iris/handle/10665/347381>).

126. Murray A, Foster C, Stamatakis E. Let's share, help deliver and sustain the WHO global action plan on physical activity. *Br J Sports Med.* 2019;53(13):794–6. doi:10.1136/bjsports-2018-100099.
127. Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva: World Health Organization; 2018 (<https://apps.who.int/iris/handle/10665/272722>).
128. Physical activity and sedentary behaviour: a brief to support older people. Geneva: World Health Organization; 2022 (<https://apps.who.int/iris/handle/10665/365170>).
129. Creating age-friendly environments in Europe: a tool for local policy-makers and planners. Copenhagen: WHO Regional Office for Europe; 2016 (<https://apps.who.int/iris/handle/10665/334252>).
130. National programmes for age-friendly cities and communities: a guide. Geneva: World Health Organization; 2023 (<https://apps.who.int/iris/handle/10665/366634>).
131. Age-friendly environments in Europe: a handbook of domains for policy action. Copenhagen: WHO Regional Office for Europe; 2017 (<https://apps.who.int/iris/handle/10665/334251>).
132. Age-friendly environments in Europe: indicators, monitoring and assessments. Copenhagen: WHO Regional Office for Europe; 2018 (<https://apps.who.int/iris/handle/10665/334284>).
133. Organization for Economic Cooperation and Development, European Union. Health at a glance: Europe 2016. State of health in the EU cycle. Paris: OECD Publishing; 2016 (https://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-europe-2016_9789264265592-en).
134. Tambor M, Domagata A, Zabdyr-Jamróz M, Kowalska-Bobko I, Sowa A, Sowada C et al. Health promotion for older people in Hungary: the need for more action. *Zesz Nauk Ochr Zdrowia Zdr Publiczne Zarzadzanie.* 2017;15(1):96–107. doi:10.4467/20842627OZ.17.010.6236.
135. van Baal PHM, Hoogendoorn M, Fischer A. Preventing dementia by promoting physical activity and the long-term impact on health and social care expenditures. *Prev Med.* 2016;85:78–83. doi:10.1016/j.ypmed.2016.01.013.
136. Dallmeyer S, Wicker P, Breuer C. The relationship between physical activity and out-of-pocket health care costs of the elderly in Europe. *Eur J Public Health.* 2020;30(4):628–32. doi:10.1093/eurpub/ckaa045.
137. Muellmann S, Forberger S, Möllers T, Zeeb H, Pischke CR. Effectiveness of ehealth interventions for the promotion of physical activity in older adults: a systematic review protocol. *Syst Rev.* 2016;5(1):47. doi:10.1186/s13643-016-0223-7.
138. Eglseer D, Visser M, Volkert D, Lohrmann C. Nutrition education on malnutrition in older adults in European medical schools: need for improvement? *Eur Geriatr Med.* 2019;10(2):313–8. doi:10.1007/s41999-018-0154-z.
139. Hawkins S. Dorset takes action to combat malnutrition in the community. *Complete Nutrition.* 2015;15(3):13–5 (<https://wessexahsn.org.uk/img/projects/Malnutrition.pdf>).
140. Malnutrition taskforce [website]. London: Malnutrition Taskforce; 2023 (<https://www.malnutritiontaskforce.org.uk/>).
141. Mozaffarian D, Angell SY, Lang T, Rivera JA. Role of government policy in nutrition – barriers to and opportunities for healthier eating. *BMJ.* 2018;361:k2426. doi:10.1136/bmj.k2426.
142. Visser M, Volkert D, Corish C, Geisler C, de Groot LC, Cruz-Jentoft AJ et al. Tackling the increasing problem of malnutrition in older persons: the Malnutrition in the Elderly (MaNuEL) knowledge hub. *Nutr Bull.* 2017;42(2):178–86. doi:10.1111/mbu.12268.
143. Gagliardi AR, Abdallah F, Faulkner G, Ciliska D, Hicks A. Factors contributing to the effectiveness of physical activity counselling in primary care: a realist systematic review. *Patient Educ Couns.* 2015;98(4):412–9. doi:10.1016/j.pec.2014.11.020.
144. Advocacy brief: social isolation and loneliness among older people. Geneva: World Health Organization; 2021 (<https://apps.who.int/iris/handle/10665/343206>).
145. Farrance C, Tsofliou F, Clark C. Adherence to community based group exercise interventions for older people: a mixed-methods systematic review. *Prev Med.* 2016;87:155–66. doi:10.1016/j.ypmed.2016.02.037.
146. Joosen P, Piette D, Buekers J, Taelman J, Berckmans D, De Boever P. A smartphone-based solution to monitor daily physical activity in a care home. *J Telemed Telecare.* 2019;25(10):611–22. doi:10.1177/1357633X18790170.
147. Mendes R, Nunes Silva M, Santos Silva C, Marques A, Godinho C, Tomás R et al. Physical activity promotion tools in the Portuguese primary health care: an implementation research. *Int J Environ Res Public Health.* 2020;17(3):815. doi:10.3390/ijerph17030815.
148. Bel-serrat S, Huybrechts I, Thuman BF, Hebestreit A, Abuja PM, de Henauw S et al. Inventory of surveillance systems assessing dietary, physical activity and sedentary behaviours in Europe: a DEDIPAC study. *Eur J Public Health.* 2017;27(4):747–55. doi:10.1093/eurpub/ckx023.
149. Lakerveld J, van der Ploeg HP, Kroeze W, Ahrens W, Allais O, Andersen LF et al. Towards the integration and development of a cross-European research network and infrastructure: the DETERminants of Diet and Physical ACTivity (DEDIPAC) knowledge hub. *Int J Behav Nutr Phys Act.* 2014;11, art. 143. doi:10.1186/s12966-014-0143-7.



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