

## POPULATION AGING AS A GLOBAL DEMOGRAPHIC PHENOMENON AND ITS IMPLICATIONS FOR PUBLIC HEALTH

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Received: 11.04.2025.

Accepted: 15.05.2025.

### ABSTRACT

*Population aging is defined as one of the most current phenomena and challenges facing world. The WHO defines population aging as one of greatest successes of human society, resulting from reduction of mortality among elderly and their longer life expectancy in the protection of population, pharmacology, public health and promotion of healthy lifestyles. The certainty of the continuity of population aging in future continues to capture attention of the general public and initiates a whole series of open questions that will require very specific and concrete answers from each country. The aim of this paper is to review available literature to indicate the specific determinants of the elderly population, identify the challenges faced by the elderly population and indicate implications of the phenomenon of population aging. The unstoppable process of population ageing has profound consequences for health, social and economic spheres of society due to specific and very different needs of elderly population. The role of demographics, social factors, health needs and barriers as economic resources and differences in use of health services among elderly need to be systematically addressed and monitored. A well-organized health and social care system is important for improving the health of older people. Public health policy should address the diversity of health and functional conditions experienced by older people and maximize number of people who promote a positive journey of ageing. The creation and implementation of innovative strategies to improve health and quality of life of older people would enable well-being in old age.*

**Keywords:** Population aging, implications, public health, ageism.

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314.117-053.9

364.4-053.9

Eabr 2025; 26(3):223-231

DOI: 10.2478/eabr-2025-0014

## INTRODUCTION

Population aging is defined as one of the most current phenomena and challenges facing the world. In the last decades of the last century, it was clear that the developed world expected a large increase in the proportion of elderly people, but with the entry into the 21st century, it became obvious that this is an inevitable and general tendency, which, with the tendency and tendencies it deals with, how real and expected, still represents a major challenge for modern society. The certainty of the continuity of population aging in the future also captures the attention of the general public and initiates a whole series of open questions that will require very specific and concrete (concrete) answers from each country).

The World Health Organization (WHO) defines population aging as one of the greatest successes of human society, resulting from the reduction in mortality of the elderly and their progress in a longer life expectancy for life. pharmacology, public health and the promotion of healthy lifestyles (2). However, the unstoppable process of population aging has profound consequences for the health, social and economic spheres of society due to the specific and very different needs of the elderly population (3). As they are most often described as health needs, social needs, economic needs and many other needs of the elderly are largely intertwined, connected and essential (4). As a consequence of the biological process of aging, there is a gradual increase in the frequency of patients with chronic diseases (cardiovascular diseases, diabetes, malignant diseases, etc.), which is why it is not unusual for more people to no longer feel well. associated diseases (so-called multimorbidity) (5,6).

With aging, the number of functionally dependent people, people with some form of mental or physical impairment, and the number of cognitively impaired people progressively increases. The extensive health problems of the elderly lead to increasing pressure on the health service and increasing allocations for their health care (5). The elderly are increasingly faced with economic barriers to using health services, as a consequence of the decline in economic power due to retirement and the cessation of the active work cycle. Most elderly people experience a decline in their capacity for independent living due to limited mobility, psychological frailty, or other physical problems. Many require some form of support, assistance, and long-term care, including nursing home care, geriatric home care, home help, community care, and extended hospital stays. This means an increase in the number of dependent elderly people in economic, health and social terms and an increase in the need for reallocation of resources to long-term care (7).

All of the above has a major negative impact on the economic stability of the health system and society as a whole (8). The specificities of the aging model are primarily a consequence of the influence of a number of factors that operate in certain social circumstances and a specific social environment. Demography, a science that, among other things, monitors the dynamics of growth and development of the elderly

population at the global level, has very precise and clear numerical criteria (indicators) in its definition: the share of the elderly in the total population, where both nominal age limits (60 and 65 years) are taken into account, together with the average age and the aging index. However, over time, the age limit has been moved from 60 to 65 years in response to accelerated population aging trends and the extension of life and working life in modern society (1).

### Demographic Profile of the Elderly

The world's population is aging rapidly. The number of people over 65 years of age more than tripled from 131 million to 417 million between 1950 and 2000, while their share of the total population increased from 5% to 7% (1,12,13). The beginning of the 21st century indicates that demographic aging is accelerating. Of the 7.3 billion people worldwide in 2015, 8.5% of the world's population, or 617 million people, were over 65 years of age. It is predicted that the number of older people will increase by more than 60% in just 15 years - so that by 2030, those over 65 will make up 12% of the total population. The proportion of older people will continue to grow over the next 20 years - by 2050 there will be 1.6 billion older people, representing 17% of the world's total population. Globally, the projected rate of ageing in the future predicts that the number of people aged 65 and over will increase by around 27.1 million per year (11). The increase will be greatest and fastest in developing countries, where the elderly population is expected to quadruple in the next 50 years. It is clear that the world is entering a new demographic period and that the 21st century is the century of population ageing (13).

Regions of the world vary in the stages of demographic transition and also in the rate of ageing. In more developed countries, especially those in Western and Eastern Europe, the demographic transition began more than a century ago and most have taken decades to complete the process. However, Asia and Latin America are rapidly advancing towards the demographic transition and are ageing more rapidly. Less than 8% of Asians were aged 65 or over in 2015, but this regional average masks the huge variations that exist within Asia itself. While about half of Asian countries currently have less than 5% of their population aged, some Asian countries are already among the oldest in the world. East Asia is one of the oldest subregions and includes the oldest major country in the world, Japan (26.6%). The proportion of older people in Asia is expected to reach 12.1% in 2030 and 18.8% in 2050 (11). Comparing continents, it is evident that Africa has the smallest elderly population (3.5%), while Europe is inhabited by the oldest population (17.4%).

Unlike other regions, Africa is still in the early stages of its demographic transition, with high birth rates and a young population structure, particularly in western, central, and some eastern countries. Researchers have identified several possible explanations for the delayed decline in fertility in some parts of Africa, including slow economic growth, insufficient progress in improving women's access to education, and increased mortality due to the HIV epidemic

(14,15). Most African countries now have less than 5% of their population aged 65 years or older, while 21 countries have populations of 3% or less (e.g., Ethiopia, 2.9%, and Uganda, 2%). While Africa is a young continent, some African countries already have large populations of older people. In 2015, the number of older people in the population exceeded one million in 11 countries, including Nigeria (5.6 million), Egypt (4.6 million) and South Africa (3.1 million). By 2050, more than half of African countries are expected to have more than one million older people, including three countries with more than 10 million (Nigeria -18.8 million, Egypt - 18.1 million and Ethiopia - 11.5 million) and another six countries with more than 5 million (11). The percentage of the population aged 65 and over ranges from a high of over 26.6% in Japan to a low of around 1% in Qatar and the United Arab Emirates. Of the 25 oldest countries, 22 are in Europe, with Germany and Italy having held the top spot for several years (16).

Slovenia and Bulgaria are projected to be the oldest European countries in 2050. Japan, however, is currently the oldest country in the world and is expected to retain this position until at least 2050. With the rapid ageing of Asia, South Korea, Hong Kong and Taiwan will join Japan as the oldest countries and regions by 2050, when more than one third of the population in Asia will be 65 (more than one third of the population of Asia). It is estimated that China's elderly population will exceed the number of Europeans aged 65 and over by 2025 (1). A special aspect of demographic ageing is the intensive ageing within the older population itself, i.e. the ageing of the elderly, which is characteristic of most countries in the world, regardless of geographical location or economic development (17).

The WHO estimates that the number of "oldest old" will quadruple in the first half of the 21st century, reaching 395 million by 2050, with one in five older people aged 80 years or older (1,18). The oldest old differ from the rest of the older population in many sociodemographic characteristics and are more likely to have multiple chronic conditions requiring long-term care, and may therefore consume public resources disproportionately and place a greater burden on informal care, often provided by families themselves (19,20).

Another important indicator of the degree of aging of the population is the average age of the population, which ranges from 15 to almost 50 years. Demographically, the youngest continent is Africa, with an average age of 19.7 years, while Europe is the oldest continent, with an average age of 41.6 years. For example, Niger, Uganda and Mali have average values of this indicator around 15-16 years, since more than half of the population in these countries is under 18 years of age. At the other end of the spectrum are Japan and Germany with an average age of 47 years. According to projections, the average age in Japan will be 53 years in 2030, and in 2050 the average age will reach 56 years (11).

In most European countries, the share of the elderly population already exceeds 14%. Serbia is among them. In the

period between the two censuses, there was no significant change in the share of people under 15 years of age in the total population – 14.3% (2011 Census), compared to 14.4% (2022 Census), but there was a significant decrease in the share of people aged 15–64 – from 68.3% (2011) to 63.5% (2022), i.e. by about 5 percentage points, while the share of people aged 65 and over increased from 17.4% (2011) to 22.1% (2022). The most unfavorable demographic situation is in the Region of South and East Serbia, where almost every fourth person (23.7%) is older than 64 years. The Republic Statistical Office predicts that the share of people over 65 will increase by another 8% in the next thirty years, so that at the end of the projection period every fourth resident of Serbia (25.2%) would be over 65 years old (21).

### Life expectancy

Life expectancy is "the average number of years that a person of a given age is expected to live if current mortality rates continue to hold." Life expectancy is increasing in all regions of the world, but particularly in developed countries, those most affected by the problem of aging. Over the past half century, life expectancy at birth has increased by almost 20 years globally, reaching 68.6 years in 2015, largely due to improved health and reduced mortality among the elderly (1).

However, there are large regional differences in this basic indicator. North America currently has the longest life expectancy at 79.9 years and is projected to continue to lead the region with an average life expectancy of 84.1 years in 2050. Current life expectancy in Africa is only 59.2 years. However, Africa is expected to make major health gains and improve AIDS mortality rates over the next few decades, with life expectancy projected to reach 71.0 years by 2050, narrowing the gap between North America and Africa (11). Looking at individual countries, uneven trends in population health are evident, reflected in differences in life expectancy across countries. In 2019, 24 countries had a life expectancy at birth of 80 years or more. Japan, Singapore, and Macau lead this group, with life expectancies over 84 years. At the other end of the spectrum, 28 countries have life expectancies below 60 years. With the exception of Afghanistan, the remaining 27 countries are in Africa. For example, life expectancy in South Africa is 49.7 years and in Japan it is 84.7 years, a difference of 35 years in life expectancy at birth between the two countries (11). Life expectancy has also increased in older ages. In the United States, for example, life expectancy for people aged 65 increased from 11.9 years in 1900–1902 to 19.1 years in 2009. Life expectancy for people aged 80 almost doubled during the same period, from 5.3 years to 9.1 years (22). According to the results of the last Population Census in 2022 the life expectancy of live-born men and women in the Republic of Serbia is 72.30 and 77.49 years, respectively. In relation to the period 2010-2012. year, an increase of 0.3 years was recorded for men and 0.4 years for women, while the difference in average life expectancy of 5.2 years in favor of women was maintained. The expected increase in average life expectancy of about two years, which was achieved in the inter-census period from 2002 to 2011,

was not repeated due to the significant impact of the coronavirus pandemic, especially in 2021, which belongs to the three-year interval around the 2022 census. In terms of this indicator, Serbia lags behind developed European countries (21,23).

### Fertility

Today, there is a consensus scientific opinion that the process of population aging is primarily caused by low fertility (11). European demographers have been warning for decades about possible declines in the total population that will accompany the inevitable aging of the population in some European countries, due to persistent “low-low” fertility levels. In some European countries, such as Belarus, Bulgaria, Romania, Serbia and Ukraine, population decline began two decades ago (24). The total fertility rate was halved from 5 to 2.5 in the period 1950–2009. In 2015, the fertility rate was close to or below the replacement level in all regions of the world, with the exception of Africa. In developed countries, this indicator is significantly lower than the world average and is 1.6. Record low fertility rates are observed in Russia (1.6), China and Switzerland (1.5), Germany and Japan (1.4), South Korea (1.2) and Taiwan (1.1). In Asia and Latin America, on the other hand, fertility rates have declined more recently but more rapidly than in Europe. The overall total fertility rate in Asia and Latin America fell by 50% (from 6 to 3 children per woman) during the period 1965–1995. In 2015, the average total fertility rate was at replacement level (2.1) and is projected to continue to decline over the next 35 years to 2050, albeit at a reduced rate (11). In Africa, fertility is still very high (4.4), with the record-breaking countries being Niger (6.8), Mali and Burundi (6.1), Somalia (6), and Uganda (5.9).

Demographers have noted that Africa has undergone a different trajectory of fertility transition than the rest of the world (25). They argue that the slow decline in fertility in Africa is due to the still high ideal family size, which stems from the distinctive pro-natalist cultural norms of African societies, the pervasiveness of fertility control regimes that focus on delaying rather than preventing, and the unmet need for family planning (26–28). The current total fertility rate in Serbia is 1.35, which is one-third lower than the fertility level required for simple population replacement (2.1 live births). For more than half a century, Serbia has been experiencing a downward trend in fertility, which is an excellent indicator of changes in reproductive norms and behavior of the Serbian population, as well as of the difficult socio-economic situation (1).

Accelerated modernization, migration from rural to urban areas, high participation of women in the full-time labor force, unemployment, unsatisfactory economic standard, inadequate support for balancing work and family responsibilities, childcare problems, birth control, etc., are just some of the factors behind the low birth rate in Serbia (29).

### Economic consequences of population aging

As one of the consequences of changing economic relations in society compared to the pre-industrial period, there is a decrease in the working-age population above a certain age, which in conditions of permanent population aging can have serious socio-economic consequences (1). As a result of the extension of life expectancy and the secular decline in fertility, which leads to inevitable population aging, the number of pensioners as part of the elderly population is constantly increasing, so pensioners are clearly distinguished as the economically dominant category that appears among the elderly population (30). The pension system is an indispensable factor in the economic and social stability of a state, and its implications are particularly pronounced in countries in transition and economically less developed countries such as Serbia (31).

Recently, many governments have expressed concerns about the adequacy and sustainability of pension systems by modifying the parameters of these schemes. These measures include: raising the statutory retirement age; increasing the contribution rate for defined benefit schemes, the tax or social security rates on pension contributions, and minimum service requirements; removing incentives for early retirement; and introducing automatic adjustment mechanisms such as linking the age at which pension benefits can start to life expectancy. Governments have also introduced reforms that strengthen private pension funds and improve their complementary role in providing adequate retirement income. While measures to raise the statutory retirement age and pension system reforms can improve the sustainability of pension schemes, it is also important to bear in mind the potential consequences of these broad reforms on poverty and inequality among older persons (32).

Population ageing is often framed in terms of sustainable health systems, ensuring well-being and economic growth, while ignoring the significant social, economic and cultural contributions that older people make (33). Ageing is a concern from the perspective of the cost of health care systems, as well as the cost of health care for older people, particularly in settings where institutional, human and financial resources to meet the basic needs of older people are limited and where social safety nets are lacking. High-income countries may differ from low- and middle-income countries in terms of their readiness or availability of resources to provide health care for an ageing population. Institutionalised long-term care, combined with informal care, are some of the options for addressing this challenge (34, 35). As part of the post-Millennium Development Goals set by the United Nations (UN), universal health coverage has become a focus for the post-2015 Sustainable Development Goals (36).

### Health profile of the elderly

The burden of chronic noncommunicable diseases on society is a major public health challenge worldwide, and the epidemic of these diseases is significantly associated with population aging (37, 38). The prevalence of most chronic

conditions increases with age, and what is particularly worrying in older people is the high prevalence of comorbidity, the assessment of disease complications, injuries and diseases and the disease of the long term. As preventable, non-communicable diseases are today the leading cause of morbidity, disability, premature death, and one of the main reasons for the use of health care, especially among older people, where they are, in relation to the community, in relation to the general community. (39, 40). All this has the consequence of increasing public spending on health and social protection of the elderly, and population aging is seen as a global threat to economic stability in the 21st century (41).

In its global report on the status of chronic noncommunicable diseases, WHO points out that in 2012, chronic noncommunicable diseases were responsible for 38 of the 56 million deaths, or 68% of deaths worldwide. Approximately three-quarters of deaths from chronic noncommunicable diseases (28 million) and 82% of premature deaths occurred in low- and upper-middle-income countries, and of the total number of people with mental illnesses that are chronic diseases. 42% were under 70 years of age (37).

According to the results of the Global Burden of Disease Study in 2010, 23.1% of the total burden of disease (574 million out of 2490 million DALYs) was caused by diseases in people aged 60 years and older. In the overall ranking of age-adjusted disability (ADA) diseases, the ten leading causes of disease burden in the elderly are: ischemic heart disease (77.7 million ADIDAs), cerebrovascular disease, obstructive disease, stroke (43.3 million), diabetes (22.6 million), pain in treatment (19.1 million), lung and bronchial cancer (18.6 million), falls (12.4 million), visual impairment (10.4 million), dementia (10 million, 9 million), hypertension (10 million, 9 million, tuberculosis) (41). The order of occurrence of these diseases does not change much depending on the region (42), with infectious and parasitic diseases contributing more to the burden in low-income countries (43), while mental and neurological diseases will make a more pronounced contribution in high-income regions (44).

The per capita burden of disease in older people is higher in low- and middle-income countries (827 DALYs per 1000) than in high-income countries (590 DALYs per 1000) (45). The most common mental disorders in this age group are depression and dementia. It is estimated that 10–15% of the elderly population suffers from depression, while 25–30% of people aged 85 years or older have some degree of cognitive decline (46). Depression in older age results from the loss of functional abilities, self-esteem, significant roles and people in life, devaluation of social contacts, and a decline in socioeconomic status due to retirement or disability (47). Older adults with physical health problems have higher rates of depression than healthy adults, as depression is comorbid with other physical and mental illnesses and is often underdiagnosed. Depression is often considered a normal and natural response to chronic illness and the changes that come with aging (48, 49). As life expectancy increases, the number of people with dementia, such as Alzheimer's disease, is

expected to increase. Alzheimer's disease is currently the sixth leading cause of death in the United States, but recent estimates indicate that it will become the third leading cause of death for older adults and the third leading cause of death from dementia by 2030. The risk of dementia increases sharply with age in people over 60 years of age (50, 51).

The goal is to ensure that people of all ages receive the health services they need without unnecessary financial hardship. The combination of a high burden of chronic diseases and low incomes in older populations means that their patterns of health care use differ from those observed in younger populations (52).

The World Health Organization (WHO) has defined healthy aging as the process of maintaining functional capacity to enable well-being in old age. WHO, Member States and partners for the Sustainable Development Goals have developed the Global Strategy and Action Plan on Ageing and Health 2016–2020 and its follow-up to the WHO Decade on Healthy Ageing 2020–2030. WHO has established key priorities such as supporting country planning and action, collecting better global data and promoting research on healthy ageing, aligning health systems with the needs of older people, laying the foundations and ensuring the human resources necessary for long-term integrated care, undertaking a global campaign to combat ageing, and advancing the global network for age-friendly cities and communities (53).

### Ageism in older people

Older people face numerous problems, stereotypes and discrimination in society. One of the most important reasons is the existence of ageism in the population and autoageism in older people. The World Health Organization defines ageism as stereotypes, prejudices and discrimination directed towards other people or towards oneself solely on the basis of age. Although ageism is believed to be present only in younger generations, there is autoageism, which refers to stereotypes, prejudices and discrimination that older people display towards other older people. Just like other forms of prejudice, ageism is a bias that devalues individuals based on their perceived membership in a group (10, 11).

Ageism is a significant social issue in all European societies, affecting individual and societal well-being. The emergence of ageism is most often associated with a generalized opinion about the loss of psycho-physical abilities or mental and physical slowness of older people. The right to dignity is guaranteed by the highest international and national regulations. The United Nations stated in Article 1 of the Universal Declaration of Human Rights that “All human beings are born free and equal in dignity and rights”. The fundamental rights in the declaration include, but are not limited to, the right to life, liberty, non-discrimination, due process, property ownership, education, political participation, work and leisure. Also, in 2002, at the Second World Assembly on Ageing in Madrid, the United Nations adopted the Madrid International Plan of Action on Ageing,

which contains a strategy aimed at providing practical assistance to countries facing demographic change. Three domains have been identified that will be given special attention in the formulation and implementation of policies: (1) older persons and development; (2) improving health and well-being in old age; and (3) ensuring an enabling environment. The existence of ageism is one of the most important obstacles to achieving the set goals of protecting older persons (12).

The United Nations has declared the decade from 2021 to 2030 as the “Decade of Healthy Ageing”, which aims to mobilize states, the non-governmental sector, international organizations, professionals, academia, the media and the private sector to improve the lives of older persons, their families and the communities in which they live. Its aim is to raise awareness of ageing, draw attention to the need for urgent action and generate changes that turn the ageing process from a challenge into an opportunity (10).

In 2015, when the 2030 Agenda for Sustainable Development was adopted by all member states, the United Nations came out with a universal plan for achieving sustainable development that would ensure peace, prosperity and the realization of the rights of all people. The Agenda calls for leaving no one behind, for the Sustainable Development Goals to be achieved in all segments of society, at all ages, with a special focus on particularly vulnerable groups, including older people. Of the 17 Sustainable Development Goals, 11 relate, among others, to the protection of older people (11).

Research conducted in the EU shows that 44% of European Union citizens consider age discrimination to be very serious, and 35% have reported discrimination based on age (more than on gender or race), while 51% of them expressed concern that employers give preference to 20-year-olds when hiring. Also shocking is the fact that 57% of the population believe that people over 70 do not contribute economically to society, and 53% of all respondents do not have any friends over 70 (54-56).

Ageism has numerous negative consequences for older people. It reduces their chances of employment, diminishes respect for older people, threatens their right to age with dignity, and contributes to discrimination. In addition, ageism has a significant negative impact on the physical and mental health of older people. Negative attitudes about aging and old age shorten life expectancy by an average of 7.5 years (57). Research has shown that the cost of treating older people for diseases caused by ageism is as much as US\$63 billion per year worldwide (58). Interventions to reduce negative prejudices against older people should include educating young people about aging and maintaining contact between generations. It is also important to discuss the negative effects of aging on older people and to implement innovative strategies to reduce the detrimental effects of aging on older adults. These effects may result in the need for effective interventions for older adults, such as positive aging

education, emotional management, body confidence building, and flexible goal setting, which can serve as factors to mitigate or perhaps reverse the negative effects of aging on their psychological well-being. Unlike other stressors, ageism cannot be addressed at the individual level alone. All age groups should be involved in addressing ageism, as it is one of the most socially prevalent and institutionalized forms of prejudice that is reflected in many areas of society (59).

There are numerous scales that are used in propose of assessing the ageism. The main issue with scales for ageism is that psychometric properties of these scales are not available which can give wrong estimates of ageism prevalence. Some of the most used scales are: Aging perceptions questionnaire, Aging semantic differential, Anxiety about ageing questionnaire, Attitudes to aging questionnaire, Expectations Regarding Aging, Facts on aging quiz, Fraboni scale of ageism, Image of aging scale, Kogan’s attitudes towards older people scale, Reactions to aging questionnaire, Tuckman and Lorge questionnaire and Willingness to Deliver Pharmaceutical Care to Elderly (60). The development and validation of a new ageism scale that covers all dimensions of ageism could be very useful for future studies.

## Conclusion

In light of the rapid growth of the aging population, research on aging needs to be given greater attention. The role of demographics, social factors, health needs and barriers to economic resources and disparities in health care utilization among older people needs to be systematically addressed and monitored. The goal is to ensure that people of all ages receive the health services they need without unnecessary financial hardship. The combination of a high burden of chronic diseases and low incomes in the older population means that their patterns of health care utilization differ from those observed in younger populations. A well-organized health and social care system is important for improving the health of older people. Public health policies need to address the diversity of health and functional conditions experienced by older people and maximize the number of people who achieve positive aging trajectories. Integration initiatives require actions at macro-levels (legislation, financing), meso-levels (age-friendly environment) and micro-clinical levels. Creating and implementing innovative strategies to improve the health and quality of life of older people would enable well-being in old age.

## CONFLICT OF INTEREST

The authors declare no financial or commercial conflict of interest.

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