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Health sector challenges and policies in the context of ageing populations*

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Abstract

This paper discusses challenges and policies to address health in the context of population ageing. It reviews a wide range of data and evidence about policies and good practices based on work by international organizations, experts and country implementation experiences. It includes an analysis of how older people are addressing their health care needs, the various programmes in place, as well as consideration of the additional risks and challenges brought about by the coronavirus disease 2019 (COVID-19) pandemic. Ageing is a salient characteristic of the world's population in this century, and this paper explores traditional and new approaches and policies aimed at fostering active, productive and healthier lives for older persons. The emerging demographic and social trends rely on the progress of technology, science and medicine in order to make all that happen.

Health systems should include specific mechanisms for health promotion, prevention, treatment and rehabilitation suitable for the needs of older persons. The paper reviews the health conditions and risks associated with ageing populations, including trends in disability in old age and its consequences, based on the latest data available. Health promotion and prevention of disability for older persons could effectively contribute to healthier lives with affordable costs, focusing on the role of primary care activities. The COVID-19 pandemic has posed major challenges for governments and hardship for older persons worldwide, including excess old-age mortality, especially in nursing homes and collective senior living communities. In addition to short-term protective measures for these population groups, the post-pandemic world needs to consider afresh the best ways to protect the health and living conditions of older persons, especially those with disabilities and in the oldest ages.

Keywords: Ageing and health, disease burden, health policies

Sustainable Development Goals: 3, 10

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Contents

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I. Introduction

Since the mid-twentieth century, the world has experienced both a demographic and an epidemiological transition, thanks to improved living conditions, advances in medicine and in public health. Although these improvements have impacted differently the various regions around the world as a result of inequalities in economic and social development, they have resulted in increased longevity of populations across the planet. Looking back at the demographic changes of the last 20 years and at projections for the next 30 years, it is clear that the twenty-first century will be a century of population ageing. Older persons, in absolute numbers and, as a share of the world's population, are bound to keep rising. Also, the concepts, reality and policies around life-cycle productivity, economic activity and social protection, should be reshaped to promote longer, healthier and more satisfying lives for the present and future generations of older persons.

This does not mean dismantling the welfare and social protection systems created in the past, but they will need to be adjusted to integrate new concepts and policies where some level of economic activity and healthier behaviours will become more prominent in the lives of older persons. Older persons are increasingly relevant players in labour markets, shaping consumption patterns, leisure and entertainment. These new demographic and socioeconomic trends are supported by the progress of technology, science and medicine.

The world's population is expected to reach its peak in the coming decades and to start to decline thereafter. Sustainable development requires that human activity be converted from a carbon-based economy to one with more widespread use of renewable energy sources, leading to the reduction of carbon footprints so that climate challenges can be mitigated or reversed, biodiversity conserved, and the environment protected.

How should this century of ageing best protect the growing older population, as well as other age groups? What challenges arise from the labour market point of view to incorporate an increasing number of new active and healthier older people? How should retirement and pension systems be adapted to keep older population lives economically sustainable and socially inclusive? These are some of the many questions raised by ageing populations, as is the main one addressed in this paper: how will or should health systems be managed to keep the older populations healthy and supported by mechanisms of promotion, prevention, treatment and rehabilitation suitable for their health needs? What public policies would be desirable or are already starting to be implemented in different countries to bring innovative and sustainable solutions in these areas?

The broad trends and projections related to ageing in the twenty-first century have been well presented by many authors and international organizations. The Population Division of the United Nations Department of Economic and Social Affairs (UN DESA) published four reports on World Population Ageing (WPA) from 2002 to 2015, documenting extensively ageing and related demographic and socioeconomic trends, including projections through the end of the twentieth century. One of those reports, published in 2015,[1] analysed various trends related to population ageing, its demographic drivers and its relationship with sustainable development. The last two publications in this series[2] updated the information and analysis on how population ageing affects assets, transfers and work, and discussed policy implications. This paper draws from those reports and takes on further questions such as: What are key health conditions

[1] United Nations (2015). *World Population Ageing 2015.* (ST/ESA/SER.A/390). The series of World Population Ageing reports were discontinued in 2019, being replaced by WPA Highlights, which are shorter and more suitable to a wider audience.

[2] United Nations (2019). *World Population Ageing 2019: Highlights.* (ST/ESA/SER.A/430) and *World Population Ageing 2020: Highlights.* (ST/ESA/SER.A/451).

and health risks associated to ageing populations? What are the trends on disability at the older ages and its economic challenges? How could health promotion and prevention of disability for older persons contribute to healthier lives at affordable costs? Which kind of health services and health provision systems are best equipped to increase access to health care and assure financial protection for older population?

The coronavirus disease 2019 (COVID-19) pandemic, since the beginning of 2020 to the present, has posed a major challenge for governments and for the older population. It has disproportionately affected mortality of people at the older ages, especially the residents of nursing homes and other senior living communities. Although some protective measures in these settings have been expanded after the COVID-19 outbreak, the post-pandemic world presents new challenges for older persons that need to be tackled as well.

In sum, this paper seeks to investigate how these issues have been addressed so far, including policy solutions in selected countries to reduce these risks and bring solutions to achieve healthy, active, sustainable and quality lives for these new generations of older persons who will feature in this century of ageing.

II. Gains in life expectancy over the past 60 years

Over the past 60 years, humanity greatly increased its average lifespan by almost 23 years. Between 1955-60 to 2015-20, life expectancy at birth in the world increased from 49.4 to 72.3 years,[3] representing an average annual gain of 0.5 per cent (or 3.7 months) per person per year during this period. Living longer was a direct result of rapidly falling mortality rates, driven in turn by the improvement in maternal and children's health conditions and better access to health care for an increasing number of adults, among other factors. In 1960, only 43 per cent of new-born boys and 53 per cent of new-born girls would, on average, reach the age of 65 years. In 2018, these odds increased to 73.7 per cent and 81.3 per cent, respectively. As a result of the long-term fertility and mortality declines, the number of older persons is growing faster than the number of people in any other age group in the world.[4]

However, the gains in life expectancy were uneven across countries and regions. Since 1955-60, upper-middle-income countries (UMICs) and low-income countries (LICs) have achieved faster growth in life expectancy at birth than countries in other income groups. High-income countries (HICs) in particular, experienced slower growth. Consequently, over these six decades (between 1955-60 and 2020-25), the gap in the life expectancy at birth between the HICs and LICs narrowed from 25 to 14 years. As shown in figure 1, the range of life expectancy at birth in 2020-25 varied from 80.8 years in HICs to 66.9 years in LICs. But the gap in life expectancy at birth across individual countries remains wide: in 2015-20, the highest life expectancy at birth was 83.6 years (in Japan), while the lowest was 56.2 years (in Lesotho).[5]

In 2018, the probability of newborn boys and girls to survive past age 65 was 84 per cent and 91 per cent in HICs, respectively, but only 59 per cent and 67 per cent, respectively, in LICs. In the last 60 years, some regions experienced faster ageing. The UMICs, for example, performed as "fast runners" in the ageing process (sometimes faster than the HICs) while the LMICs advanced at a pace similar to that of the LICs. Income inequalities drive the differences in the probability of survival into old age, which remains a privilege of the rich in poor countries.

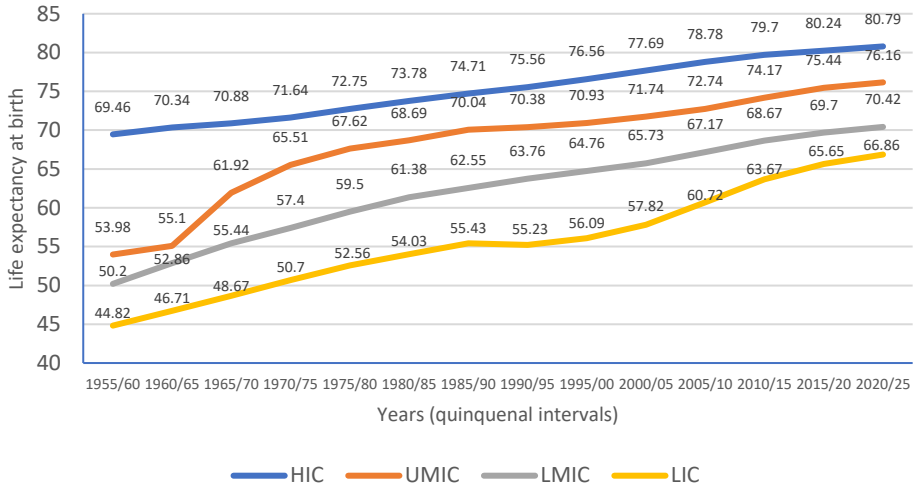
[3] Data was downloaded from https://population.un.org/wpp/DataQuery/. Accessed on 12 June 2021.

[4] A recent review of the effects of progress in health conditions on the reduction of mortality and morbidity is available in Robine, J.M. (2021).

[5] The COVID-19 pandemic in 2020 and 2021 is lowering life expectancy at birth and also at specific ages. Preliminary estimations from a study developed by Heuveline and Tzen (2021) shows that life expectancy at birth in 2020 was reduced by 1.67 years in Brazil and 1.72 years in United States of America.

This is also expressed in the differences related to the remaining years of life, indexed by life expectancy at age 60. According to United Nations (2019), global life expectancy at age 60 was estimated to be 21.1 years in the period 2020-2025, varying from 17.2 years in Sub-Saharan Africa to 24.6 years in Oceania, which includes HICs such as Australia and New Zealand.

Figure 1. Life expectancy at birth (in years) by income group, 1955-2025



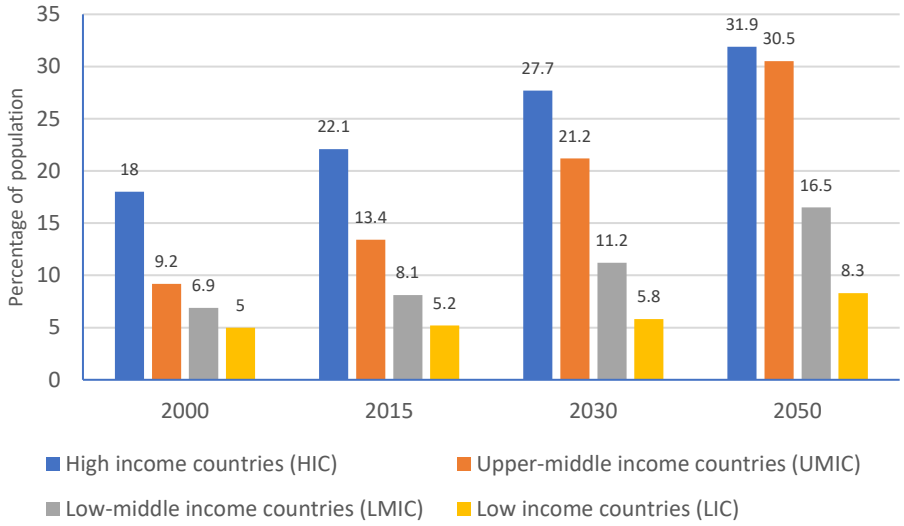
Source: United Nations (2021). *World Population Prospects 2019 Database*. Available at https://population.un.org/wpp/DataQuery/. Accessed on 12 June 2021.

Despite the fact that HICs are the most aged countries and are expected to keep this position in the next three decades, the ageing process is taking place in countries from all regions and income groups. Projections to 2050 indicate that more than one fifth of the world's population (21.5 per cent) will be aged 60 or over. This percentage will vary significantly according the country's income level, as can be seen in figure 2. In the UMICs, for example, the percentage of the population aged 60 or over will be close to the percentage in the HICs. The absolute number of people aged 60 years or over is larger in the UMICs than in the HICs, as is their total population.

According to the United Nations' *World Population Ageing Report*, in 2050, nearly half of the world's population will live in countries or areas where at least 20 per cent of the population is aged 60 years or over, and one in four people will live in countries or areas where older persons account for more than 30 per cent of the population. This trend poses another important question. How will they adapt to the relative or absolute decline of their working-age populations (concentrated in the ages between 20-64 years), and how will economic sustainability be affected by the higher dependency ratios.

It is expected that by 2050, 1 in 6 people in the world will be over the age of 65, compared to 1 in 11 in 2019. The population aged 65 and over will increase from 0.7 to 1.5 billion from 2019 to 2050, representing an increase of 120 per cent. Around 64 per cent of persons in this age group will be living in Asia in 2050.

Figure 2. Percentage of population aged 60 or over by income group, 2000-2050



Source: United Nations (2015). *World Population Ageing 2015* (ST/ESA/SER.A/390).

The real challenge to be faced in the next decades is that while ageing has continued to progress in high-income countries, some of which have seen their populations *decline* over the past years (such as Germany, Japan and the Russian Federation, the advanced stages of population ageing have already been reached in other countries of Eastern Europe and is spreading to countries such as China and Cuba and will soon reach some Latin American countries. This should affect the traditional view about what are the "working ages" in a global perspective. Most European countries had their population aged 20-64 years peak in the past decade. Shortages in their workforce *vis-à-vis* increasing retirement-age populations are prompting these countries to rethink their labour markets, even those that are seeing the benefits of increased productivity induced by fast adoption of artificial intelligence and other technological changes. The traditional view of a working life ending uniformly around 65 years is being called into question, as the large and rapidly increasing number of older persons puts persistent pressure on governments' finances.

III. CHANGES IN THE BURDEN OF DISEASES AT OLDER AGES

The demographic transition is, to a large extent, the matrix of the epidemiological transition. Larger proportions of older persons lead to increases in the population-level prevalence of chronic diseases and reductions in the prevalence of communicable diseases, perinatal, maternal and child causes of death. Also, life expectancy has been on the rise and the relationship between age and population health has changed over time. A recent publication by the Institute of Health Metrics and Evaluation (IHME), based on the 2017 data of burden of disease (BOD), gave an interesting interpretation of the variable relationship between age and health status: "A 30-year gap separates countries with the highest and lowest ages at which people experience the health problems of a 65-year-old, according to a new scientific study. Researchers found 76-year-olds in Japan and 46-year-olds in Papua New Guinea have the same level of age-related health problems as an 'average' person aged 65" (Chang and others, 2019).

This type of analysis views ageing not only as a chronological process, but also as one of health deterioration or increasing severity of disease, which affect people throughout their life cycle. Countries where the population is exposed at an early age to health risks and do not have sound policies for health promotion and prevention or responsive health systems, tend to experience a faster deterioration of their population's health status at the older ages.

Thus, universal health coverage (UHC) is considered a right and has been instituted as one of the Sustainable Development Goals (SDGs) targets.[6] Healthy human ageing begins at birth and evolves through life depending on the risks to which a person is exposed and, on the coverage and quality of the health systems of the country where the person lives. Staying healthy in old age is like winning a marathon with multiple barriers, opportunities and choices, many of which are out of one's control. The role and aim of public health policies should be to reduce or eliminate barriers and generate more opportunities for people to make better choices and achieve better health outcomes.

A commonly used measure of "healthy life" is the (the complement of the) Disability Adjusted Life Years (DALYs). One DALY is equivalent to the loss of a healthy life year, which is equal to the sum of the part of the year of life lost (YLL) due to premature mortality and the part of year lost due to disability (YLD) for people living with a health condition. A useful way to analyse the differences in the BOD between countries over time is to consider the number of DALYs per 100 persons and their distribution between YLDs and YLLs. Lower-income countries tend to have higher proportions of YLLs, given their higher early age mortality and their lower weight of years lost to disability.

The higher the mortality rates and the frailer the population, the greater the loss of healthy years of life. DALYs reflect people's well-being and quality of life, which in turn can impact the economy and productivity of countries. Many factors affect the number of DALYs in a given country, the main ones being behavioural, environmental and the ability of health systems to contain premature mortality through the promotion, prevention and treatment of diseases.

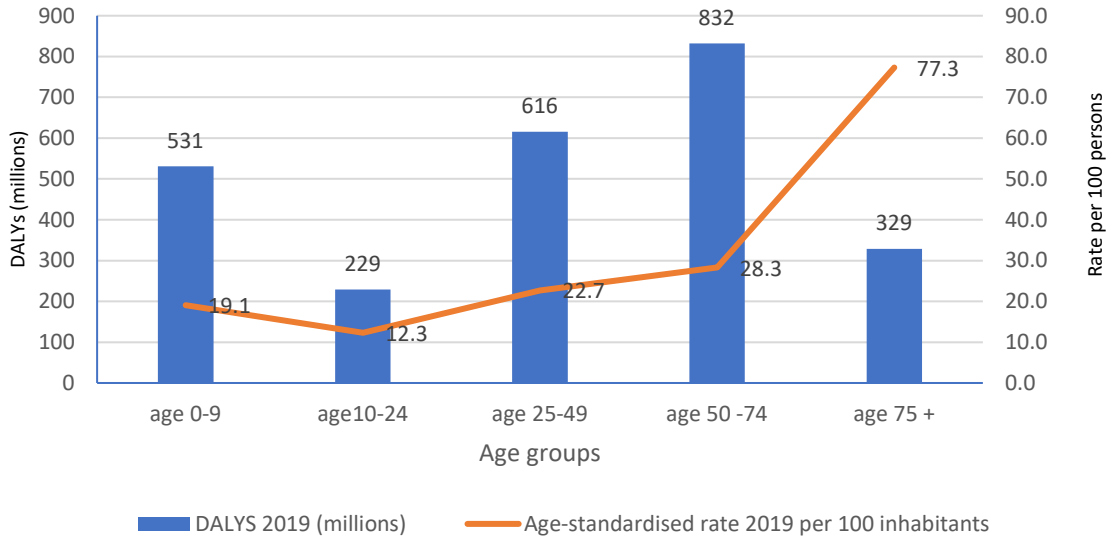
At the same time, the greater the proportion of people at the older ages (and other things being equal), the greater the number of DALYs in a country, because DALYs tend to be larger at the older ages. Figure 3 shows that the highest absolute percentage of DALY losses in the world in 2019 was concentrated in the 50 to 74 age group. However, considering the DALYs per 100 persons standardized by age, the group of 75 years or older had the highest rates of DALYs.

Figure 4 shows the significant decline in the number of DALYs (i.e., increased number of healthy years of life) in the world during the last three decades. Between 1990 and 2010, the annual reduction was 1.4 per cent and only slightly slower, 1.3 per cent per year, in the following nine years. However, the extent and speed of the reduction in DALYs rates (per 100 persons) were different across age groups. Between 1990 and 2010, the largest decline, as expected, was in the population aged 0 to 9, driven by the reduction in neonatal and infant mortality. The second and third largest declines occurred in the groups aged 50 to 74 and over 75, reflecting improvements in the health conditions of older populations. Between 2010 and 2019, the largest percentage reductions in DALYs occurred across the ages 0 to 49 years and took place at a somewhat faster pace than in the previous period. During 2010-2019, the groups aged 50-74 and 75 or over

[6] SDG target 3.8 aims to *achieve universal health coverage, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all (*United Nations, 2015a).

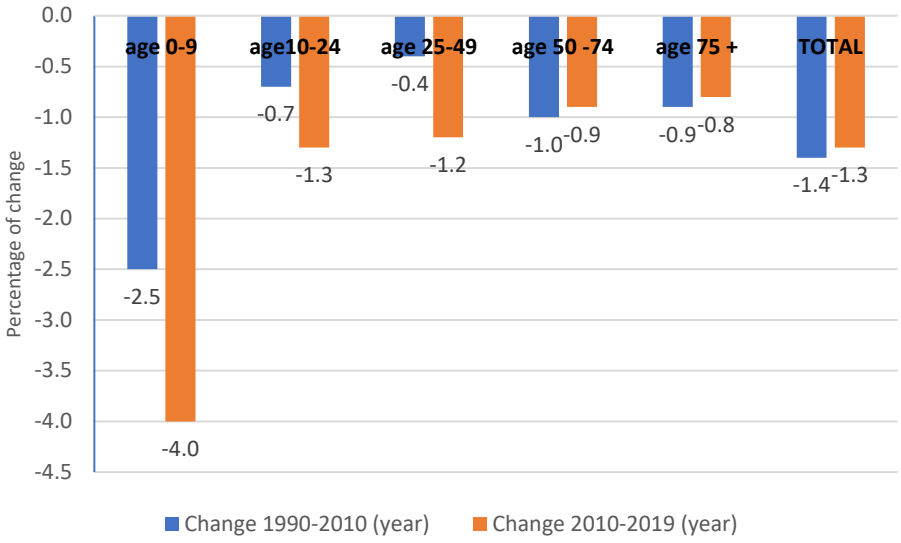
showed slower progress (smaller percentage DALY reductions) than other age groups, and slower than the progress for the same age groups during the 1990-2010 period.

Figure 3. Disability- adjusted life years and age-standardized disability-adjusted life years rate for the world, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 4. Annual percentage change in age-standardized disability-adjusted life years for the world by age, 1990-2010 and 2010-2019



Source: The Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figures 3 and 4 give an indication of how the world's population has become healthier in the past three decades. The following sections of this paper will review how health conditions of the populations vary across countries and regions. Understanding these differences is essential to identify positive synergies

between ageing and health and to design future policies based on practical experiences in building accessible, efficient and inclusive health systems.

Disability adjusted life years tend to increase over the life cycle and with the level of income, but for different reasons, so it is not easy to interpret or explain the trend or magnitude of DALYs in particular regions. On the one hand, countries with very low income have generally also young population age structures and are subject to high levels of mortality and morbidity due to malnutrition, lack of basic sanitation, inadequate health systems, exposure to toxic or unhealthy environments and other factors that increase the number of DALYs per 100 persons.

Conversely, the wealthiest countries tend to have more aged populations, and their older age structures also lead, other things the same, to higher values of DALYs per 100 persons because of the higher prevalence of chronic disease and disability at older ages. Partly compensating this purely compositional effect are the advances in medical science and technology, that have prolonged the lives of older persons, helped to reduce the number of DALYs and may support healthier lives of people at the older ages. Finally, there is always variability across individuals within countries: in most low-income countries but even in high-income countries, some middle-aged and older persons are exposed to stressful environments, poor nutrition or inadequate health systems, which impact adversely on mortality and morbidity in adulthood and old age.

In sum, it is difficult to make a simple, general statement about the relationship between a country's level of income and the (total or per person) number of DALYs, or to state that the demographic and epidemiological transition will necessarily reduce the quantity of DALYs and improve the overall health status of the population. Institutional factors and the policy framework, including the quality and adequacy of epidemiological surveillance and health systems, as well as inclusive social protection systems that guarantee effective coverage of health care, are essential to reduce the number of DALYs and improve health conditions of the population in a given country.

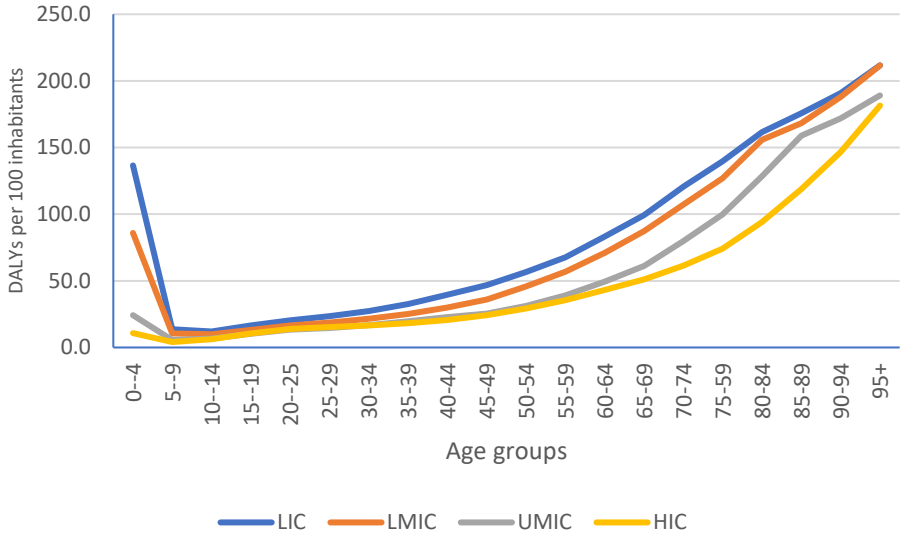
A. DALYs according to countries' level of income

This section of the paper reviews a range of indicators of the burden of disease produced by the IHME, including DALYs, YLLs and YLDs for countries of all world regions and different levels of income.[7] Figure 5 shows that the burden of disease in LICs and LMICs in 2019 (the most recent data point), as measured by DALYs, is greater than in UMICs and HICs in all age groups. Factors such as greater exposure to communicable diseases, malnutrition, poor access to water and sanitation, high levels of environmental pollution and other primary causes are strongly related to premature death and serious illnesses in the poorest countries. This mainly affects infants and young children there, where the burden of disease is much greater than in rich countries in these age groups.

Low-income countries and MICs have a higher incidence of DALYs over the life cycle when compared to UMICs and HICs. In the 10-14 age group, DALYs in LICs were 12 per 100 persons in 2019, double the rate of 6.1 per 100 in the HICs. For the 65-69 age group, DALYs in LICs were 99 per 100 persons meanwhile in the HICs are only 51 per 100. The disparities persist through the older ages, with the percentage differences appearing to narrow at the older end of the age range.

[7] This section and the following ones will use the World Bank's classification of countries by income level: HICs (High-Income Countries), UMICs (Upper-Middle-Income Countries); LMICs (Lower-Middle-Income Countries) and LICs (Low-Income Countries).

Figure 5. Disability-adjusted life years by age and income group, 2019



Source: The Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

The global burden of disease has shown substantial reductions in recent years, especially in low- and middle-income countries, which have benefited from improved access to primary health care and international aid to support the achievement of the health sector's Millennium Development Goals (MDGs) from 1990 to 2015. These improvements have been greater for the younger ages and in populations with younger age structures that have been targeted by the MDGs, which prioritized protection of children and youth in poorer countries. Between 2010 and 2019, DALYs in the LICs decreased from 64.8 to 48.9 per 100 persons, a reduction of 23 per cent. This reduction was somewhat slower in LMICs and UMICs (of 14.9 per cent and 14.2 per cent, respectively) while in HIC it was only 2.8 per cent.

Appendix 1 presents data on the number of DALYs per 100 persons by specific age groups and income level. The data shows that the difference in DALYs between rich and poor countries is much greater at young ages than at older ages. Specifically, in 2019, DALYs per 100 persons in the LICs among children under five years was 12.8 times larger than DALYs of the same age group in the HICs. For the age group of 80 years or over, the difference was of only 1.5 times.

The changes of DALYs between 2010 and 2019 by broad age groups and countries clustered by income level can be seen in table 1 below. The data reflects the effects of global efforts, undertaken during the past few decades, to tackle infectious diseases and prenatal care in reducing the health risks and improving health conditions of children under 10 years. In fact, the data show that the largest proportional reductions in DALYs between 2010 and 2019 were obtained for children under five years, including the reduction by almost 40 per cent in the UMICs. There was also some progress in tackling chronic diseases and disability at older ages, but it was not of comparable magnitude or impact.

It is also worth noting that the LICs had substantial reductions in DALYs over this period in the age groups 15-49 and 50-69 years. For the ages above 65 years, the gains were proportionately greater (the percentage reduction of DALYs the largest) in UMICs. In the case of the HICs, all age groups, with the

exception of children under 5, experienced relatively modest percentage reductions in DALYs between 2010 and 2019.[8]

TABLE 1. PERCENTAGE CHANGE IN DALYS BY BROAD AGE GROUP AND COUNTRY LEVELS OF INCOME: 2010-2019 (PERCENTAGE)

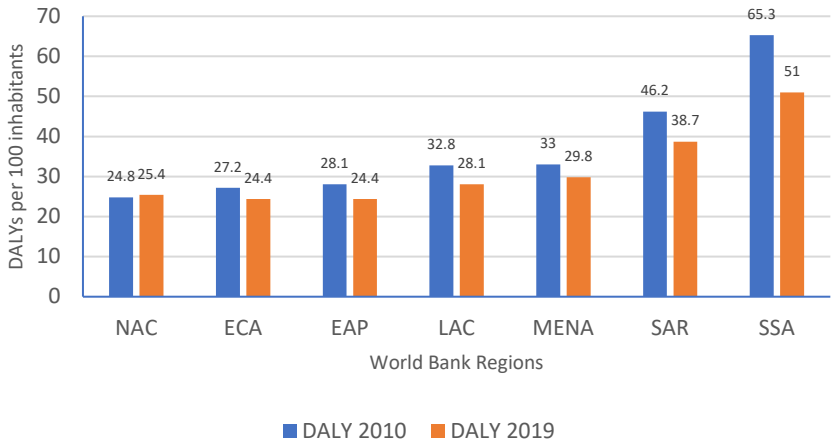
Age Groups (years)	*Low-Income Countries*	*Lower-Middle-Income Countries*	*Upper-Middle-Income Countries*	*High-Income Countries*
All Ages	-23.0	-14.9	-14.2	-2.8
Under 5	-32.7	-30.3	-39.4	-15.7
5 to 14	-27.5	-17.7	-15.1	-1.9
15 to 49	-26.5	-11.1	-2.7	+0.6
50 to 69	-14.4	-7.1	-10.8	-2.5
65-69	-9.7	-11.4	-11.7	-3.2
70 and over	-7.7	-5.2	-10.1	-3.1
80 and over	-6.7	-2.5	-9.9	-2.5

Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

B. DALYs by world regions

The number of DALYs per 100 persons was reduced in almost all world regions, as can be seen in figure 6. The largest reductions occurred in sub-Saharan Africa (SSA) and the South Asian Region (SAR), where DALY rates per 100 persons fell by 21.9 per cent and 16.2 per cent between 2010 and 2019, respectively. Countries such as Ethiopia, Sudan and Bangladesh have seen yearly reductions of over 2 per cent in age-standardized rates of DALYs.

Figure 6. Age-standardized disability-adjusted life years by region, 2010 and 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 6 also shows that the gap in the BOD is gradually narrowing among world regions. Although the large reductions of DALYs per 100 persons in South Asian Region and sub-Saharan Africa have been part of a longer-term trend, these regions still had the highest rates of DALYs per 100 persons (51.0 and

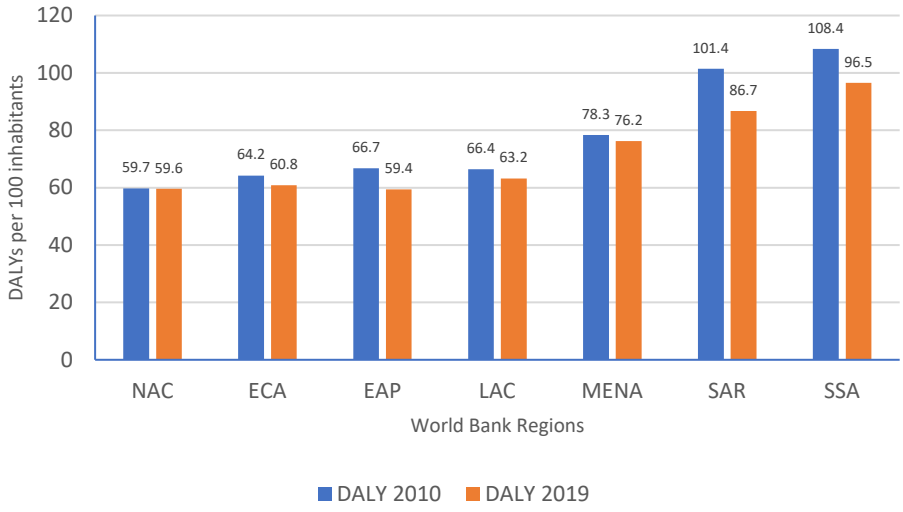
[8] The small percentage *increase* in DALYs for the age group 15-49 years, may be a random estimation error, but if real, it may bring unwanted consequences on the health of that generation at the older ages in decades to come.

38.7 per 100, respectively) in 2019. South Asian Region and sub-Saharan Africa are also the regions with the lowest average income levels and highest levels of poverty.

All other regions showed lower reductions in the rates of DALYs per 100 persons along this period, ranging from -9.7 per 100 (in East Asia and the Pacific and the Middle East and North Africa) to -14.3 per 100 persons (Latin America and the Caribbean).

In only one region (North America), the rate of per capita DALYs appears to have *increased* between 2010 and 2019 (+2.4 per cent).[9] Europe and Central Asia (ECA) region presented progress in DALYs' reduction during this period when compared with North America. According to OECD reports, some factors contributing to worsening health conditions in the United States of America during the last decade included widening gaps in health insurance coverage since 2016, inadequate access to primary health care services, poor health-related behaviours and worsening living conditions for a significant proportion of the country's population.

Figure 7. Disability-adjusted life years for population aged 65-69 by region, 2010 and 2019



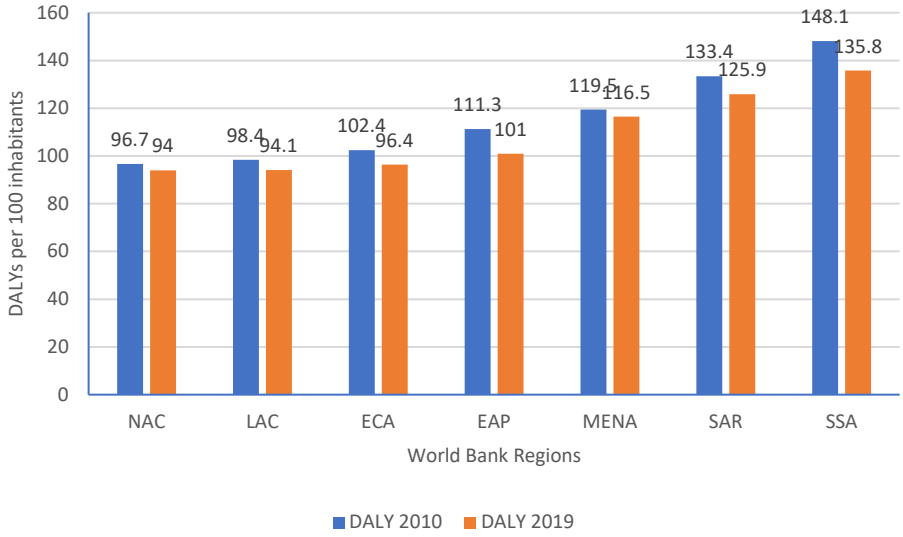
Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

The burden of disease has also been reduced for older persons aged 65 or over during 2010-2019, as can be seen in figures 7, 8 and 9. For this age group, all regions have shown improvements (reductions of DALYs) in the last decade. Major reductions were registered in sub-Saharan Africa (-14 per cent), South Asian Region and East Asia and Pacific (both with -11 per cent) and significant but slower progress in Europe and Central Asia and Latin America and the Caribbean (both around -5 per cent), Middle East and North Africa (-3 per cent) and North America (- 0.2 per cent). In 2019, East Asia and the Pacific and North America had the lowest DALY rates per 100 persons (both under 60 per 100), followed by Europe and Central Asia (61 per 100) and LAC (63 per 100). The higher end of DALYs per 100 persons included Middle East and North Africa (76 per 100), South Asian Region (87 per 100) and sub-Saharan Africa (97 per 100 persons). Despite fast progress in DALY reductions for populations in the younger retirement ages, the poorest regions in the world (sub-Saharan Africa and South Asian Region) still hold the largest DALY

[9] The three countries in this region—United States of America, Canada and Bermuda—registered small increases in DALYs per 100 persons between 2010 and 2019.

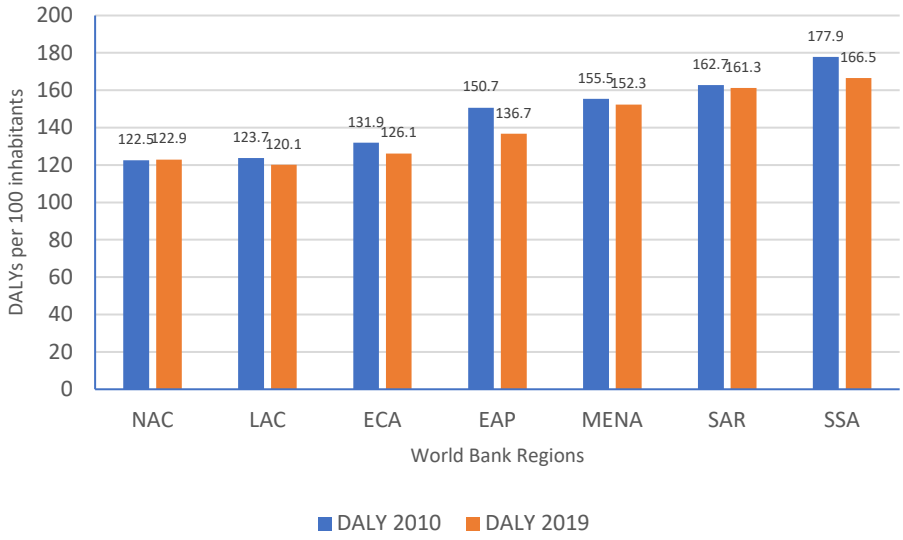
rates per 100 persons among older persons. More details about DALYs among older persons can be seen in the data for population groups aged over 70 and over 80 in the following figures.

Figure 8. Disability-adjusted life years for population aged 70 or over by region, 2010-2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 9. Disability-adjusted life years for population aged 80 or over by region, 2010 and 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Disability adjusted life year rates per 100 persons for the population aged 70 or over are higher than those aged 65-69 years but showed modest declines between 2010 and 2019 as compared to the latter age group. The progress (reductions in DALY per capita rates) was faster in East Asia and the Pacific (-9.3 per cent) and sub-Saharan Africa (-8.3 per cent) and it was slower in Middle East and North Africa (-2.5 per cent) and North America (-2.8 per cent). DALYs per capita among the population aged 80 or over were the largest and progress (declines) was slower than in other ages over this period. In 2019, LAC was the region with the lowest DALY rates per 100 persons in the world, surpassing North America by a small margin.

There are wide disparities between DALY rates per 100 persons among older persons across countries within each region, as can be seen in table 2. These differences are smaller in regions where countries are more homogeneous, such as North America, but are quite wide in other regions.

TABLE 2. COUNTRIES WITH THE HIGHEST AND LOWEST DALY RATES PER 100 PERSONS FOR THE POPULATION AGED 70 AND OVER IN EACH WORLD BANK REGION, 2010-2019

Countries	*DALY Rates per 100 persons*		*Gross Variation (percentage)*
	2010	*2019*	
Europe and Central Asia (ECA)			
Uzbekistan	214.7	188.3	-12.3
Iceland	83.5	73.6	-11.9
East Asia and Pacific (EAP)			
Solomon Islands	217.3	208.4	-4.1
Singapore	76.0	66.4	-12.6
Latin America and the Caribbean (LAC)			
Haiti	231.5	144.5	-37.6
Colombia	82.9	77.6	-6.4
Middle East and North Africa (MENA)			
Egypt	155.0	142.0	-8.4
Malta	88.0	77.5	-11.9
North America (NAC)			
United States of America	98.4	95.8	-2.6
Canada	82.7	79.8	-3.5
South Asia (SAR)			
Afghanistan	170.0	175.6	+3.3
Maldives	96.8	97.8	+1.0
Sub-Saharan Africa (SSA)			
Central African Republic	202.6	192.1	-5.2
Mauritius	112.0	105.3	-6.0

Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

The burden of disease for the population aged 70 years and older varies widely across countries, areas or territories within each region, with the East Asia and Pacific region holding the largest ratio of high-to-low rates of per capita DALYs. The largest value of per capita DALYs in the world in 2019 was that of the Solomon Islands,[10] and the lowest was Singapore's,[11] both located in the same region. Older persons in Singapore experienced a major reduction in the rate of DALYs per 100 persons (of almost 13 per cent) during this period, which is uncommon among populations in the advanced stages of the demographic transition.

The South Asian Region is the only world region where the gap (between the extreme country values of DALY per 100 persons) for the age group 70 years or over increased between 2010 and 2019. The country with the least favourable evolution in this indicator was Afghanistan, where the DALYs per 100 persons for the population aged 70 and over increased by 3.3 per 100 persons during this period.[12]

[10] According to information from the Embassy of the United States of America in Solomon Islands, hospitals and pharmacies are limited to populated areas and religious missions. Health options are extremely limited, and the nearest reliable medical facilities are in Australia or New Zealand. This may justify why DALYs for seniors aged 70 years and over (208.9 per 100 persons) were so high in 2019 in this country. Available at https://pg.usembassy.gov/wp-content/uploads/sites/276/2017/08/Health-and-Medical-for-Solomon-Islands.pdf.

[11] Singapore has a very favorable health environment for older persons. The country has universal health coverage based on health insurance and life expectancy at birth is 82.3. It is estimated that about 85 per cent of those over 65 years are healthy and reasonably active.

[12] Considering the war and civil conflict that confine populations and impose limits to access health services (especially for women), Afghanistan ranked lowest in the Global Age Surveillance Index. It occupies a very low position in old-age pension coverage and the lowest gross national income (GNI) per capita in the South Asian Region. Older Afghanis have the lowest educational attainment and life expectancy among older persons in the region. Despite progress in some health indicators since 2001, the country is far behind others in the region and the world (see further info in the Global Age Watch Index. Available at https://www.helpage.org/global-agewatch/population-ageing-data/country-ageing-data/?country=Afghanistan&printer=1).

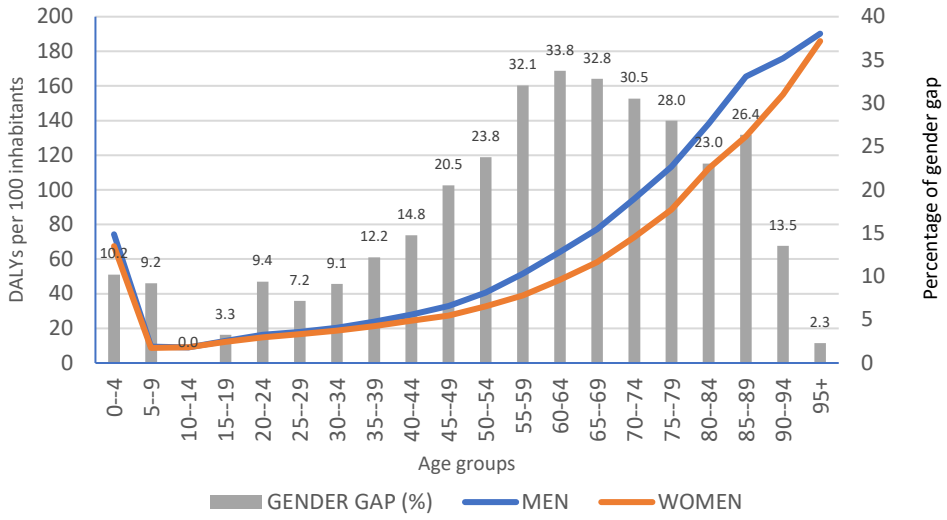
C. Gender differences in DALYs for older populations

Previous studies of the BOD show that, since the early 1990s, women have a higher life expectancy living with disease than men and are less likely to die early due to disease or injury. Women are subject to high risk of illness and early death associated with pregnancy, are more likely than men to experience sexual violence and to have various chronic illnesses and mental disorders such as depression. However, throughout the life cycle, men have a heavier overall BOD than women due to biological and social factors associated to their younger average age at death.

The explanations put forth to explain men's earlier average age at death than women's includes differences in the immune system, whereby females are able to fight infectious diseases and physical trauma more easily and efficiently than males. Also, there is evidence that women tend to have lower infection rates because estrogen is an anti-inflammatory compound.[13] But because estrogen affects the immune system, women also tend to develop, disproportionately, more autoimmune diseases, such as multiple sclerosis and lupus, among others. Associated with this, women have, throughout their life (especially before menopause), less deadly cardiovascular problems than men, including strokes and heart attacks.

Figure 10 shows the global burden of disease in 2019 for men and women by age and the corresponding gender gap, which shows a steady upward trend after childhood, reaching levels above 30 per cent between the ages 55 and 74 years. After age 75-79 years, the gender gap in the BOD tends to narrow, reaching 2.3 per cent in the population aged 95 and over.

Figure 10. Disability-adjusted life years by age and sex and percentage of gender gap (men's DALYs/women's DALYs) for the world, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

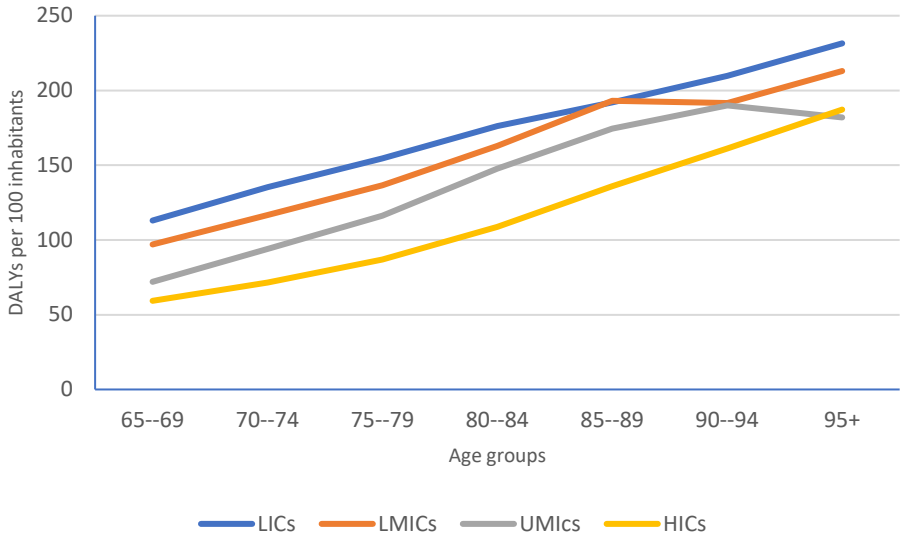
Appendix 2 shows the BOD in 2019 expressed in DALYs per 100 persons, by age and sex, according to countries grouped by income level. Across income groups, the highest gender gaps in the BOD appear in the ages 60-69 years (LICs), 55-69 years (LMICs), 50-79 years (UMICs) and 60-84 years (HICs). However, the UMICs is the income group with the largest gender gap in the late working and early

[13] See Mohammad and others (2018), Angum and others (2020) and Ortona and Pierdomicini (2019), among others.

retirement ages. The gender gap was 40 per cent or more in the ages 55-69, reflecting substantial excess male mortality, basically associated with preventable chronic conditions.

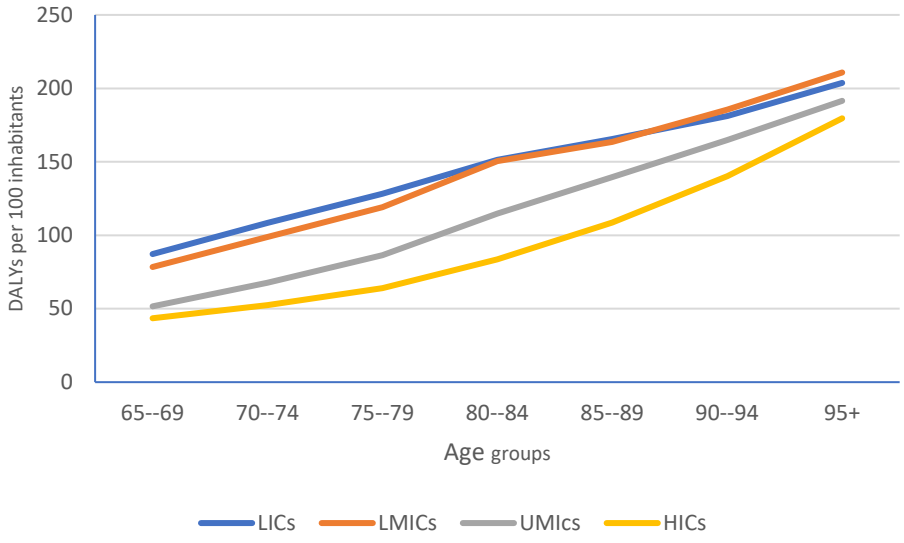
The rates of DALYs per 100 persons for both sexes tend to be inversely proportional to the level of countries' income, as can be seen in figures 11 and 12. LICs and MICs have a heavier BOD than UMIC and HIC for both male and female, across the range of older ages. For older women, there is very little difference in the number of DALYs per 100 persons between LICs and LMICs.

Figure 11. Disability-adjusted life years for older men by age and income group, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 12. Disability-adjusted life years for older women by age and income group, 2019

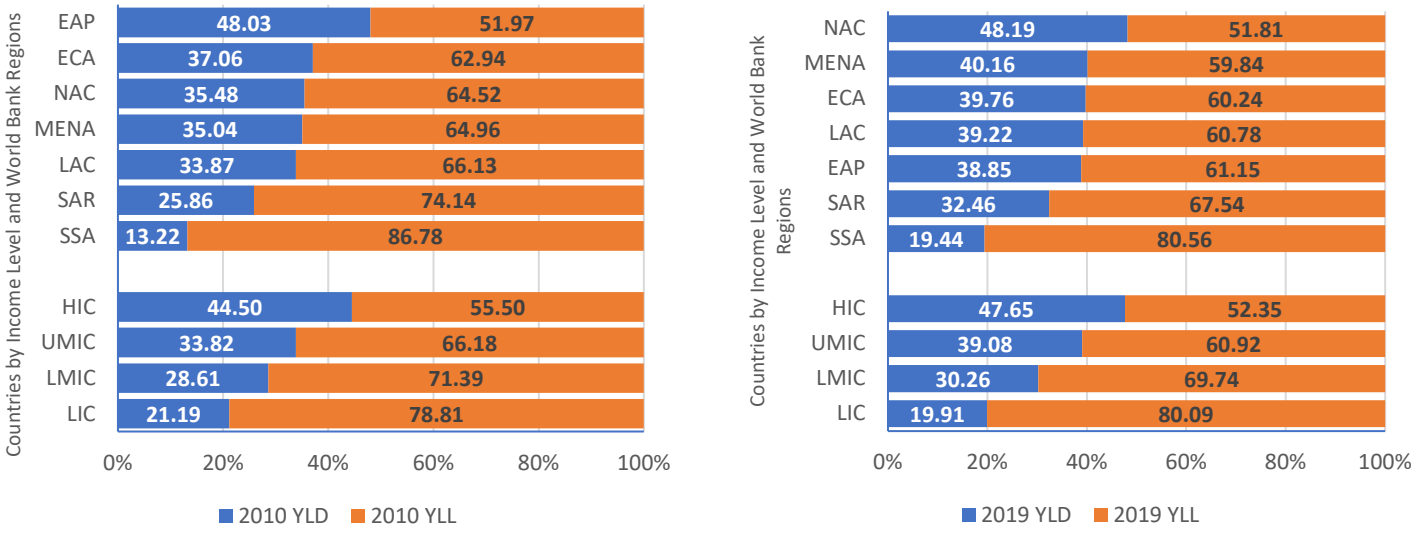


Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

D. Premature mortality and years of life lost by disease in old age

The progress of medicine and increased coverage of health systems has made possible the already referred reduction of premature mortality and of the weight of life lost to death, while the relative weight of the years of life lost due to disease has increased. Countries vary significantly in the breakdown of DALYs between YLLs and YLDs, with the proportion of YLLs being higher in lower-income countries and lower in higher-income countries. Over the last two decades, the share of YLDs in the global burden of disease has increased, from 21 per cent in 1990 to 34 per cent in 2019. Between 2010 and 2019, the weight of YLDs in the total DALYs increased across all regions of the world, as can be seen in figure 13.

Figure 13. Distribution of DALYs (proportional shares of YLL and YLD) by region and income groups, 2010 and 2019 (percentage)



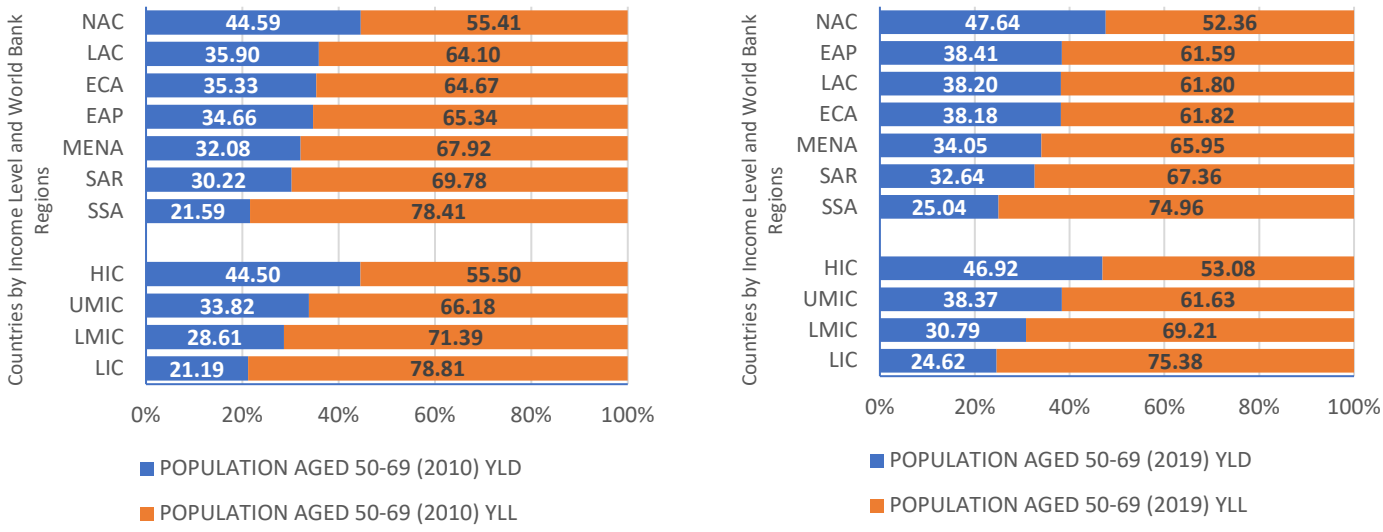
Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.
Note: YLL represents years of life lost due to premature mortality and YLD represents the part of years of healthy life lost due to disability.

The share of YLDs in the total disease burden is lower in sub-Saharan Africa and South Asian Region, the poorest regions in the world, and both have made considerable progress in reducing the relative share of early mortality. Between 2010 and 2019, the share of YLDs fell from 87 per cent to 81 per cent in sub-Saharan Africa, and from 74 per cent to 67 per cent in South Asian Region. East Asia and the Pacific retains the lowest share of early mortality in the BOD, of about 52 per cent in both 2010 and 2019.

The distribution of DALYs in YLLs and YLDs has stayed fairly stable, with the LIC's proportion of years of life lost due to early mortality (YLL) of nearly 80 per cent. In HICs, this share has gone down by more than 3 percentage points, from 55.5 per cent to 52.3 per cent.

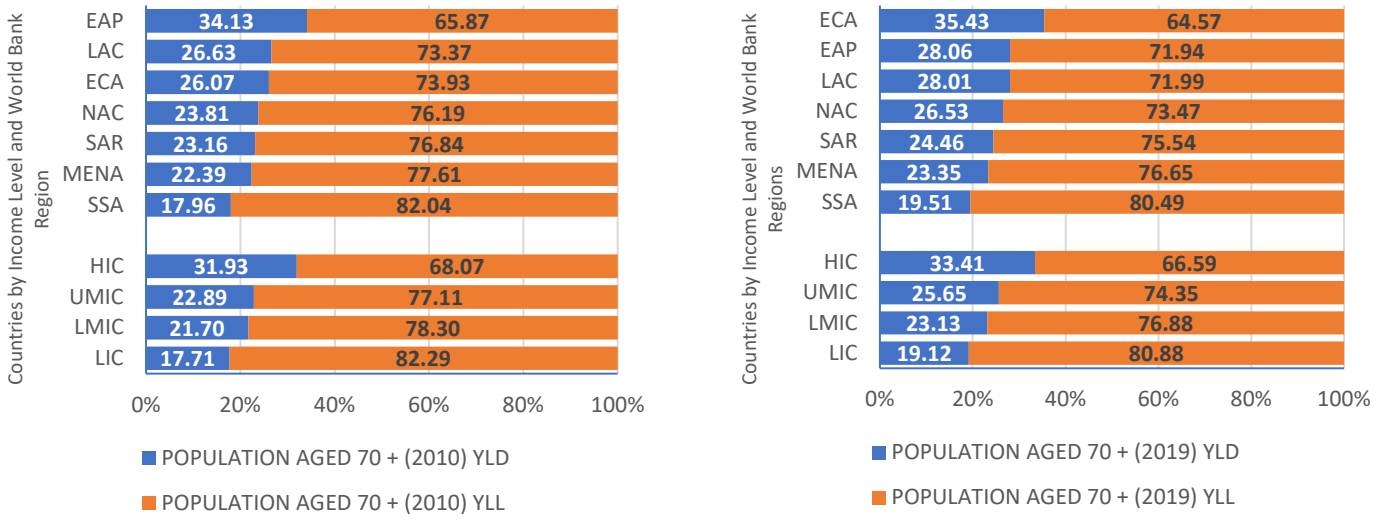
Surviving an early death is a first step to improving the health of older persons. But many of those who survive to old age do so in poor health conditions, limiting their ability to lead an active and fully satisfying life. Therefore, greater efforts are needed to allow people to remain healthy through the entire range of older ages. The following figures (14 and 15) show the changes in YLLs and YLDs in two broad age groups of older adults, those aged 50 to 69 years, and the population aged 70 years or over.

Figure 14. Distribution of disability-adjusted life years (proportional shares of YLL and YLD) for population aged 50-69 by region and income group, 2010 and 2019
(percentage)



Sources: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 15. Distribution of disability-adjusted life years (proportional shares of YLL and YLD) for population aged 70 or over by region and income group, 2010 and 2019
(percentage)

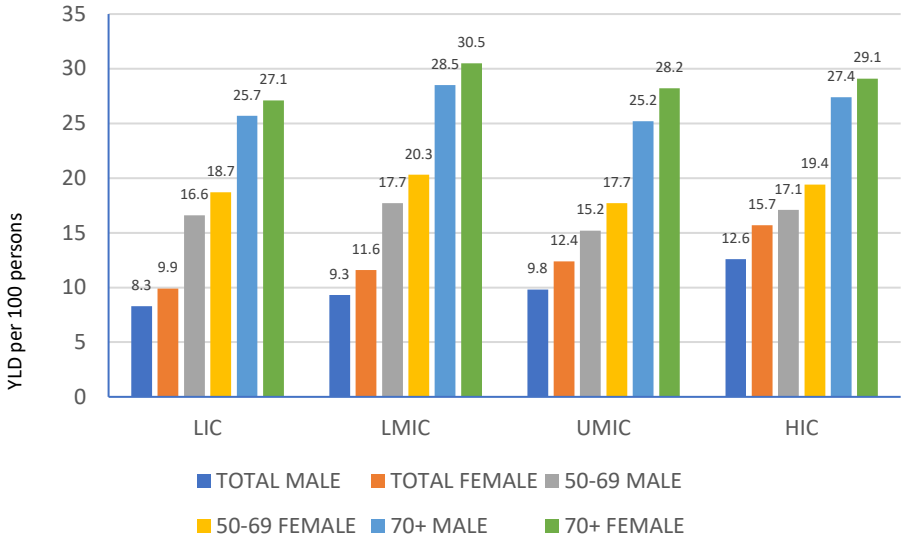


Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Despite the overall improvements in the BOD between 2010 and 2019, early (i.e., premature) adult mortality is still the main component of the loss of years of healthy life for older persons. In LICs, the YLL represent about 75 per cent of DALY of the population aged 50-69, and 80 per cent for those aged 70 years and over. North America remained the region with the lowest weight of early mortality as a cause of healthy life years loss over the period, while East Asia and the Pacific overtook LAC as the region with the second

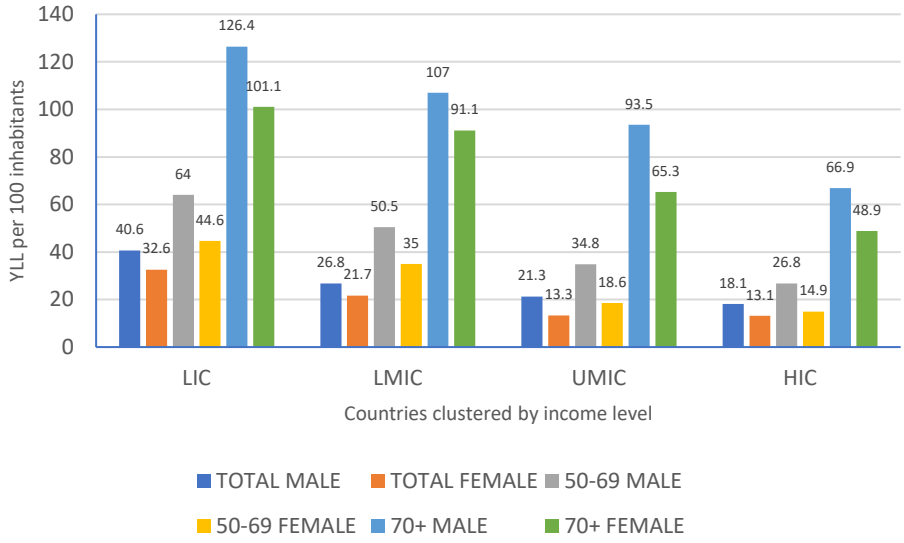
lowest share of YLL in both of those age groups. sub-Saharan Africa remained the region with the highest participation of early mortality in the total DALYs for older people.

Figure 16. Years of life lost due to disability (YLD) by age, sex and income group



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 17. Years of life lost due to premature mortality (YLD) by age, sex and income group



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

While they live on average, longer, women have a higher burden of years of life lost to disability or disease than men. Conversely, men have a higher proportion of years lost to premature mortality than women. This pattern is intensified at the older ages and is observed in most countries, to a large extent independently of their level of income. Part of the explanation for women's higher proportion of years lived with disability is that women live longer than men, in particular, into the oldest ages where disability is more common. Also, specific hormonal differences (already noted in this paper) appears to increase women's resistance to the risk of death of some transmissible and chronic conditions, while allowing them

to live longer with said conditions. To the extent that these diseases make it harder to complete daily activities, older women tend to be more prone to need long-term care from relatives or institutions.

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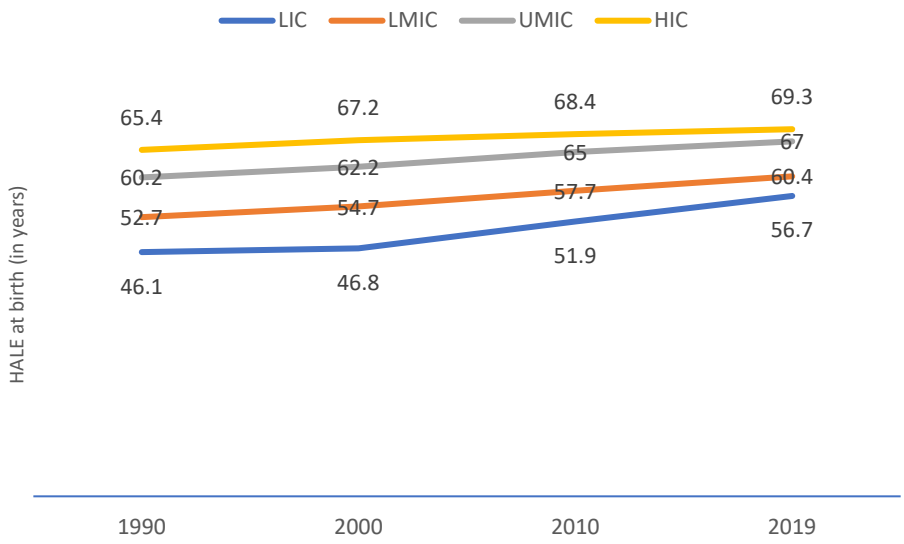
Health adjusted life expectancy (HALE) represents the average number of years a newborn can be expected to live in good health if the current death rates and patterns of health conditions continue to exist in a given country or region. Mortality rates and the severity weighted measures of illness and injury (YLD) affecting the population of the particular country or region are used as inputs to calculate HALE.

According to estimates produced by IHME (figure 18), HALE has increased in all groups of countries classified by level of income. In HICs, HALE increased from 65.4 to 69.3 years, while in LICs it increased from 46.1 to 56.7, between 1990 and 2019, respectively (figure 18). Increases on HALE over these nearly 30 years, have been, in general, inversely proportional to the countries' level of income, so that the HALE gap between HICs and LICs has narrowed from 42 per cent in 1990 to 22 per cent in 2019.

The difference between HALE and life expectancy at birth in 2019 is higher in the HICs (11.8 percentage points) and tends to decrease, reaching the lowest value in the LICs (8.3 percentage points), given that the number of healthy years of life lost due to disability (caused by illness or injury) tend to be higher in higher-income countries.

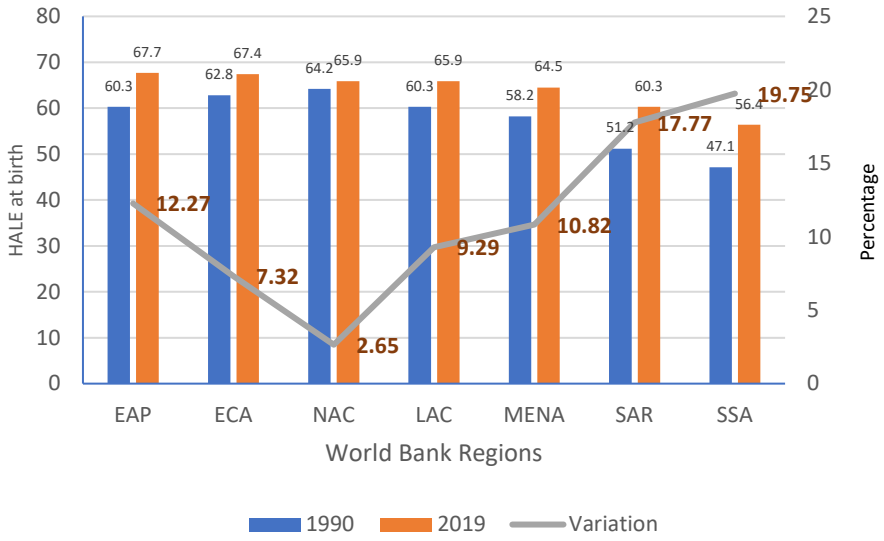
Figure 18. Health-adjusted life expectancy by income group 1990-2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 19 presents a comparison of HALE across the World Bank regions between 1990 and 2019. It shows that the greatest HALE reductions occurred in sub-Saharan Africa (19.7 per cent) and South Asian Region (17.8 per cent), which include countries with low-income levels. A significant reduction was also recorded in East Asia and the Pacific (12.3 per cent). Indeed, thanks to a rapid increase in income over this period, East Asia and the Pacific became the region with the highest HALE in 2019. The slowest progress was recorded in North America (2.6 per cent) due to factors previously mentioned in the analysis of the disease burden related to the United States of America, the largest country in this region.

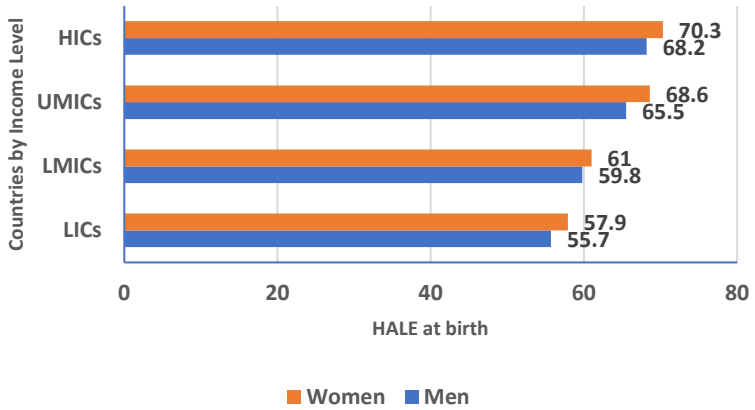
Figure 19. Health-adjusted life expectancy and its change by region, 1990 and 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Considering the variations in HALE by sex, the 2019 data shows that, despite having a greater burden of disease associated with disability, women have a higher HALE than that relative to men in all regions according countries' income groups, as can be seen in figure 20. The highest differences could be found in the UMICs (4.7 per cent) and the lowest in the LMICs (2.0 per cent).

Figure 20. Health-adjusted life expectancy by sex and income group, 2019

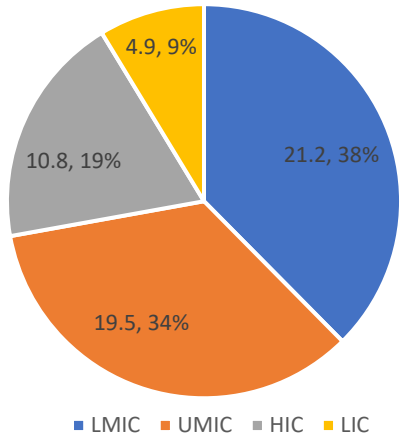


Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

IV. TRENDS IN MORTALITY AND MORBIDITY IN OLD AGE BY SPECIFIC CAUSES

In 2019, middle-income countries accounted for 72 per cent of global mortality, divided into 38 per cent for LMICs and 34 per cent for UMICs (figure 21). Non-communicable diseases (NCDs) were the leading cause of deaths and premature morbidity, representing 74.5 per cent of the 56.4 million deaths registered worldwide. Communicable, maternal neonatal and nutritional causes accounted for 18.0 per cent and injuries for 7.5 per cent of global deaths, respectively (figure 22).

Figure 21. Total deaths for the world by income group, 2019
(in millions and percentage)

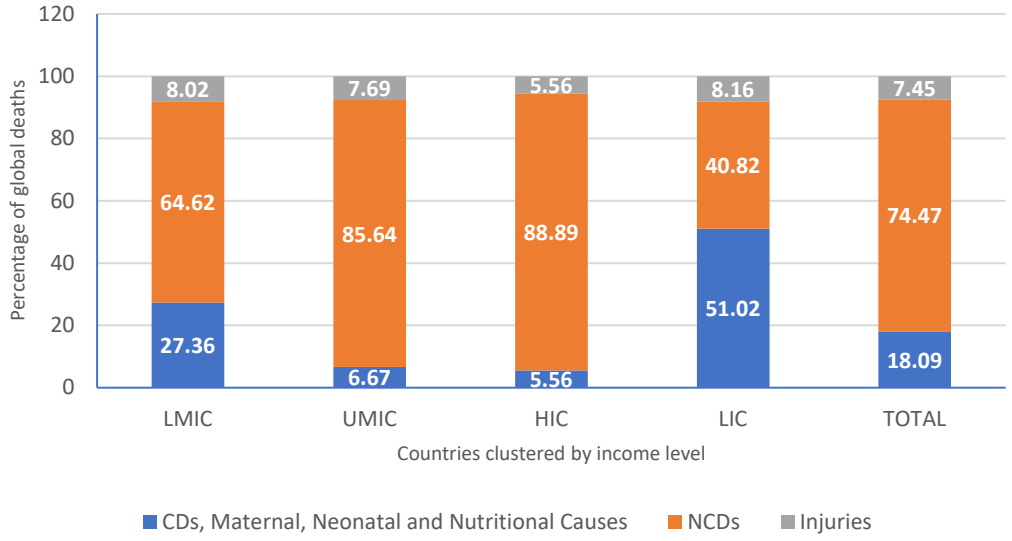


Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Non-communicable diseases involve several health conditions such as cancer, heart disease, diabetes, kidney and respiratory failure and many other causes that represent an increasing problem, especially in middle-income developing countries. Non-communicable diseases killed 42 million people in 2019 and are the result of changes in structural economic, social, cultural and behavioural determinants, such as accelerated urbanization, environmental degradation, unhealthy lifestyles and others. Given this, the weight of NCDs is basically concentrated in LMIC and UMIC, representing 33 per cent and 40 per cent of the total deaths from NCDs, respectively.

Figure 22 shows the weight of NCDs in the total mortality across countries grouped by income level and the three major groups of disease. As can be seen, NCDs represent 89 per cent and 86 per cent of the deaths in HICs and UMICs. Although lower in LMICs and LICs, the share of NCDs was 65 per cent and 41 per cent in total deaths, respectively. Only in LICs, the participation of communicable diseases (CDs), maternal, neonatal and nutritional, represented the majority of causes of death (51 per cent) in 2019, but, given the projected rapid reduction in fertility in the near future, this situation is likely to be reversed in the next decades.

Figure 22. Percentage distribution of the global death by diseases and income group, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

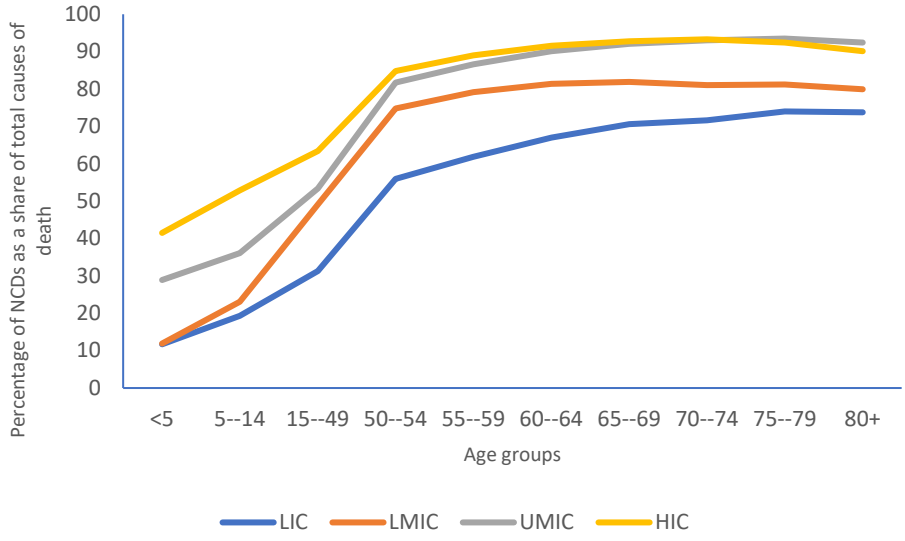
Given that the incidence of NCDs has increased together with the demographic transition to low levels of fertility and mortality, most developing countries, including the LICs, are likely to experience fast increases in the burden of NCDs in the coming decades. In this sense, health systems in developing countries must prepare to tackle both premature mortality and the years lost due to disability associated with NCDs in order to avoid major losses in well-being and productivity.

Conversely, the proportion of mortality from NCDs tends to rise with population ageing. To confront this emerging trend, especially in developing countries, it is necessary for the South Asian Region to prevent the incidence of NCDs starting at the younger ages and to prevent and treat their potential intensification at the older ages. Figure 23 shows the evolution of the share of NCDs in 2019 in total deaths by age group, across countries clustered according to income level.

In the HICs and UMICs, NCDs make up more than 80 per cent of deaths in all age groups after age 50, and they represent over 90 per cent of all deaths at ages 60 years or over. In the case of LMICs, the age pattern is similar, albeit with lower levels, with NCDs representing more than 80 per cent of deaths starting after age 60. In the case of LICs, the participation of NCDs in the total of deaths, although significant, reaches 70 per cent only after age 65, without approaching the higher shares observed in the other income groups at the oldest ages.

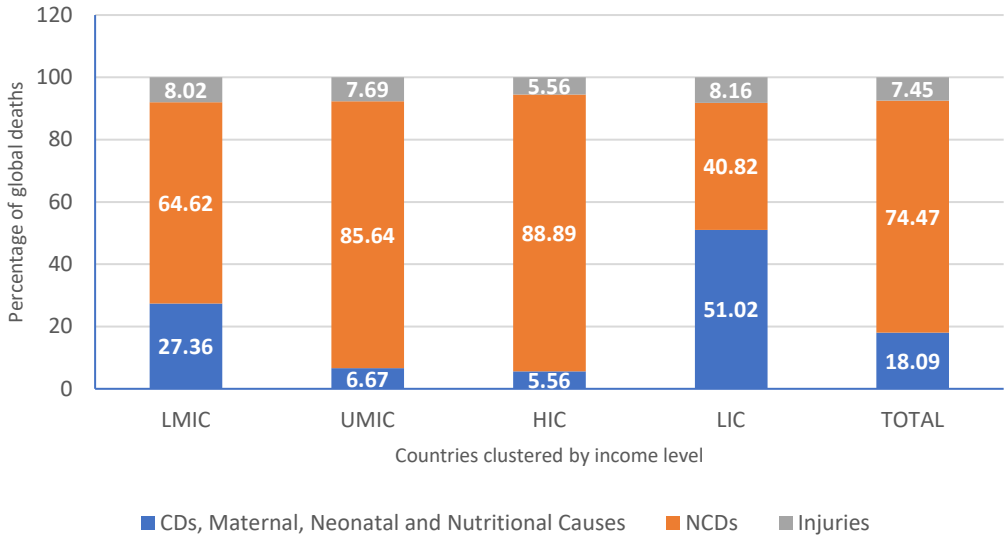
In addition to the analysis of the weight of NCDs in mortality over the life cycle (i.e., age), how this group of causes affects the years lost due to disability (YLD) was examined next.

Figure 23. Percentage of non-communicable diseases as a share of total causes of deaths by age and income group, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 24. Percentage of non-communicable diseases as a share of total years of life lost due to disability (YLD) by age and income group, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 24 shows that among those aged 15 years or older, NCDs in 2019 represent between 86 per cent and 90 per cent of all causes of disability in the HICs and UMICs. The share of NCDs increases steadily with age and the two groups of countries stabilize at similar levels of NCD participation in the older ages. In the case of LICs and LMICs, a similar age pattern is observed. Looking at the age groups 50-54 and 80 years or over, the weight of NCDs increases gradually but persistently in LICs, from 76 per cent to 84 per cent, and in the case of LMICs, from 81 per cent to 84 per cent.

Considering that NCDs are the main causes of death and loss of healthy years of life, especially for older persons, they need to be addressed as priorities by health systems and policies in the context of promotion and prevention, as well as in regard to early detection, treatment and rehabilitation. Table 3 lists the main five causes of DALYs losses for selected age groups in countries classified by income level in 2019.

TABLE 3. FIVE MAIN DISEASE GROUPS ASSOCIATED WITH DALYS BY BROAD AGE GROUP IN COUNTRIES CLASSIFIED BY INCOME LEVEL, 2019 *

High-Income Countries	*Upper-Middle-Income Countries*	*Lower-Middle-Income Countries*	*Low-Income Countries*
Overall Population			
Neoplasms Cardiovascular Diseases Musculoskeletal Disorders Mental Disorders Neurological Disorders	Cardiovascular Diseases Neoplasms Musculoskeletal Disorders Mental Disorders Other NCDs	Cardiovascular Diseases Maternal and Neon. Des. Respiratory Infections & TB Neoplasms Other NCDs	Maternal and Neon. Des. Respiratory Infections & TB Neglect. Trop. and Malaria Enteric Infections Other NCDs
58 per cent OF TOTAL DALYs	**54 per cent OF TOTAL DALYs**	**46 per cent OF TOTAL DALYs**	**50 per cent OF TOTAL DALYs**
Population Aged 50-69			
Neoplasms Cardiovascular Diseases Musculoskeletal Disorders Diabetes and CKD Mental Disorders	Cardiovascular Diseases Neoplasms Musculoskeletal Disorders Diabetes and CKD Mental Disorders	Cardiovascular Diseases Neoplasms Diabetes and CKD Chronic Respiratory Diseases Musculoskeletal Disorders	Cardiovascular Diseases Neoplasms Respiratory Infections & TB Diabetes and CKD Digestive Diseases
65 per cent OF TOTAL DALYs	**66 per cent OF TOTAL DALYs**	**61 per cent OF TOTAL DALYS**	**57 per cent OF TOTAL DALYs**
Population Aged 70 and over			
Cardiovascular Diseases Neoplasms Neurological Disorders Musculoskeletal Disorders Diabetes and CKD	Cardiovascular Diseases Neoplasms Chronic Respiratory Diseases Diabetes and CKD Neurological Disorders	Cardiovascular Diseases Chronic Respiratory Diseases Neoplasms Diabetes and CKD Respiratory Infections & TB	Cardiovascular Diseases Respiratory Infections & TB Neoplasms Chronic Respiratory CKD Diabetes and CKD
70 per cent OF TOTAL DALYs	**76 per cent OF TOTAL DALYs**	**67 per cent OF TOTAL DALYS**	**67 per cent OF TOTAL DALYS**

Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation (IHME), Accessed on 10 May 2021.
*The red boxes represent cases where the majority of the burden of diseases in related to NCDs; the yellow boxes represent burden of diseases in transition and the green boxes represent cases where the majority of the burden of diseases is related to transmissible diseases, maternal and neonatal and nutritional conditions.

When considering the BOD (measured as a percentage of DALYs) attributed to the top-five causes in total DALYs *for the population as a whole*, it was observed that all the main causes of deaths in HICs and UMICs are NCDs. In the case of HICs, the top five causes represent 58 per cent of the total disease burden and, in the case of UMICs, 54 per cent. In the LMICs, in contrast, the first five causes (46 per cent of the total DALYs) are a mixture of NCDs and other causes, characterizing an intermediate stage of the epidemiological transition. Finally, in LICs, the first five causes (half of all DALYs) are mostly

communicable diseases (such as malaria, tuberculosis and enteritis), maternal and neonatal causes, which represent the initial stages of the epidemiological transition.

For *the population in the late working ages to the early retirement ages* (ages 50 to 69), the disease burden consists largely of chronic diseases in all income groups except for LICs. The first five groups of causes—all chronic diseases—represent more than 60 per cent of the total DALYs in HICs, UMICs and LMICs. But in the case of LICs, the top five causes still present a hybrid profile where respiratory infections and tuberculosis stands out as the second most frequent cause in the burden of disease.

For *older populations* (aged 70 years or over), the first five causes in the HICs and UMICs are all chronic diseases, representing 70 per cent and 76 per cent of the total DALYs in this age group, respectively. But hybrid situations are still found in cases of LMICs and LICs due to the presence of respiratory infections and tuberculosis.

The preceding analysis (of DALYs by causes among older people) shows a situation that deserves attention from health policy makers, especially with regard to three groups of causes that are present in all groups of countries: (i) cardiovascular diseases, (ii) diabetes and chronic kidney diseases and (iii) neoplasms. Many of these conditions are preventable by healthy behaviours (such as good nutrition, physical activity, low exposure to air and water pollution, etc.), early detection through image equipment or laboratory tests (in the case of breast cancer, cervix, colon, prostate and others), and even vaccines (such as HPV and hepatitis B for preventing cervix and liver cancer, respectively). Early treatments of cancer cases could also reduce mortality by using less invasive medical technologies. These three groups of diseases, taken together, represent 49 per cent and 55 per cent of the worldwide DALYs for the population aged 50-69 and 70 years or over, respectively.

V. Risk factors, health promotion and prevention for older citizens

The discussion about health risk factors in old age is complex, as these factors actually start to influence the health status and subsequent mortality earlier in people's life cycle. So, it is generally accepted that the measures necessary to promote healthy lifestyles and prevent chronic diseases later in life must begin when people are young and continue through their life cycle. According to an IHME study (2020a), the main risk factors contributing to the BOD changed rather dramatically since 1990.

Table 4. Ten major world health risk factors in 1990 and 2019 and percentage of DALY losses

Ten Leading Risk Factors 1990	*Associated DALYs (percentage)*	*Ten Leading Risks Factors 2019*	*Associated DALYs (percentage)*
Child Wasting	11.4	High Systolic Blood Pressure	9.3
Low Birthweight	10.6	Smoking	7.9
Short Gestation	8.7	High Fasting Plasma Glucose	6.8
Household Pollution	8.0	Low Birthweight	6.3
Smoking	6.2	High Body Mass Index (BMI)	6.3
Unsafe Water	6.2	Short Gestation	5.5
High Systolic Blood Pressure	5.9	Ambient Particulate Matter	4.7
Child Underweight	4.9	High LDL Cholesterol	3.9
Unsafe Sanitation	4.6	Alcohol Use	3.7
Handwashing	3.2	Household pollution	3.6

Source: IHME (2020a).

Most of these changes are associated not only with demographic and epidemiological transition, but also with human and social behavioural changes and environmental risks brought about by urbanization and climate change. Table 4 shows that the greatest declines in risk exposure were associated with social

and economic progress, associated to reductions in domestic air pollution, unsafe water, poor sanitation, lack of hand washing and deficit in child growth, among others.

Then again, the greatest increases in risk exposure were linked to environmental pollution by particulate matter, high fasting blood glucose and high body mass index (BMI), among others. In 1990, the greatest global health risk, for all ages, was child nutritional wasting, accounting for 11 per cent of total DALYs, whereas in 2019 the main global risk factor was high systolic blood pressure, representing 9 per cent of the total DALYs. The top 10 risks in 1990 accounted for almost 70 per cent of DALYs, while in 2019 they accounted for 58 per cent after a dramatic change in their composition.

Table 5 shows that between 1990 and 2019, the distribution of the top ten risk factors in the age group 50-74 has not changed much over time. Despite changes in their specific ranking within the top ten, the listed factors represented 85 per cent of the total DALYs for this age group in both years.

TABLE 5. TEN MAJOR HEALTH RISK FACTORS IN 1990 AND 2019 ACCORDING DALY LOSSES, WORLD, POPULATION AGED 50-74 YEARS

Ten Leading Risk Factors 1990	*Associated DALYs (percentage)*	*Ten Leading Risks Factors 2019*	*Associated DALYs (percentage)*
Smoking	19.4	High Systolic Blood Pressure	16.1
High Systolic Blood Pressure	16.8	Smoking	15.5
Household Air Pollution	8.5	High Fasting Plasma Glucose	12.2
High Fasting Plasma Glucose	8.3	High BMI	11.8
High BMI	7.6	Ambient Particulate Matter	6.8
High LDL Cholesterol	7.0	High LDL Cholesterol	6.2
Alcohol Use	5.1	Alcohol Use	5.0
Ambient Particulate Matter	4.7	Kidney Disfunction	4.7
High Sodium	4.0	Household Air Pollution	3.5
Kidney disfunction	3.7	High Sodium	3.4
TOTAL	**85.1**	**TOTAL**	**85.2**

Source: IHME (2020a).

In both years there is a preponderance of behavioural and metabolic risk factors in the DALYs associated with this age group, showing that few changes have occurred over nearly three decades in the composition of the risks. Some behavioural factors, such as tobacco use, have improved, as their weight in total DALYs dropped from 19.4 per cent to 15.5 per cent between 1990 and 2019. Environmental factors are still relevant, despite the fact that household's indoor pollution, which was the third largest risk factor, reduced its weight from 8.5 per cent to 3.5 per cent of the DALYs, while ambient particulate matter increased its share from 4.7 per cent to 6.8 per cent.

Some risk factors, such as high LDL cholesterol and alcohol abuse, maintained the same position in the ranking of the top ten risk factors. However, despite all these (relatively small) changes, the age group "in transition from active life to early retirement age" had, in 2019, 55 per cent of the risks associated with their behaviour (smoking and high BMI) and metabolic disorders (high blood pressure and fasting plasma glucose). In sum, lifestyle changes are still crucial to a healthy transition from the working age to retirement age, especially quitting smoking and balancing the diet (including controlling sugar and salt intake).

TABLE 6. TEN MAJOR HEALTH RISK FACTORS (RANKED BY DALYS) IN 1990 AND 2019, WORLD POPULATION AGED 75 YEARS OR OVER

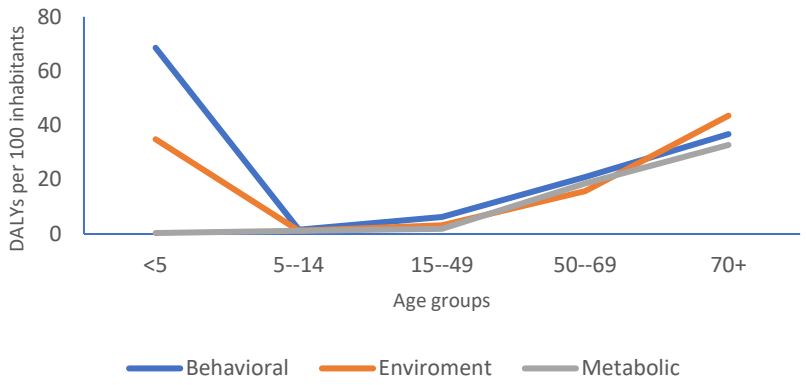
Ten Leading Risk Factors 1990	*Associated DALYs (percentage)*	*Ten Leading Risks Factors 2019*	*Associated DALYs (percentage)*
High Systolic Blood Pressure	22.0	High Systolic Blood Pressure	19.1
Smoking	14.8	High Fasting Plasma Glucose	13.5
High Fasting Plasma Glucose	10.5	Smoking	12.3
High LDL Cholesterol	9.2	High BMI	7.3
Household Air Pollution	7.8	High LDL Cholesterol	7.2
High BMI	5.7	Ambient Particulate Matter	6.7
Ambient Particulate Matter	5.2	Kidney Disfunction	5.9
Kidney disfunction	5.1	Low Temperature	3.4
Low Temperature	4.6	Household Air Pollution	3.1
Low Whole Grains	3.5	Low Whole Grains	3.0
TOTAL	**88.4**	**TOTAL**	**81.3**

Source: IHME (2019a).

The social and economic changes during the last three decades from 1990 to 2019, brought about a major increase in life expectancy together with a shift of the main risk factors for the population over 75 years of age, as can be seen in table 6. In 2019, the five main risk factors for this population are also related to metabolic and behavioural risks, making up almost 60 per cent of the DALYs of older persons in this age group.

The Institute of Health Metrics and Evaluation calculates DALYs associated with health risk factors in 2019, grouped as: *environmental and occupational,*[14] *behavioral*[15] *and metabolic risks.*[16] Figures 25 to 28 show DALYs related to health risk factors by broad age group and level of income. The graphs suggest that there seems to be a particular transition in the patterns of each of these three groups of factors according the countries income groups.

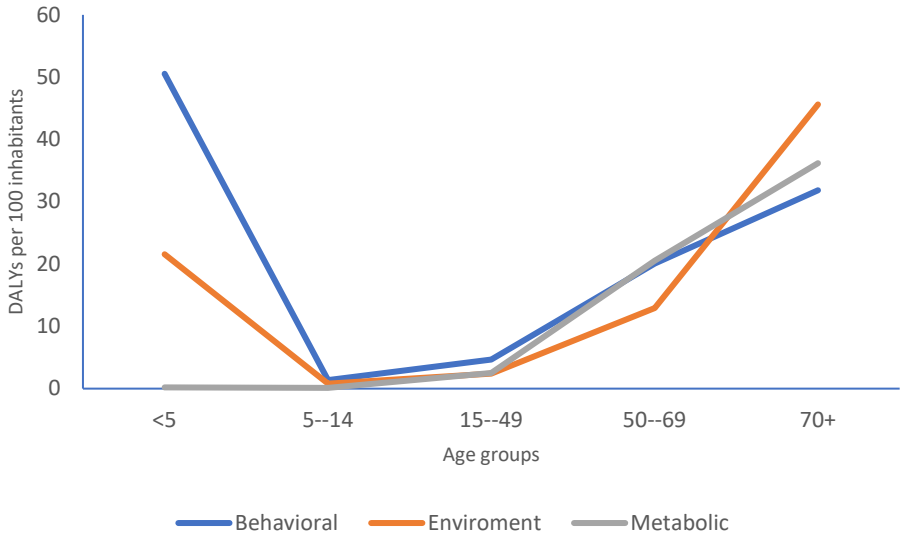
Figure 25. Disability-adjusted life years (per 100 persons) by age and type of risk factors for the low income countries, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

[14] Environment and occupational risks are related with unsafe water, sanitation and handwashing facilities, air pollution, ambient particulate matter and non-adequate temperature. Occupational risks are also a specific category of risks related to work accidents and professional diseases.
[15] Childhood and maternal malnutrition, tobacco, alcohol and drug use, partner violence, childhood sexual abuse and bullying, unsafe sex, unbalanced diet and low physical activity.
[16] High fasting plasma glucose, high LOL cholesterol, high systolic blood pressure, high body mass index, low bone mineral density and kidney disfunction.

Figure 26. Disability-adjusted life years (per 100 persons) by age and type of risk factors for the lower-middle income countries, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

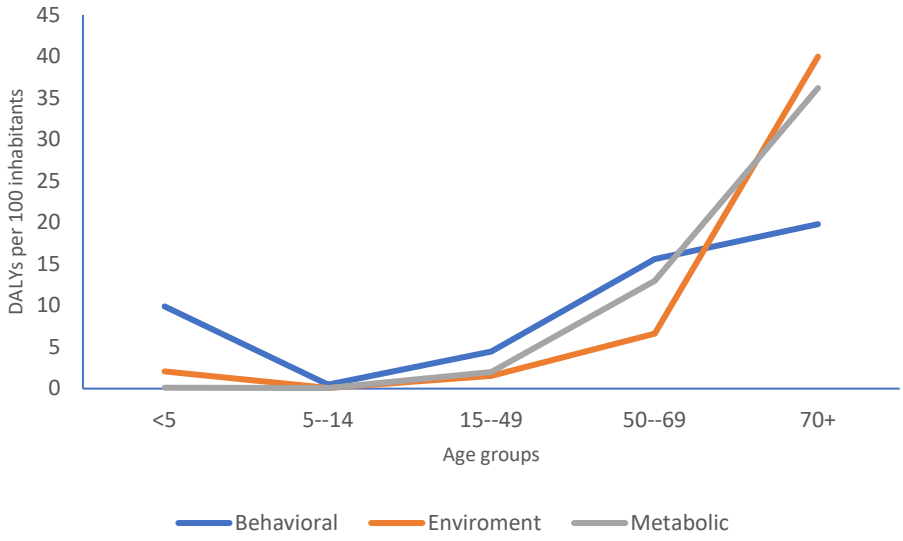
Behavioural risks feature as the most important type of risk factors for most age groups, and countries at all income levels, except for ages from 50 to 69 years or over, when environmental and metabolic risks take precedence (specially in UMICs and HICs). However, behavioural risks lend themselves to be monitored and controlled from an early age, affecting metabolic risks later in life, including in old age. This is the case of the lack of a balanced diet and physical activity throughout the main working ages that can induce high blood glucose levels, high LDL cholesterol and high body mass index by the time of retirement, or even earlier.

In the LICs, environmental, behavioural and metabolic risks are all very relevant in the late life, as can be seen in figure 25. Environmental risks, in particular, appear to be the most relevant for older populations in all countries regardless of income levels.

Older adults in LICs may be vulnerable to environmental contaminants due to changes in lifestyles and increased exposure to some types of contaminants, including in water and the air. Their poor socioeconomic and nutritional status can also affect their vulnerability to environmental risks. For example, older adults in poor countries are often exposed to indoor air pollution (carbon monoxide emitted by wood stoves), by being a passive smoker or being exposed to dust, mould, pesticides, asbestos, and other contaminants that can worsen pre-existing conditions, such as asthma or chronic obstructive pulmonary diseases.

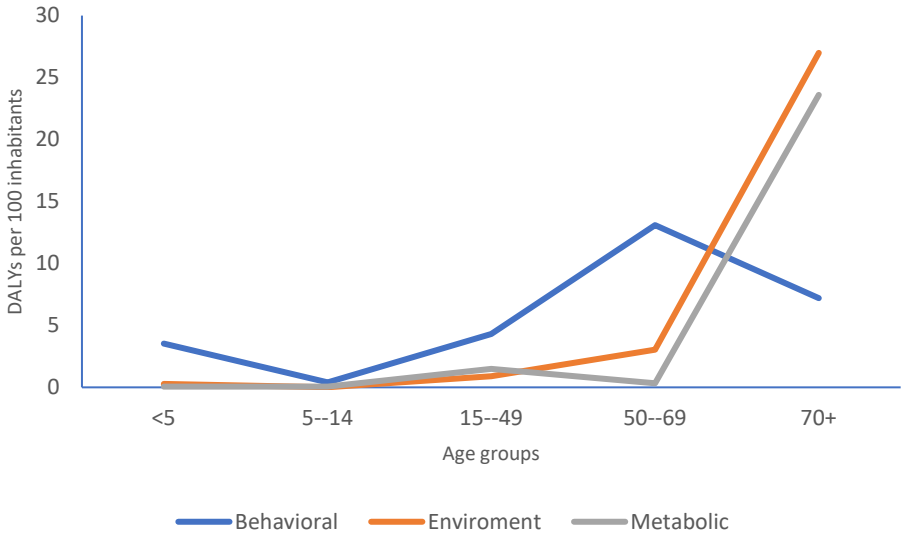
Figures 27 and 28 show that environmental risks still prevail among the older citizens at UMICs and HICs, but metabolic risks are also relevant, while behavioural risks are less frequent in these age groups. Climate change has been identified as an additional source of risk for older populations, who often suffer from extreme heat waves in the summer or low temperatures in the winter, especially the poor or vulnerable communities in these countries. Metabolic risks are also associated with the emergence of chronic diseases in old age, especially when health systems are unable to gather information about the health status of these populations and provide good primary health care to monitor health conditions and pharmaceutical assistance.

Figure 27. Disability-adjusted life years (per 100 persons) by age and type of risk factors for the upper-middle income countries, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure 28. Disability-adjusted life years (per 100 persons) by age and type of risk factors for the high income countries, 2019



Source: Author's elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figures 27 and 28 show that environmental risks still prevail among the older citizens at UMICs and HICs, but metabolic risks are also relevant, while behavioural risks are less frequent in these age groups. Climate change has been identified as an additional source of risk for older populations, who often suffer from extreme heat waves in the summer or low temperatures in the winter, especially the poor or vulnerable communities in these countries. Metabolic risks are also associated with the emergence of chronic diseases in old age, especially when health systems are unable to gather information about the health status of these populations and provide good primary care to monitor health conditions and pharmaceutical assistance.

Current international experiences suggest that the main steps to reduce health risk factors in old age should be based on the following types of policies:

- Social communication and change management strategies to foster community environments and, social and health institutions that can meet the health needs of older persons;

- Systematically collecting and accessing basic health and environmental data to monitor the health status of older people and disseminate this information to community leaders, policy makers and health professionals, as well as to share knowledge and best practices to minimize the associated risks;

- Develop health promotion and disease prevention strategies over the life cycle as a way to align health systems with the needs of older populations;

- Organization of health systems incorporating the needs and preferences of older persons, especially in the contexts of rapid demographic and epidemiological transitions and;

- Designing integrated health and social protection policies to improve the active life of the elderly, developing mechanisms of continuity of care between different groups of health providers, to provide quality care, and non-health institutions to involve older citizens in active life.

Special resources required to sustain these integrated health and social engagement strategies, including for long-term care and community social services. Strengthening health systems, appropriate training of the health sector workers and creating age-friendly environments, are all key to building an infrastructure for the effective promotion, prevention, treatment and rehabilitation of the health and well-being of older persons.

VI. Access to health care for older persons

Living longer has been one of the most salient achievements of economic development, science and technology. A vast majority of people around the world has benefited from the advances that have taken place over the last century, concurrently with the demographic and epidemiological transitions. But as we have shown above, living longer also increases some health risks. The interaction of different types of risk factors—environmental, behavioural and metabolic—requires careful monitoring of the evolving needs for health promotion, disease prevention, treatment and rehabilitation.

The international consensus that health should be a universal right is not new. Article 25 of the 1948 Universal Declaration of Human Rights of the United Nations already integrated it and was reflected in the constitution of the World Health Organization (WHO), which reads: “Everyone has the right to achieve the highest possible level of health, since health is one of the fundamental rights of every human being, regardless of race, religion, political conviction, economic or social condition”. But the importance and priority given to the goal of universal health care (UHC) has only grown since, especially so during the last two decades.

In 2005, the World Health Assembly resolved to undertake a transition to UHC, to improve health conditions through poverty reduction and achieving a range of internationally agreed development goals, including the Millennium Development Goals. Subsequently, WHO released two global health reports,

dedicated to the themes of primary care (2008) and financing of health systems (2010), both elaborated within the scope of UHC.

The World Health Report in 2013 addressed the need for research to subsidize UHC, emphasizing the importance of promotion, prevention, treatment and interventions by other sectors in achieving health benefits. In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, including the Sustainable Development Goals (SDGs) which incorporate UHC as Goal 3.8, as previously noted.

The World Health Organization is committed to grant UHC to old-age population by: (i) advising countries to organize services to respond to older persons' diverse levels of capacity as well as their needs and preferences; (ii) ensuring interventions that are key for maintaining intrinsic capacity and functional ability of older people; (iii) developing sustainable financing mechanisms to protect older citizens and their families from falling into poverty due to catastrophic health spending; (iv) creating incentives for the provision of integrated health services tailored to the needs of the older population, and; (vi) establishing service-delivery models and comprehensive systems of long-term care centered in communities where older people live (WHO, 2019).

Living longer must include paths to keep older persons active and healthy. However, current health systems often lack health provision schemes and interventions to maintain intrinsic capacity and functional ability of older people. These interventions include restorative surgery (cataract, knee/hip replacement), assistive devices, functional nutritional supplements, multimodal physical exercises and long-term care.

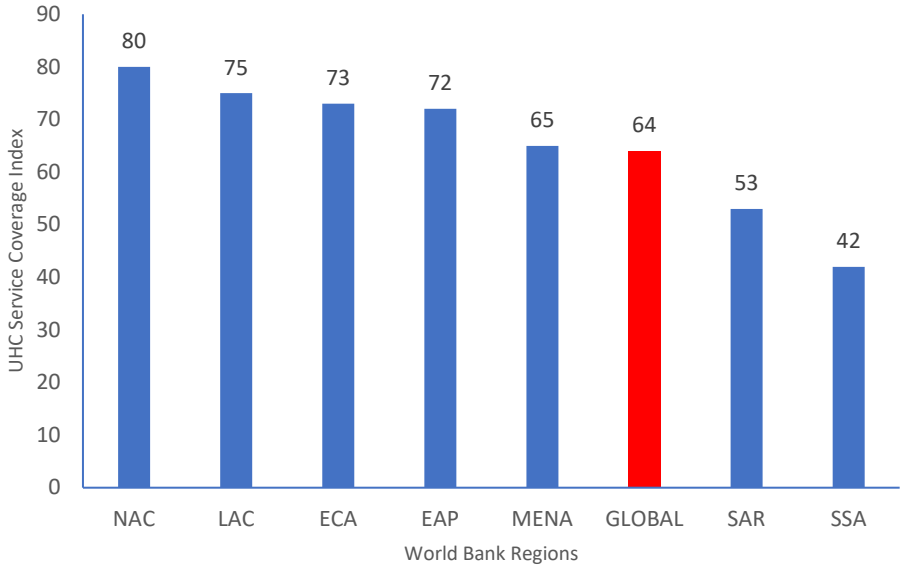
As a matter of principle, the structure and financing of UHC for older persons should include interventions that carry the greatest benefits for healthy ageing and should include investments in integrated health and social care for older people. Key questions to address to achieve these goals include: what are the current health coverage gaps for senior citizens in different countries and regions of the world? What is the cost to close those gaps, and how can it be financed sustainably? How are different countries dealing with the financial challenges and designing solutions for a comprehensive UHC for older persons? How is the COVID-19 pandemic affecting the health conditions of and the health policies aimed at older persons?

Since the establishment of the SDG target to achieve UHC by 2030, international entities such as UN DESA, WHO, the World Bank and others, have developed two indicators to measure progress. Indicators 3.8.1 measures the population's coverage of essential basic services and indicator 3.8.2, the degree of financial protection against health spending leading families to fall below the poverty line.

The first indicator was called UHC - Service Coverage Index (figure 29)[17] and the first analysis related to this index was published in December 2017 in a global report prepared by WHO and the World Bank. The best performance on this indicator was in the Americas (North America and Latin America) and the worst in the poorest regions, South Asian Region and sub-Saharan Africa, suggesting some correlation between poor performance in this regard and aggregate level of income.

[17] The UHC service coverage index is calculated in a scale of 0 to 100 as a weighted geometric mean of 14 indicators in 4 health services areas: (i) reproductive, maternal, newborn and child healthcare (including the following indicators: family planning, antenatal care 4+ visits, child immunization, measured by DTP3 and care seeking suspected pneumonia); (ii) infectious diseases control (TB effective treatment, HIV treatment measured by ART, Insecticide-treated nets and basic sanitation); (iii) Non-communicable diseases (normal blood pressure, mean fasting plasma glucose, cervical cancer screening and tobacco control), and; (iv) service capacity access (hospital bed density, health worker density, access to essential medicines and IHR core capacity index).

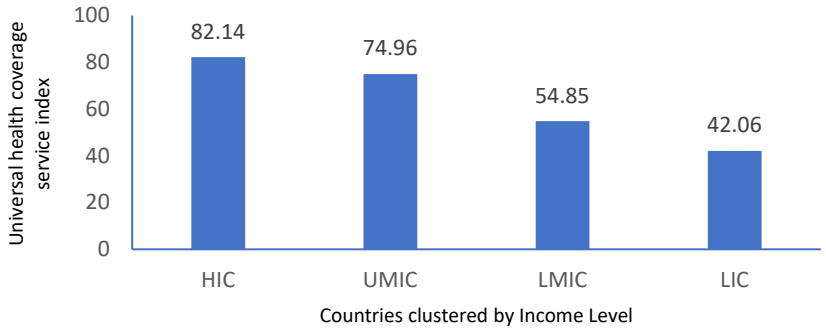
Figure 29. Universal health coverage service index by region, circa 2017



Source: WHO and the World Bank (2017).

Analysing the Health Service Capacity Access sub-indicator in 179 countries based on WHO (2017) statistics, the two major countries of North America, Canada and the United States of America, scored 100 per cent. In all other world regions, wide disparities in the indicator were observed. In LAC, it varied from 29.9 per cent (Haiti) to 98.7 per cent (Brazil). In Europe and Central Asia, it varied from 69.5 per cent (Albania) to (99.8) Norway. In East Asia and Pacific, the range was from 34.9 per cent (Lao People's Democratic Republic) to 100 per cent (China), while in Middle East and North Africa, the range was from 0.2 per cent (Somalia) to 99.6 per cent (Saudi Arabia). In South Asian Region, the sub-indicator varied from 20.1 per cent (Nepal) to 66.6 per cent (Maldives) and in sub-Saharan Africa, from 12.0 per cent (Chad) to 98.0 per cent (Seychelles).

Figure 30. Universal health coverage service index by income group, circa 2017



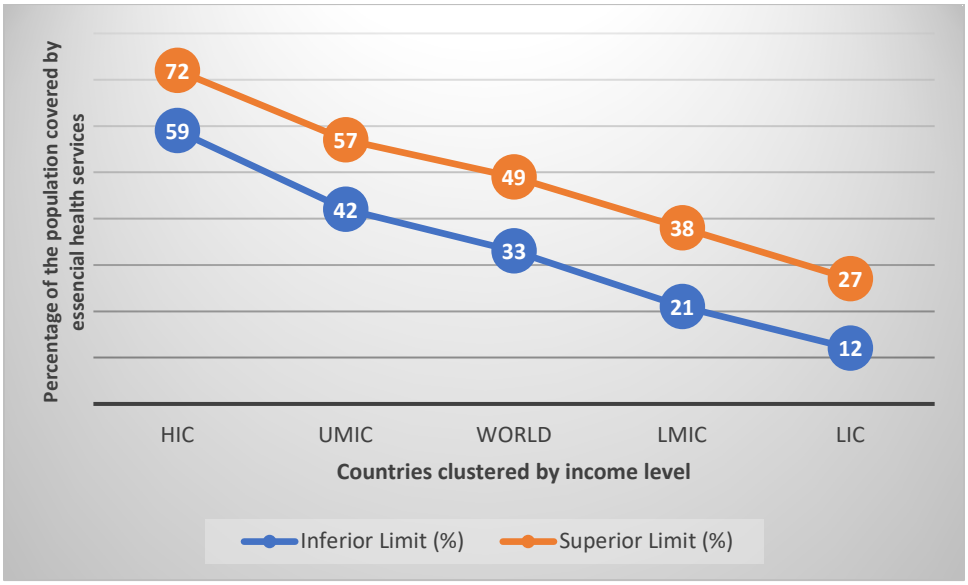
Source: WHO and World Bank (2017).[18]

[18] An update of this initial publication could be found in WHO (2019). The data of the Service Coverage Index of countries clustered by income level are the same and could be seen in figure 1.3 (page 14). However, this publication uses also other estimations to calculate the percentage of people covered by essential health services (see Annex 1.3.1 in WHO, 2019).

Figure 30 shows the values of this indicator sorted by countries and classified by income levels. The UCH coverage ratio in HICs in 2017 was more than twice that observed in LICs, with coverage generally inversely proportional to the country's income level.

A recent publication of WHO (2019) offered an alternate methodology to estimate the coverage of essential health services. The original methodology was reviewed because using the average of multiple intervention indicators to approximate coverage of essential health services may overestimate the proportion of people who receive most or all services they need. Also, the original approach may miss potential coverage patterns in groups of interventions or services. According to WHO, this new approach, consistent with the measurement of the SDG indicator 3.8.1, relies on a different but similar set of tracer indicators over a range of disease areas and service delivery platforms. The method focuses on "contact" coverage of essential services as the percentage of people who need a service and receive it and is of adequate quality to realize the potential health gains.[19] The results of this new methodology can be seen in figure 31.

Figure 31. Percentage of population covered by essential health service by income group, 2017



Source: WHO (2019).

This new approach shows a lower coverage of health services than the previous methodology and a greater distance to reach the SDG UHC goal in 2030, based on 2017 data. Even the population living in the HICs and UMICs appears to be underserved in terms of coverage of essential health services compared to previous estimates. It also reveals that the health coverage gap between LICs and HICs is 2 to 3 times larger than that presented in previous calculations, requiring much greater efforts to meet the SDG target 3.8.

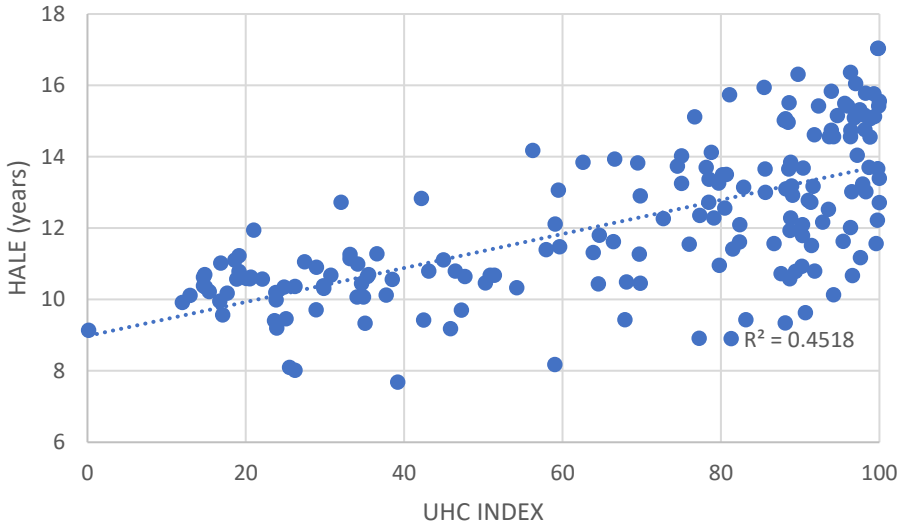
However, this indicator does not track exclusively the coverage of health services for older populations. Considering the four components of this indicator, there are two more directly related to the health services needed by older persons. The first is the component of access to service capacity, as older people use health

[19] This methodology, according WHO (2019), consists of the following steps: (i) Select a small set of 12 tracer indicators of service coverage informed by the indicators used in SDG indicator 3.8.1. The selected tracer indicators are similar, but not identical, to those contained in SDG indicator 3.8.1; (ii) Compute the average coverage of essential services using these new selected indicators. In 2017, the global estimate for average coverage for these original tracer indicators was 64 (figure 29) but this does not mean that 64 per cent of the world's population was covered with all essential health services; (iii) Convert the average tracer indicators to the percentage of people covered by essential health services through associations with co-coverage measures (from a database of countries' household surveys). These percentage values are multiplied by population estimates from the *World Population Prospects* (United Nations, 2019) to estimate the number of people covered by essential health services.

services more often than younger people, requiring greater installed capacity of health services. The second is the component of access to tracing interventions for non-communicable diseases, which map closely to the BOD profile for most elderly people.

Figure 32 shows the correlation between the UHC services capacity access index and healthy life expectancy for the population aged 65 and over in 179 countries in 2017. The graph shows a variable, albeit, on the whole, positive association between these two variables, demonstrating that the greater the capacity of health services, the greater the number of additional years of healthy life for a person aged 65 years, although there is wide variation across countries and regions. In countries like Japan and Singapore, where the health service capacity access index covers almost 100 per cent of the population, a person aged 65 years or over is expected to live 17 additional years of healthy life, while in countries like Somalia, Central African Republic and Chad, where the service capacity index does not even reach 30 per cent of the population, the expected healthy life at age 65 years is close to 8 years.

Figure 32. Correlation between the universal health care service capacity access index (percentage) and health-adjusted life expectancy for population aged 65 or over in 179 countries, 2017



Source: WHO and IHME.

Another way to indirectly measure how the UHC service coverage index is meeting the needs of older persons is by evaluating the access to non-communicable disease (NCD) screening interventions. As discussed above, most BOD in old age is associated with NCDs, but many countries do not have health systems that allow to screen and provide adequate health care for NCD needs. In other words, providing good access to NCDs interventions represents an under-utilized means to reduce the number of DALYs among older persons.

VII. Financial protection and sustainability of universal health coverage in old age

As documented above, older persons have on average a heavier BOD and greater health care needs. The corresponding higher health care costs come at a stage of the life cycle in which older persons typically have lower incomes. In some cases, the financial pressure may lead to economic hardship or increase the likelihood of impoverishment due to catastrophic health expenditures, especially in contexts where social protection plans for older people are insufficient or non-existent.

Economic downturns, such as the "Great recession" of 2008-2009 and the pandemic crisis of 2020, can be particularly harmful for older persons, especially for those facing health problems, disability and reduced income. All of these situations create vulnerability and risks of catastrophic health. Resilient health systems and universal health policies constitute a safety net for the elderly, protecting their health and financial security.

Catastrophic health expenditures have hit older persons hard, especially in low- and middle-income countries. Recent studies show that the proportion of households with catastrophic health expenditures in India has increased over the past two decades, and that it was higher among families with older people (Pandey and others, 2017). A study conducted in urban Nigeria, based on 2010 data (Adisa, 2015) found that 9.6 per cent of elderly-headed households faced catastrophic expenses, given the regressive nature of health fees paid out-of-pocket, whereby rich and poor families pay the same amount for medically assisted care, as well as limited health insurance coverage among older persons' households.

In China, there is a high rate of catastrophic health expenditure in households with elderly members, which is of special relevance in view of the country's rapid population ageing. Studies conducted between 2011 and 2013, based on data from a longitudinal health and retirement study (Zhang and Gao, 2019), found that catastrophic health expenditures among older persons were associated with worsening physical and mental health.

Even in HICs, health expenditures can have negative effects on older people, often more intensively than other age groups. For example, a recent study in Italy showed that spending in health care has a large negative effect on the well-being of the older persons, controlling for other variables, such as life expectancy and GDP per capita (Lopreite and Mauro, 2017).

But how to measure the contribution of health spending to poverty? Since 2015, the World Bank has defined poverty as the portion of the population earning less than $1.90 a day, according to international purchasing power parity (PPP) criteria. In 2017, the Bank considered other criteria to establish the specific poverty line for LMICs (US$3.20) and for UMICs (US$5.50), owing to different degrees of monetization of their economies and cost of living. Another approach, used in many countries, is to establish a poverty line, as a percentage of individual or household average "out of pocket" (OOP) expenditures (Fisher, 1997).

To measure indicator SDG 3.8.2 in 2015, WHO (2019) deducted OOP health expenditures from household budgets. The resulting value was used to determine how health spending reduces household or individual disposable income, and to estimate the proportion of the population pushed below the poverty line, according to three poverty line definitions: (i) less than US$ 1.90 per day; (ii) less than $3.20 per day (both in PPP), and (iii) the value equivalent to 60 per cent of the population's average per capita income or consumption.

About 90 million people fell below the poverty line in 2015 worldwide due to OOP expenditures, when using the threshold of US$1.90 a day, but that number rises to 99 million if the threshold used is US$3.20 a day, and to 183 million if the criterion is 60 per cent of the average country´s per-capita income.

Table 7 shows the percentage of people estimated to have fallen below the poverty line in 2015 by WHO regions, using these three criteria; identifying also the countries with the largest percentage of population falling below the poverty line due to health spending.

TABLE 7. PERCENTAGE OF THE POPULATION FALLING BELOW THE POVERTY LINE DUE TO HEALTH OUT-OF-POCKET SPENDING IN 2015 ACCORDING WHO REGIONS AND DIFFERENT THRESHOLDS

WHO Regions and more affected countries	*Threshold of US$1.90 (percentage)*	*Threshold of US$3.20 (percentage)*	*60 per cent of average per capita income or consumption (percentage)*
World	1.2	1.4	2.5
Africa	1.5	1.4	1.6
Americas	0.2	0.4	1.5
Eastern Mediterranean	0.4	1.2	2.2
South East Asia	2.8	3.3	3.1
Western Pacific	0.9	0.4	3.5
Europe	0.1	0.1	1.6
More affected countries	Sierra Leone (13.4) Bangladesh (7.0) Afghanistan (4.5)	Cambodia (6.5) Bangladesh (6.2) Sierra Leone (6.0)	Sierra Leone (11.6) Bangladesh (6.42) Cambodia (4.5)

Source: WHO (2019).

Some comments can be made about this data:

(i) Catastrophic spending on health has the greatest impact on increasing poverty when measured by the poverty line of 60 per cent of the countries' average income. In 2015, 2.5 per cent of the world's population was impoverished using this criterion, compared to 1.4 per cent and 1.2 per cent using the poverty lines of $3.20 and $1.90, respectively;

(ii) South-East Asia is the region with the highest percentage of people who fell below the poverty line in 2015 due to high health expenditures, when using the $1.90 and $3.20 poverty lines. However, considering the poverty line of 60 per cent of the countries' average income, the Western Pacific region showed the greatest impoverishment due to health expenditures;

(iii) Sierra Leone, Bangladesh and Cambodia, followed by Afghanistan, are the countries that presented the highest percentages of people who fell below the poverty line due to health expenditures.

(iv) In the Americas and Europe, impoverishment due to health spending was marginal at the poverty lines of $1.90 and $3.20 a day, but at the (relative) poverty line of 60 per cent of the average daily per capita consumption or income, it affected 1.5 per cent of the population in the region of the Americas and 1.6 per cent in the European region. However, a 2016 study encompassing 15 Europeans countries found that being diagnosed with diabetes mellitus and cardiovascular diseases, was associated with catastrophic health expenditure among older persons even in countries with developed risk-pooling and health insurance mechanisms[20] *(*Arsenijevic and others, 2016).

Another way to analyse the effect of catastrophic health expenditures is to consider threshold values of the *proportion of health expenditures in the family budget* over which these expenditures are considered to be "catastrophic". This type of measure was indeed used to assess the baseline and progress on SDG indicator 3.8.2. The thresholds used by WHO were 10 per cent and 25 per cent of the family budget.

[20] In Portugal, Poland, Denmark, Italy, Switzerland, Belgium, the Czech Republic and Hungary.

A retrospective analysis of these data shows systematic increases in this percentage using both thresholds, namely a greater exposure of the world's population to catastrophic health expenditures. Between 2000 and 2015, the percentage of the world population that spent 10 per cent or more of the household budget on health increased from 9.4 per cent to 12.7 per cent (570.5 to 926.6 million inhabitants). Considering the threshold of 25 per cent of the family budget, the proportion of the population with catastrophic health spending increased from 1.7 per cent to 2.9 per cent (105.9 to 208.7 million people) during the same period (WHO, 2019).

TABLE 8. INCIDENCE OF CATASTROPHIC HEALTH SPENDING IN WHO REGIONS, USING THRESHOLDS OF 10 PER CENT AND 25 PER CENT OF THE FAMILY BUDGET, 2015

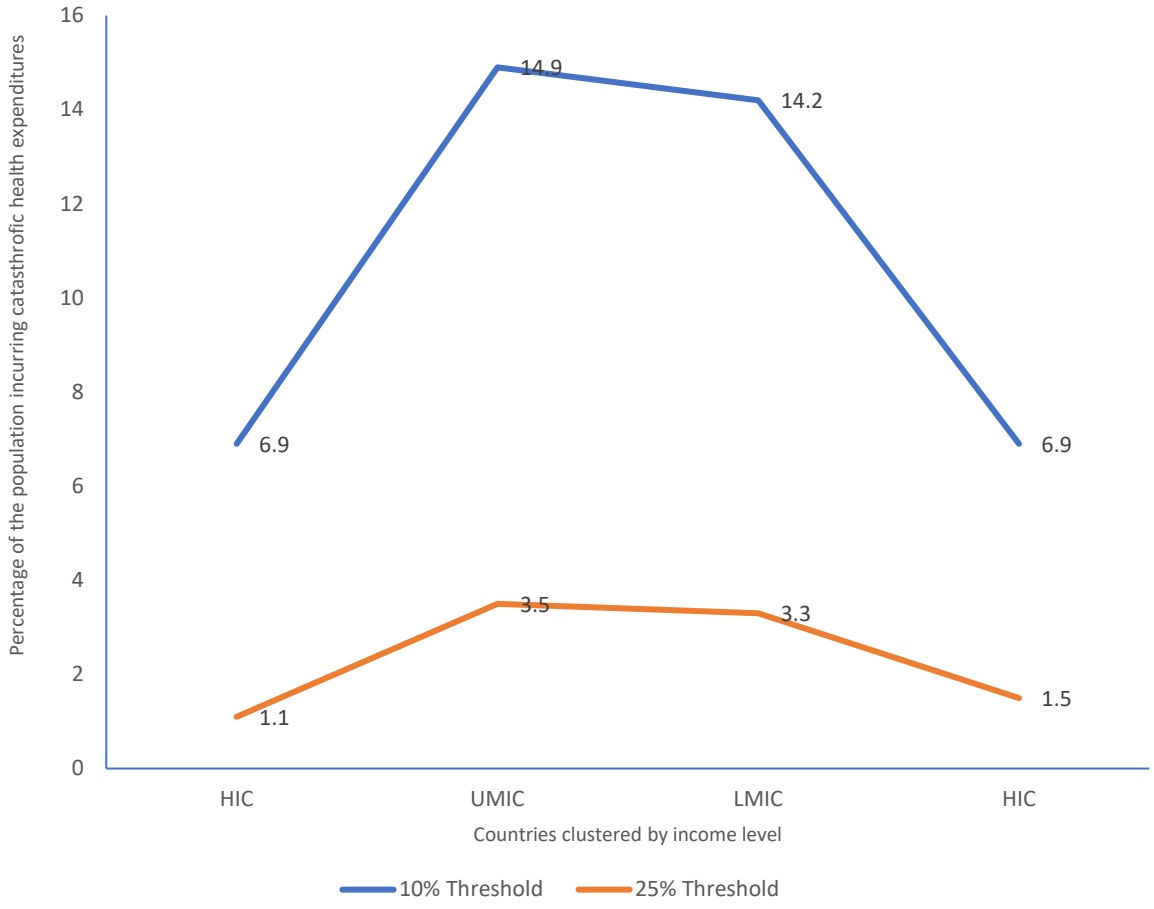
WHO regions	*Population with Catastrophic Health Spending with Threshold of 10 per cent of the family's budget*		*Population with Catastrophic Health Spending with Threshold of 25 per cent of the family's budget*	
	Percentage	*Population (millions)*	*Percentage*	*Population (millions)*
World	12.7	926.6	2.9	208.7
Africa	7.3	71.1	1.8	17.4
Americas	11.3	109.8	1.8	18.0
Eastern Mediterranean	11.7	76.9	1.9	12.4
Europe	7.4	67.4	1.2	10.5
South-East Asia	16.0	307.4	3.8	73.6
Western Pacific	15.9	292.6	4.2	76.6

Source: WHO (2019).

Table 8 shows the percentage of the population with catastrophic health expenditures in the world and in WHO regions in 2015, using the two thresholds, of 10 per cent and 25 per cent of household income. As can be seen, at both thresholds, the incidence of catastrophic health expenditures is highest in Southeast Asia and the Western Pacific Region. Considering the 10 per cent threshold, about 16 per cent of the population residing in both regions suffered catastrophic health expenditures in 2015. Taking into account the 10 per cent threshold, the incidence of catastrophic health expenditures is around 4 per cent of the global population. Africa (7.3 per cent) and Europe (7.4 per cent) were the regions that presented the lowest incidence of catastrophic health expenditures at the threshold of 10 per cent and at the threshold of 25 per cent the incidence was also lower in Europe (1.2 per cent).

Considering the total population affected in 2015, it was observed that a large number, 927 million people or 12.7 per cent of the total world population, incurred in catastrophic health expenditures when using the threshold of 10 per cent of family income. Of the people affected, almost two thirds (65 per cent) were concentrated in the regions of Southeast Asia and the Western Pacific. When using the threshold of 25 per cent of family income, the number of people considered to have incurred catastrophic expenses is smaller (209 million or 2.9 per cent of the world population) but the share of Southeast Asia and the Western Pacific in this regard was even higher (72 per cent). Clearly, these are the regions at greatest risk of impoverishment and catastrophic health expenditures and that are in the direst need of financial protection policies for UHC.

Figure 33. Percentage of population incurring in catastrophic health spending by income group, 2015



Source: WHO (2019).

Another way to analyse the incidence of catastrophic health spending is considering the countries according the World Bank income groups, as can be seen in figure 33. The middle-income countries (UMIC and LMIC), considering both thresholds, had the higher proportion of the population under catastrophic health spending in 2015. These countries concentrate a high proportion of the world's population with catastrophic health spending of 87 per cent and 94 per cent, for the thresholders of 10 per cent and 25 per cent of the household budget, respectively.

Comparing the achievements related to health service coverage index (SDG indicator 3.8.1) and financial protection (SDG 3.8.2), there are four situations to be analysed. The *first* situation corresponds to countries with good access to health care (with or close to *universal* coverage) and good financial protection, namely, with a low percentage of the population with catastrophic health expenditures or low probability of falling into poverty due to high health expenditures. These countries, most of which are high or middle income, have been able in recent decades to carry out health reforms by creating financial protection mechanisms to health care spending, transforming their health systems to be more inclusive, adapting them to the use of new technologies and strengthening epidemiological surveillance systems to face epidemics and to prevent the emergence of chronic diseases in old age.

Even so, some of them face challenges in sustaining their gains, including through improving efficiency and ensuring equitable access. In many of these countries, maintaining UHC has become quite costly and fiscal pressures have led to consider and implement administrative reforms to increase the efficiency of the health systems.

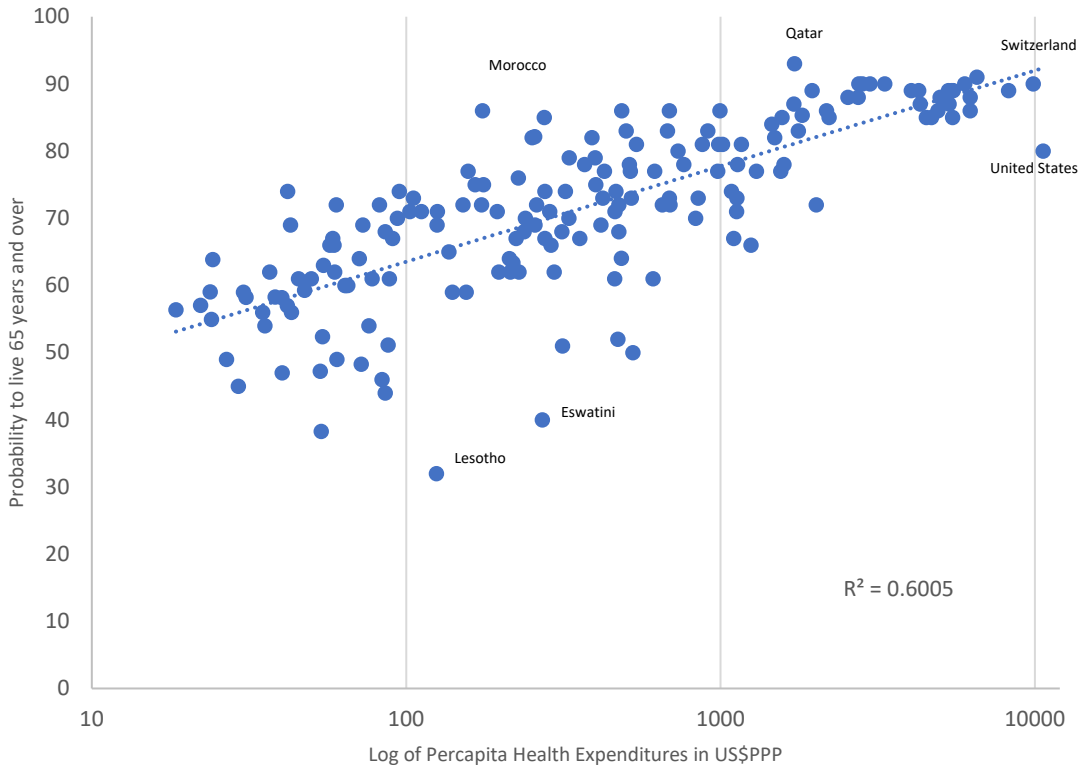
A *second* type of situation is that of countries which have achieved high service coverage but where the level of public sector financial protection is insufficient to avoid impacting family budgets, especially of households with older persons. This group consists of some HICs and UMICs, and many LMICs that need to implement financial reforms to their health systems to address this problem. For example, the treatment of chronic diseases such as diabetes or cardiovascular is exempt of co-payments in some HICs, such as Spain, Netherlands or Austria (which are in the first group). However, France has a means-test (an income threshold) for individuals or families to be eligible for full financial coverage (i.e., without any co-payment) for health services. This creates financial difficulties for older persons because medical expenses are higher at those ages (Arsenijevic and others, 2016).

The *third* situation—generally associated with LMICs and some LICs—represents countries with low coverage of services and weak financial protection of health care expenses. This situation is often associated with large inequalities due to segmented health schemes (for the military, civil servants, etc.) and fragmented health financing. Health services are mainly concentrated in urban or metropolitan areas and require high levels of OOP spending. These countries need reforms to integrate different health service delivery schemes using financial models that allow smooth transitions from one scheme to another without loss of in-service eligibility benefits and creating health protection mechanisms (through sponsored health insurance by government or tax-financed systems) for the majority of the population. Specific reforms on financial protection to address catastrophic health spending in old age are required. For example, data for Cambodia show that in 2014, older people spent 50 per cent more per month on health care than younger people. Catastrophic health expenditures among households with older people were associated to living in rural areas, and having a household member with an illness, especially a non-communicable disease. These factors were strongly associated with falling into poverty (Jacobs and others, 2016).

The *fourth* and last situation includes the majority of the LICs, characterized by low service coverage and precarious or inexistent financial protection. Some of the characteristics of the third situation such as fragmented systems and financing and high inequity in accessing health services are also present in this group of countries. Particular occupational groups, such as civil servants or employees of large companies may have at least basic health insurance and corresponding financial protection, but the majority of the population does not. These countries generally have more elementary priorities, they need basic health services and hospital infrastructure, qualified health human resources and supply chains to ensure basic goods and services delivery, including medicines. Even though they may have some of the required infrastructure and services in major urban areas, these countries typically have large, underserved populations in rural communities, small villages and in the periphery of urban areas. Somewhat paradoxically, catastrophic health expenditures in these contexts are less frequent due to lack of services delivery options. However, research in low-income countries like Burkina Faso has found catastrophic expenditures between 6 per cent a 15 per cent of family budgets (Su and others, 2006).

One of the critical aspects to ensure sustainability of health policies for the elderly is the cost of these services at the older ages. Overall health care costs (or expenses) are associated with the use of services, and they typically increase throughout the life cycle. Thus, population ageing adds to the challenge of the financial sustainability of UHC, especially in lower-income countries, by increasing cost throughout the simple growing share of the elderly population in the demographic structure. Figure 34 shows that there is some correlation between the probability of surviving to age 65 and per-capita health spending in 2018.

Figure 34. Correlation between probability of living 65 or over and current health expenditure per capita (USD PPP) in 175 countries, 2018



Source: WHO Health Financing Databases and World Bank Indicators. Both accessed on 6 June 2021.

Although generally higher, the per capita spending on health is associated with higher chances of surviving to age 65 years, there are important variations around this trend. For example, in 2018, the United States of America spent $10,624 per capita on health and had a 79.8 per cent probability of survival to age 65, while Switzerland spent less (US$ 9,871 per capita) but had a higher probability of survival to that age (90.4 per cent). Other countries, for example, Qatar, which spent only US$1,716 per capita on health in 2018, had a high (93.8 per cent) chance of surviving to age 65. Morocco and Bangladesh spent even less, only US$175 and US$42 per capita, respectively, and had a probability of surviving to age 65 of 86 per cent and 74 per cent, respectively. But more typically, lower-income countries have both low per capita spending on health and higher mortality, i.e., lower chances to surviving to age 65 years.

Several factors could explain this variability. Some of it is likely due to differences in the efficiency of financing and delivery of health services and in the distribution of expenditures across programmes. But most importantly, how risk factors—mainly behavioural and environmental but also metabolic—are collectively managed and reduced, are essential to explain the diversity of results. Reducing health illiteracy, namely providing good information and education to the population about healthy behaviours and risk factors, can be more efficient and cost-effective in the short and the long term to improve the

chances of people living longer and healthier lives. This is especially true in low-income countries such as those in sub-Saharan Africa which have the worst outcomes in these indicators. However, efficient service delivery systems, with the characteristics that will be described in the next sections, are also essential to achieve good results in healthy ageing processes.

Much of the increase in health care costs may be associated with the current curative model, including reliance on hospital inpatient care, especially for older people, that provides a large volume of health services, which include certain costly and sometime unnecessary procedures, such as surgeries, that could be treated by effective low-cost primary care interventions. Studies carried out over the last decade (Dormont and others, 2010) suggest that this trend has little relation to demography and is rather driven mainly by systemic issues, including the behaviour of institutions and actors of the medical system, propaganda influencing citizens' preferences and by the urge to disseminate expensive new medical technologies.

In sum, risk factors and medical practices explain much of the increases in health-care spending, and they are reinforced by population ageing. New and more holistic health policies, based on the promotion of healthy lives and primary care could improve the prospects for active and healthy ageing, generating benefits and less onerous costs. These constitute core policy areas to be explored by governments, the private sector and individuals themselves, as appropriate in each country, in the years to come.

VIII. Some lessons learned on health policies to address the needs of older persons

Considering current demographic trends and prospects for the coming decades, the world is heading towards a situation where it will soon have more older persons than children and an unprecedented number of people in the oldest ages.[21] What kind of policies are in place to ensure adequate financial protection and quality medical care for this population? What can health systems do to increase the chances that these older persons may enjoy years of life in good health? How will health systems help older persons to stay active and socially engaged in their last years and decades of life? This section will discuss some suggested policies and select country experiences to assess answers to these questions.

Some important elements to build a good health policy for older persons are:

(i) Financial Protection: Ensuring adequate financial protection through affordable and equitable health insurance programmes that meet the specific health standards and needs of older persons;

(ii) Managing NCDs: Designing cost-effective policies for healthy ageing by mitigating the development of NCDs during the life cycle and managing long-term NCD patients.[22] These policies should include health promotion, risk prevention, early detection, treatment of and rehabilitation from NCDs to improve health conditions of the older population, targeting in particular, the main risk factors that lead to heart disease, stroke, diabetes and cancer;

(iii) Health Information Systems: Developing adequate public health information systems and community-based health records, including demographic and epidemiological data, and electronic medical records for patients. [23] Artificial intelligence, information technology (such as

[21] Octogenarians, nonagenarians and centenarians.
[22] As seen before in most countries, independent of their income level, NCD are the main causes of mortality, morbidity and disability in old age. Unfortunately, most health systems in the world are designed to solve episodic acute care and much less so to manage long-term NCD at affordable costs.
[23] Comprehensive health information systems are also key for the design and implementation of effective health policies, but most LICs and LMICs do not have effective national information health systems or complete coverage of vital statistics, including the registration of births and death.

telemedicine) and big data systems, together with analytical tools to monitor and understand patterns of health, social relationships and well-being in old age should be deployed to make sure that older persons are effectively included in health protection policies, and;

(iv) Infrastructure and Virtual Access to Health services: Building well-located institutions, national infrastructure and easy access to in-person or online services to meet the health needs of the older population, ensuring that the services are covered by health insurance, thereby providing financial protection, access to quality services and to yield cost-effective health outcomes.

One important lesson learned has been that proper management related to the institution and maintenance of the aforementioned good health practices is essential. Additionally, the following principles have been found to be useful:

(i) The primary health care (PHC) approach plays a key role in meeting most of the health care needs of older persons, as it is the main source of communication, educational information, promotion, prevention, early detection and treatment of most of their health problems. PHC is also the best instrument for the management of older persons experiencing loss of autonomy and need long-term care. Effective PHC models require a multidisciplinary team to deal with diverse health care needs, including increasing illness complexity, disability and frailty. PHC is also the best channel to provide support for long-term or home-based care givers attending to dependent older persons;

(ii) Health education systems, including universities, technical education and community colleges, must be oriented to increase the qualified workforce on the frontlines to meet the needs of the older population, including community (voluntary or not) health workers. Most countries in the world do not have qualified workforce to meet the health needs associate with the ageing process, especially in PHC;

(iii) In the PHC centres and on the web, providing clear information and tools to respond to frequent questions and increase health literacy is essential to prepare the population, communities and older persons to understand and manage, as much as possible, their health risks and health symptoms. Improved health literacy also facilitates effective provision of services, including by family doctors when needed, and to schedule visits for prevention and early detection of health conditions common in old-age;

(iv) Governments need to assume primary responsibility to formulate policies, plans and supportive regulatory frameworks to address health environments for the older population and maintain active monitoring and evaluation of the results achieved by those policies, plans and regulations;

(v) Integration and continuum of health care are essential to efficiently allocate health systems resources to address the health care needs of older persons. The fragmentation of health care systems must be replaced by an *integrated care approach*, based on the population covered and centred on patient needs;

(vi) In addition to health-care systems and services proper, a more comprehensive approach of the social needs of older people, should involve and empower individuals, families and communities to actively engage in the management of their health, to make better informed decisions about their own health care and that of older persons' caregivers.

Not all of these policy recommendations have been fully implemented or thoroughly evaluated in most countries and further study will be needed to assess the feasibility and effectiveness of various approaches and measures to improve the health outcomes of older people in different settings. The studies cited in the next section give brief assessments of select policy areas.

A. Financial protection

In countries around the world, there is limited institutional, human and (most importantly for this section), *financial* capacity to meet the health needs of older persons, especially in poor countries where social safety nets are thin or vastly underfunded. That's why target 3.8 of the SDGs is such an important marker for improving the health of older persons, as it reflects an international commitment to universal health coverage, whereby people of all ages can have access to health services *without having to suffer financial hardship*.

Financial protection under universal health coverage means different types of funding sources and mechanisms. In some countries, extensive health coverage is based on (obtained thanks to) a *health insurance model*, providing a means-tested basic package of services, with various health plans that purchase services for their beneficiaries from a variety of health providers. In other countries, financial protection is based on a single, *national health system* financed by taxes, whereby government institutions purchase necessary services from a pool of providers based on the principles of equitable rights and access for all. Still, many other countries have been structured into *pluralistic systems* that combine public and private health insurance and, sometimes, private health insurance with tax-based public health systems (Londoño and Frenk, 1997). Financial protection is generally adapted to local socioeconomic, demographic and epidemiological characteristics, and each country's political economy. No single health care system project has proven to be absolutely better than another or a one-size-fits-all solution. Improvements are needed, from time to time, to adjust financial protection mechanisms to changing circumstances.

B. Managing NCD by PHC approach

Sri Lanka is an LMIC that has, since 2010, adopted a national policy and developed strategic framework for NCDs led by the Ministry of Health as part of its National Strategy for Elderly Health, initiated in 2006. According to a study by the Observatory of Health Systems Asia-Pacific Health and Policy (Karuna Pema and Abeykoon, 2016), the Ministry of Health, in collaboration with other stakeholders, is leading the strategy aimed at reducing premature mortality (for ages under 65 years) due to NCDs by 2 per cent per year over the following 10 years, through the expansion of curative services and individual and community health promotion. The goal is to reduce risk factors related to old age, extend life expectancy and improve the health conditions of the population aged 65 years or over. The core strategy was based on: (i) increasing the proportion of primary health facilities with trained professionals for diagnosis and treatment of NCDs; (ii) providing feasible and evidence-based guidance for the diagnosis and treatment of major NCD among patients attended in the PHC units; (iii) providing guidance on essential equipment and medicines for the diagnosis and treatment of major NCD, with due consideration of affordability; (iv) standardizing treatment to reduce the inappropriate use of medicines; (v) establishing a referral system and case-management strategies for NCDs to strengthen the connections between health workers at different levels; (vi) improving the management information system for NCDs; (vii) promoting prevention and health education; (viii) measuring gaps, progress and impact, by improving quality of diagnosis, case management and follow-up; (ix) supporting engagement and change of health-related behaviours; and (x) increasing motivation, skills and workforce competence on PHC.

The strategy had mixed results in terms of its implementation, due to lack of experts at the central level to manage the programme and the behaviour of professional bodies at services level. One fully satisfactory

result was the increased availability of medications necessary for the treatment of NCDs. However, mixed results were observed in the following aspects: (i) inadequate PHC infrastructure in most places and limited improvements realized due to insufficient budgetary allocations; (ii) screening for NCD has been implemented but utilization rates remain low, especially among older males; (iii) 95 per cent of the PHC facilities had qualified doctors in 2016, but there were shortages of nursing and paramedical staff; (iv) lack of lab investigation facilities and equipment made it difficult to evaluate progress on promotion, prevention and treatment strategies; (v) NCD guidelines were been poorly implemented due to the lack of staff training and auditing; (vi) timely references from the PHC centers to hospitals were adequate for acute cases, but there were delays of up to two months for non-urgent cases; (vii) NCD information systems captured data from the hospitals but lacked information about out-patient visits.

C. Health information systems and virtual access to health

In the HICs and UMICs, an increasing proportion of older persons are going online on a daily basis for multiple purposes, such as connecting with family and friends, making online purchases and searching a variety of information, including on health and making medical appointments. The pandemic has expanded this kind of activity, amplifying the use of the telemedicine and the response to medical surveys, including personal medical files and payment for health services received. Older persons often search for what matters most for their health, such as medication effects, wellness and mentoring on health issues.

All these behavioural changes and improved skills in using information technologies are a powerful driver to increase the effectiveness of health systems, to improve health literacy and administrative records of older patients. This represents a good opportunity to: (i) update institutional patients' records and give online access of them to all patients; (ii) provide easy access to diagnostics and specialized medical services, throughout remote access of test results; (iii) saving time and money of older people by reducing the need to commute to medical services; (iv) increase health literacy and provide educational benefits by easy access to medical information; (v) reduce unnecessary hospitalizations and emergency calls by the use of telemedicine; (vi) increase the feeling of security and independence by staying at home even while under constant medical supervision; (vii) increase awareness of health conditions by active participation in online prevention, diagnosis and treatment webinars; and (viii) reducing the burden of caregivers of disabled seniors.

However, the full benefits of improved health information systems are yet to become widespread. Especially in LMICs and LICs, much remains to be done to break key barriers, such as: (i) costly electronic devices and internet connectivity for older persons' budgets; (ii) limited skills to use information technologies, in some cases made more difficult by cognitive decline in old age; (v) cultural resistance to the use of IT and online resources instead of in-person-contact with doctors and other health-care providers; and (vi) age discrimination, that may sometimes lead to limited support that older persons need to effectively use IT resources and tools, especially those with hearing or visual impairments or dementia syndromes, such as Alzheimer's disease.[24]

D. Health infrastructure for the health care of older persons

Improving the health of older persons requires strengthening four major domains of the health care system: health workforce management and availability; accessibility to properly equipped health care service delivery units; public health programmes with integrated information systems; and health-related research. All countries, specially LMICs and LICs, face limitations in providing health services to older persons in one or more of the mentioned domains, due to inaccessible infrastructure or inadequate data collection, analysis and dissemination. These problems are more prevalent in small localities, rural

[24] About discrimination of older persons by medical doctors and staff, see United Nations (2019).

communities, isolated areas or in densely populated urban peripheries of metropolitan regions in poor countries.

E. Primary health care (PHC) and long-term care (LTC)

Extending effective PHC systems to older persons is not only a good strategy to improve their health status but is also likely to help contain or revert the increasing financial burden of health care for older persons. Prioritizing PHC for the health care of older persons requires to reengineer the administration of acute needs of older patients and connecting the PHC system more closely with long-term care (LTC) institutions and nursing homes, that will likely continue to increase rapidly in the next 30 years following the global trend of population ageing.

Long-term care and nursing home institutions have played an important role in managing disabled older persons in developed countries. These institutions are growing fast, in tandem with the overall ageing of populations not only in the HICs, but also in UMICs and LMICs. It has been well documented that nursing homes experienced disproportionate COVID-19 transmission and deaths of older citizens during the pandemic. This problem has been attributed to weaknesses in risk management and safety measures, that affected not only the residents but also the care workers and visitors. According to Thompson and others (2020), the United Kingdom of Great Britain and Northern Ireland, France, Spain, Belgium, Canada, and the United States of America reported significant to large fractions of deaths due to the COVID-19 coming from LTC and nursing homes. A lesson learned in this case, is that in addition to implementing more efficient risk management procedures, the establishment of national databases registering all nursing homes and monitoring the residents' health status would be of great help in the future. These databases/information systems can be very useful beyond the pandemic, to more continuously assess the care needs of this particularly vulnerable population group and institutions.

F. Health education for better health care of older persons

There is wide recognition of the importance of health promotion and wellness, especially by health-care providers working with older persons. Research related to wellness and the prevention of diseases has found these approaches to be especially effective for older persons, supporting lifelong healthy behaviours. Since older persons have especially high risk of NCD and disability, the education of the health workforce should place greater emphasis of these approaches, to more efficiently manage the special risks of and maximize the health benefits to older patients.

Major constraints to have a workforce well trained and prepared to promote wellness and the health of older people worldwide include inadequate quality of training, recruitment and retention of the health workforce and scarcity of professionals for family caregiving and community-based services. Improved evaluation and innovation in health-care processes and recruitment and training of teams experienced in integrated and continuum care would contribute very positively in this regard. In HICs and in some UMICs, there is a specialized (but insufficient) health workforce to attend older patients. In the LMICs and LICs, where most older persons are not covered by health institutions, the problems lie more with the difficulties in providing good quality care by older persons' families, neighbours or by others in the proximate community.

According to the Health Workforce Alliance of United States of America—HWA (2014), several factors contribute to the lack of interest and low retention rates of health workforce in the fields of geriatrics and gerontology. They include low wages, including fees paid by public insurance schemes such as the Medicare that provides health insurance coverage to the majority of the population aged 65 years or over.

Also, NCD multimorbidity among older persons generates additional demands on health workers, that are required to spend more time with older patients and require more team integration, including with family or other caregivers. Many health workers in this field feel underpaid and overburdened.

Conversely, in the majority of developing countries where fertility and family size are falling, the availability of family caregivers is on the decline and there is increasing demand for professionals in this field. In 2010, the caregivers support ratio in United States of America was more than seven potential caregivers for every person aged 80 years or over, but this ratio is projected to decline rapidly, to 4 to 1 by 2030. To face these issues, entities such as the HWA in United States of America are developing an advocacy toolkit for geriatrics workforce programmes and advising Congress on the need for a well-trained workforce to care for older adults. Specifically, HWA is promoting the preparation of the geriatric workforce for the Veterans Health Administration, for long a leader in geriatrics and gerontology in United States of America, managing programmes to improve the quality and efficiency of care for older adults and strengthening career development ("ladders") for home-care workers.

G. Reduction of health illiteracy among seniors

Health illiteracy is a problem present in all age groups, but it tends to affect disproportionately older adults, because of the rapid pace evolution of medical science and the complexities associated with managing chronic disease and, in some cases, also because of the cognitive decline associated with advanced ageing. In order to enhance comprehension and bring about positive health behaviour changes, health systems must use clear communication and a patient-centred approach that demonstrates acceptance, empathy of and respect for older adults.

Education to increase health literacy should prioritize the essential health needs across the life cycle through old age, providing information for individuals to lead healthy lives. Like in other areas, there is no "one-size-fits-all" solution or programme, but a range of measures and efforts can be undertaken to motivate and prepare older adults to maintain continuous learning about their health and self-care. Special attention should be given to align health concepts, values and beliefs that with medical knowledge and science, including the value of the management of older people´s well-being through health promotion and prevention. The maintenance and monitoring of follow-up treatment can be reinforced through communication routines and schedules for virtual or face-to-face medical appointments, when necessary, should also be part of this training.[25]

A systematic review of research and experiences to improve older adults' health literacy in the United States of America, (Chesser and others, 2016) found that the age and income were significantly associated with health literacy, in addition to race, which has always been an important factor in the country. Somewhat surprisingly, sex differences did not appear to be as closely related to health literacy among older adults. While it is clear that individuals with low health literacy often experience poor physical and/or cognitive health, the role of health literacy in medication management needs further attention. Routine health literacy screening in clinical care settings might be a useful additional tool in the care of older adults. Health literacy training is likely to improve health care decisions, patient and provider communication and satisfaction, compliance with treatment directions, improved health status and even cost savings to the older persons and to the health care system.

[25] A comprehensive guidance about how to improve health literacy at old age could be found in Kececi and Bulduk (2012).

H. Policies, plans and regulatory framework

Williamson (2015), in a study of health policies for ageing populations in East Asia and the Pacific Region, found that 22 of 26 countries studied had policies that explicitly addressed older persons' health and well-being. However, most of these policies were not part of a comprehensive health policy framework for ageing, but were rather fragmented, some focused on physical disabilities (22 out of 26 countries), on mental health (12 out of 26 countries), nutrition (15 out of 26 countries) and NCDs. Eight of the reviewed countries (Cambodia, China, India, Iran (Islamic Republic of), Malaysia, Nepal, Pakistan and Viet Nam) developed specific health policies focused exclusively on older population, such as tacking age-specific NCDs, support for older persons' access to health care and research and data collection to inform policy design.

India had implemented a policy to address health-care needs of older persons, developing specific infrastructure and training human resources, supporting families, reducing health-care costs, promoting affordable health care, designing protocols for palliative care and referrals to deal with age-related NCDs.

I. Integration and continuum of care with access addressing social needs

Pluralistic and segmented health-care systems tend to be complex, generating difficulties to access for patients requiring several levels of care, practitioners and delivery mechanisms. Health care for older persons is inherently complex, so health systems should try to simplify matters for individuals and their families. A fundamental step is to centre systems not on the health provider units, but on the patients, avoiding as much as possible health-care delivery in silos, which represent barriers in accessing different areas of care and make the transition between providers difficult or impossible for some older people and their families or other caregivers.

One approach to resolving this problem is the integration of providers through chains of "continuum of care" with interdisciplinary and interinstitutional collaborative teams. Their goal is to ensure that older patients will get the right care, by the right provider, at the right time and at the right place. For example, since 2019, Ireland is trying a new system of continuum health care for homecare for older persons (O'Shea, 2019). The pre-existing model of homecare/LTC in Ireland had several shortcomings, such as statutory coverage confined to residential care, uncertainty of community-based funding and limited availability of services in the communities. The pre-existing model was basically supply-driven, had persistent staff shortages and weak social integration. As a result of the rapid ageing of Ireland's population, the population 65 and over is projected to absorb half of all health care activity in the country by 2031. The forecast rise in requirements includes a 46 per cent increase in the demand for primary care and 39 per cent for homecare beds, and overall demand for homecare services increase of 70 per cent and for non-elective in-patient services in public hospitals by 24 per cent.

The new model is focused on the needs of older persons, offering more choices, greater flexibility, inclusion, engagement, connectedness, while respecting the preferences of individuals. The range of homecare options and choices offered by the new model include: (i) the use of own housing modified and adapted; (ii) home-sharing companionship in return for low rent; (iii) split housing with relatives/friends; (iv) regroup with another householder; (v) option of retirement villages with private living in communal settings; (vi) communal residency controlled or co-housing community; (vii) supportive house sheltered for independent living; (viii) housing with social care and technological supports; and (ix) residential nursing homecare plus housing with care and supports on site, and residential nursing care units. It will be interesting to learn about the implementation of this and other similar innovations in providing continuum of care.

IX. HEALTH CARE PROTECTION FOR OLDER PERSONS IN PANDEMIC TIMES: POLICY IMPLICATIONS, CHALLENGES AND PERSPECTIVES

Since the beginning of the pandemic, the United States of America has had a large number of COVID-19 cases and deaths. The country also has good statistics and administrative data to gage some of the demographic impacts of the COVID-19 epidemic. For example, an analysis by Haveline and Zen (2021), noted that COVID-19 may have produced a reduction of about 1.3 years in the life expectancy at birth in United States of America in 2020, and that the impact of the pandemic on overall mortality appears to be far greater than that of the HIV epidemic or of the worst three years of the opioid crisis.[26]

Despite concentrating a large number of deaths, the United States of America has not suffered the worse impact in terms of COVID-19 mortality. Larger reductions in life expectancy at birth, exceeding two years, have been estimated for Panama, Peru, cities or regions of Italy, Spain, United States of America and especially, Mexico City. However, the overall effects of COVID-19 mortality in population trends are still unclear. Because a large proportion, as much as 80 per cent, of deaths occur in people over the age of 70 years, it cannot have a major long-term impact on population dynamics. Part of the declines in births in 2020 that have been attributed to the pandemic may be more a postponement of childbearing rather than a sustained break from the trends in reproductive behaviour.

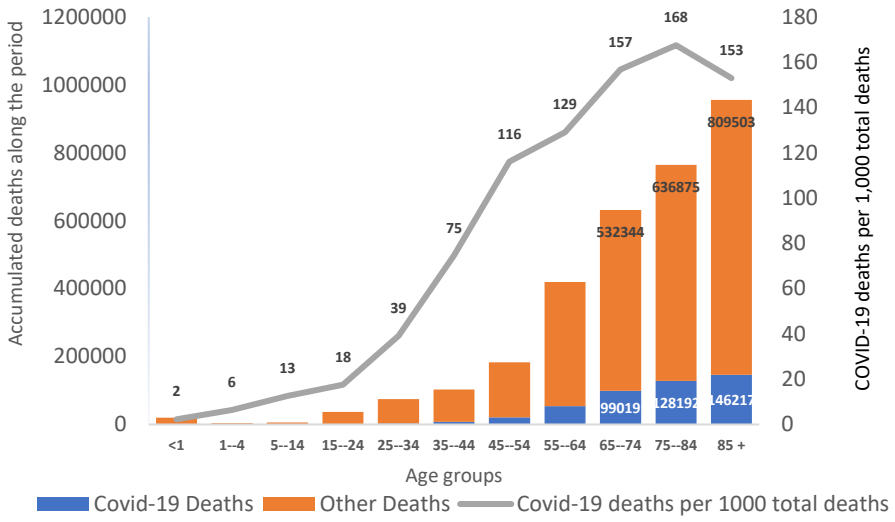
Freed and others (2020) estimated that 80 per cent of accumulated COVID-19 deaths (by July 2020) in the United States of America were of people aged 65 years or over. This proportion varied across states and regions, from 70 per cent in the District of Columbia to 94 per cent in Idaho. Additionally, the share of COVID-19 deaths in this age group was higher than the share of all deaths of the population aged 65 and over by all other causes in all states, except for Arizona, New York and Kansas, suggesting that the effect of the epidemic on life expectancy at age 65 may be larger than the effect on life expectancy at birth. However, this is not a consensus assessment; see for example Goldstein and Lee (2020) and Golubev and Sidorenko (2020).[27]

Figure 35 shows the age distribution of the total cumulative COVID-19 cases, as well as the age distribution of the total cumulative deaths from other causes and the proportion of total COVID-19 deaths per 1000 total deaths in the United States of America, by age group, between February 2020 and February 2021. The graph shows that the proportion of deaths due to COVID-19 among all deaths increases with age, going from 18 per 1000 in the 15-24 age group, to 168 per thousand, in the 75 to 84 age group, when it drops to 153 in the age group 85 and over.

By 9 June 2021, 1.4 million (or a bit more than 4 per cent) of the cumulative 34.9 million *cases* of COVID-19 in the United States of America had occurred in LTC institutions for older persons. However, 183.9 thousand (or 32 per cent) of the 574.6 thousand COVID-19 *deaths* occurred in the LTC institutions, and this proportion was over 50 per cent in some states (figure 36) reflecting the vulnerability of older persons living in these institutions, as noted earlier.

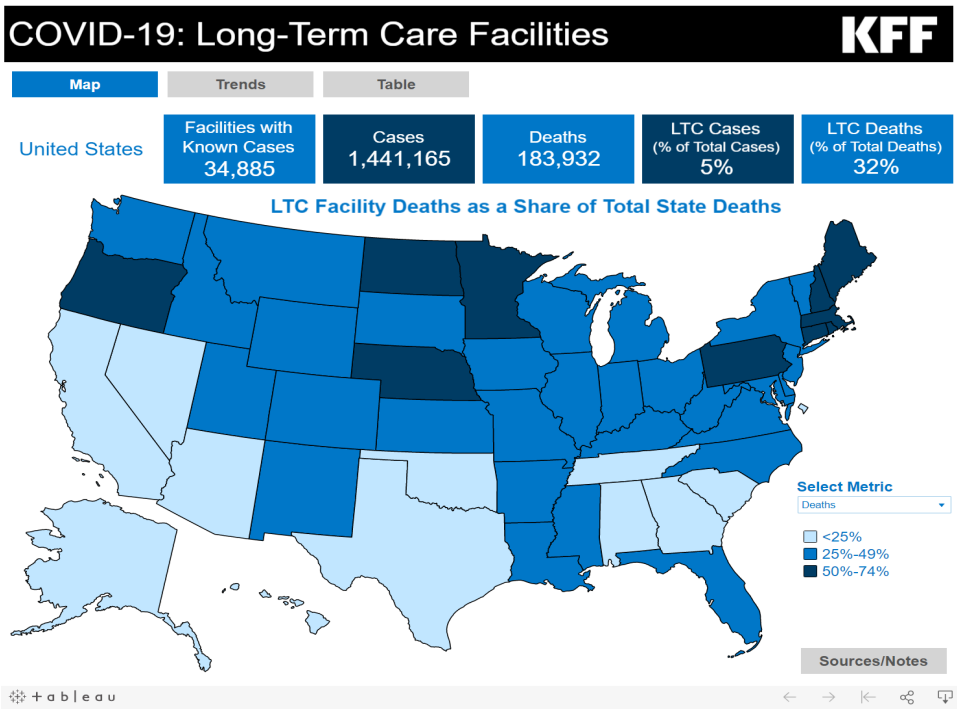
[26] These findings are roughly in line with analyses and projections made earlier in the epidemic except for a lower estimated reduction in life expectancy than, for example, in Goldstein and Lee (2020). Available at https://.pnas.org/content/pnas/117/36/22035.full.pdf.
[27] Goldsetin and Lee already cited in the previous footnote. Golubev and Sidorenko is available at https://pubmed.ncbi.nlm.nih.gov/32593259/.

Figure 35. Accumulated COVID-19 deaths, accumulated other deaths and COVID-19 deaths per 1,000 total deaths by age, United States of America, 1 February 2020-17 February 2021



Source: CDC, COVID-19 Deaths by Age.

Figure 36. Cases and deaths by COVID-19 in long-term care facilities in the United States of America by State, accumulated cases until 9 June 2021



Source: Kaiser Family Foundation (2021). Available at https://kff.org/coronavirus-COVID-19/issue-brief/state-COVID-19-data-and-policy-actions/#longtermcare.

An early policy brief issued by the United Nations in the first few months of the pandemic, in May 2020, noted that the majority of reported cases of COVID-19 (58 per cent of them) were of people under the age of 60 years, the deaths disproportionately affected older persons (United Nations, 2020). Later studies showed an increase in the prevalence of cases among older people (60 years and over). The higher risk of mortality among older persons is mainly due to comorbidities, which are more frequent at the older ages, and generate more severe COVID-19 cases. People in the more advanced ages tend to experience reduced functionality of multiple organs, including the pulmonary airways, negatively affecting the response of the respiratory system during lung infections. Advanced age is also associated with weakened immune system, which, added to other underlying chronic diseases, increases the risk of serious illnesses caused by COVID-19 infection.[28]

The COVID-19 pandemic created another (indirect) effect on morbidity and mortality of older persons, produced by the cancellation of elective medical procedures and surgeries, in hospitals and out-patient units following guidance or requirements for health services safety. Most of these cancelations have affected interventions related to NCDs, worsening the health conditions of older people and producing excess mortality due to NCDs during 2020 and 2021.

Data for other HICs and UMICs show different age patterns of COVID-19 risks than that of the United States of America, although, in all cases, the risk of mortality has proven to be much greater for older than for younger people. In China, the first country affected by the pandemic, data as of October 2020 (Islam and others, 2020) showed that 80 per cent of those who died due to the novel coronavirus were 65 years or older. In Italy, which was the second country with an outbreak of the disease, the reported case fatality ratio (of COVID-19 deaths to cases) until August 2020, was significantly higher than that in China (7.2 per cent versus 2.3 per cent), mainly due to Italy's more aged population. In Europe, at the end of April 2020, half of all COVID-19 deaths were associated with older persons living in institutions providing LTC.[29]

In LICs and LMICs, older persons are also more exposed to COVID-19 risks than younger people, although data on cases and deaths was more often incomplete and inaccurate. Older persons living in refugee camps, informal settlements, prisons and slums, are particularly at risk because the high population density of congregate living, exacerbated sometimes by lack of adequate sanitation, personal protective equipment, as well as more limited access to health services. In LIC, older women often provide most of the care for older relatives, increasing their risk of infection.

According to United Nations (2020), in addition to the risks of morbidity and mortality, older persons are more vulnerable than other age groups to the reduction or loss of income, especially for those who do not have a pension, and to suffer from depression and other mental disorders associated with increased isolation from their family, friends and communities. Physical isolation from their family can expose older persons to increased risk of abuse and negligence. Cases of violence against older persons were reported in various countries over the course of the pandemic. Many older persons living alone, especially at the more advanced ages, have difficulty or cannot effectively operate computers or mobile phones, which increases their degree of isolation.

The availability of COVID-19 vaccines since the end of 2020 has been a major breakthrough and a cause for optimism about the turning of the pandemic. Vaccines bring the promise to increase immunity, reduce and eventually stall the transmission of the disease in the months and years to come. Many countries are achieving so far, as of August 2021, high levels of vaccination using several COVID-19 vaccines. Priority to receive the vaccines were given to health professionals in the front-line, essential workers and

[28] In the LICs, LMICs and among disadvantaged older persons in UMICs and HICs, other risk factors include poor nutrition, dementia and various clinical complications, especially in frail and bedridden patients. However, many LICs and LMICs have not, at least so far, produced an accurate accounting of the cases and deaths by COVID-19 disease by age.

[29] In Ireland, according to BBC article of 23 April 2020 (https://bbc.com/news/world-europe-52399869) 45 per cent of the country's overall deaths happened in LTC institutions.

people in age groups (first and foremost, older persons) with higher risk of infection and death to COVID-19. The vaccination rollout has indeed proceeded much faster for older persons than for other groups in the HICs and some UMICs.

In some HICs and UMICs, additional priority in vaccination was given to LTC institutions. In the United States of America, the *Federal Pharmacy Partnership Program for Long-Term Care* was launched on 21 December 2020 to make COVID-19 vaccine available to employees and residents in qualified nursing, assisted living and other similar facilities.[30] In April 2021, the Program was closed after fulfilling its main objective, with 4.9 million doses applied and 2.9 million elderly residents in LTC fully vaccinated.

As of 9 June 2021, the United States of America had 76 per cent of people 65 years and older fully vaccinated and 87 per cent partially vaccinated against COVID-19, compared with 43 per cent and 52 per cent of the total population, respectively. As a result, rates of infection, emergency room visits, hospitalizations, and deaths associated with the pandemic have decreased significantly among older adults in the United States of America since March 2021. Given rapid vaccination rollouts in other HICs and in some HMICs, particularly among older persons, it seems possible that the epidemiological risks for older people in these countries could be substantially reduced by the end of 2021 and beyond.

In the LICs and LMICs, the slow pace of immunization and less prioritization on older persons could well produce a prolonged burden of COVID-19 mortality and morbidity among the elderly in these countries, despite the efforts of international initiatives such as the COVAX mechanism[31] and bilateral support for HICs to supply the poorest countries with their surplus vaccine production.

In sum, the COVID-19 pandemic has brought unprecedented challenges, amplifying pre-existing economic, social and health risks for the older population, especially among the poor. But if the crisis leads to renewed efforts to minimize these risks and address decisively the health needs of older persons, the world might be able to get back to the pre-pandemic trend of increasing healthy life expectancy and to better support older persons to lead more active, socially inclusive and satisfying lives.

[30] The Programme was sponsored by the Federal Government as a partnership between the CDC and several pharmacy chains (CVS, Walgreens and Managed Health Care Associates). The programme was implemented in close coordination with states, territories and local entities, LTC facilities, federal partners including the Centres for Medicare and Medicaid Services (CMS) and professional organizations including the American Health Care Association and Leading Age.

[31] COVAX is the vaccines pillar of the Access to COVID-19 Tools (ACT), co-led by CEPI, Gavi and WHO, alongside the key delivery partner UNICEF. In the Americas, the PAHO Revolving Fund is the recognized procurement agent for COVAX. It promises to provide vaccine doses for at least 20 per cent of countries' populations by diverse and actively managed portfolio of vaccines, which will be delivered as soon as they are available. COVAX aims at ending the acute phase of the pandemic by providing room for countries to rebuild their economies.

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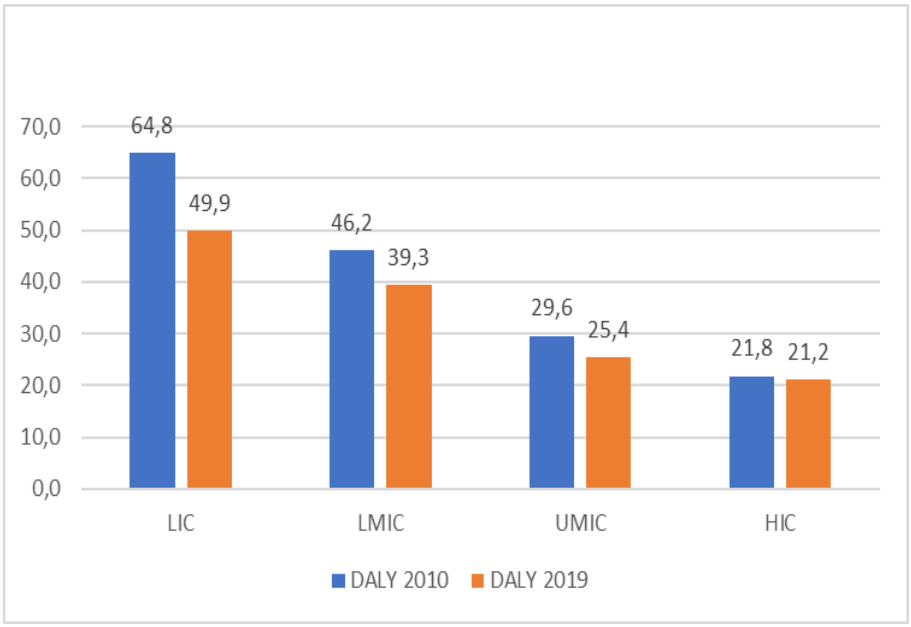
ANNEX I

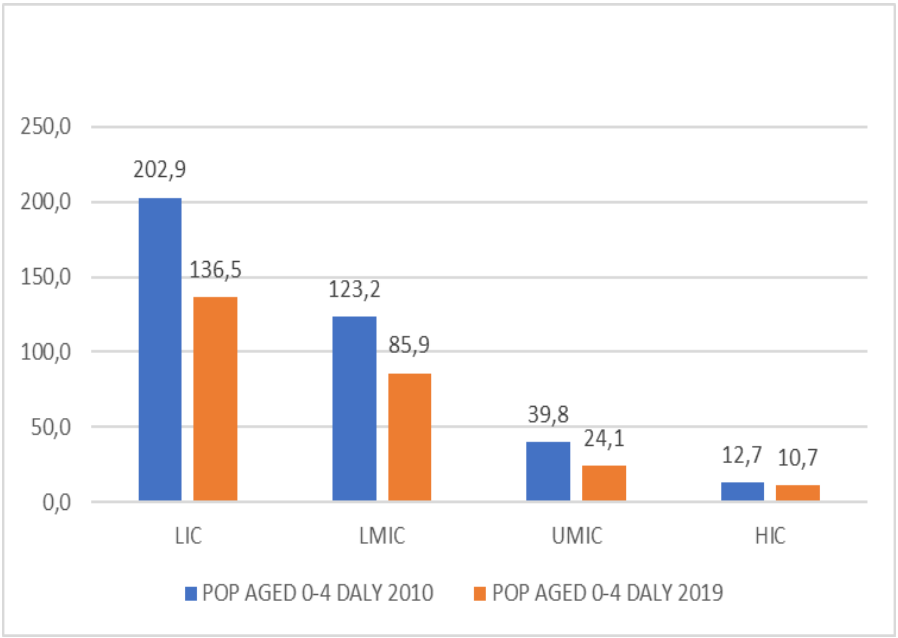
AGE SPECIFIC DISABILITY ADJUSTED LIFE YEARS (DALYS) BY INCOME GROUP

Figure A1.1. Age-standardize disability-adjusted life years by income level (per 100 persons), 2010 and 2019



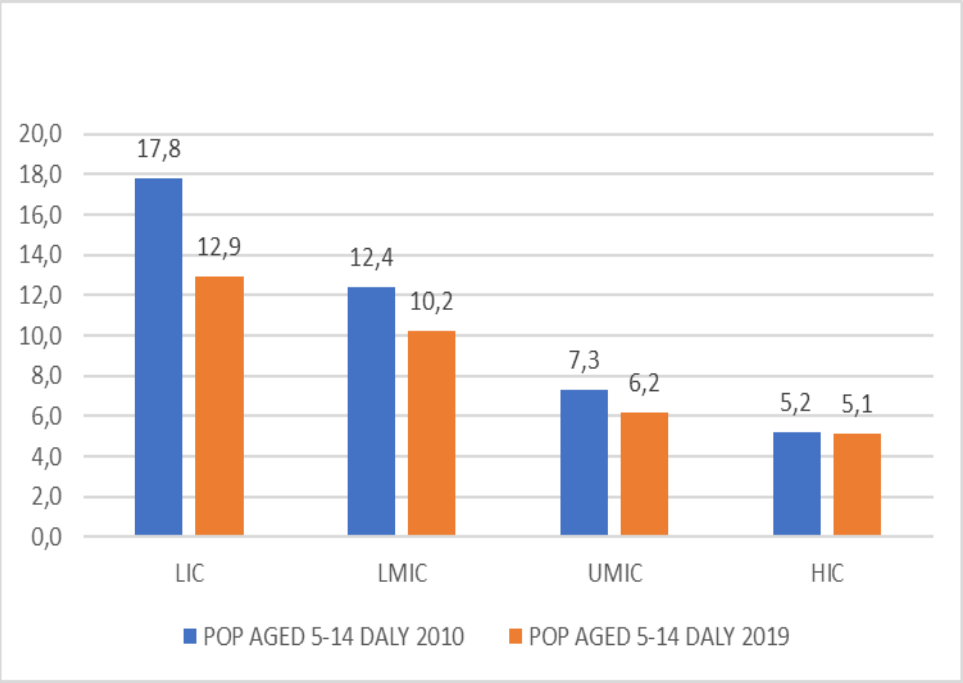
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A1.2. Disability-adjusted life years for population under 5 years old by income group, 2010 and 2019



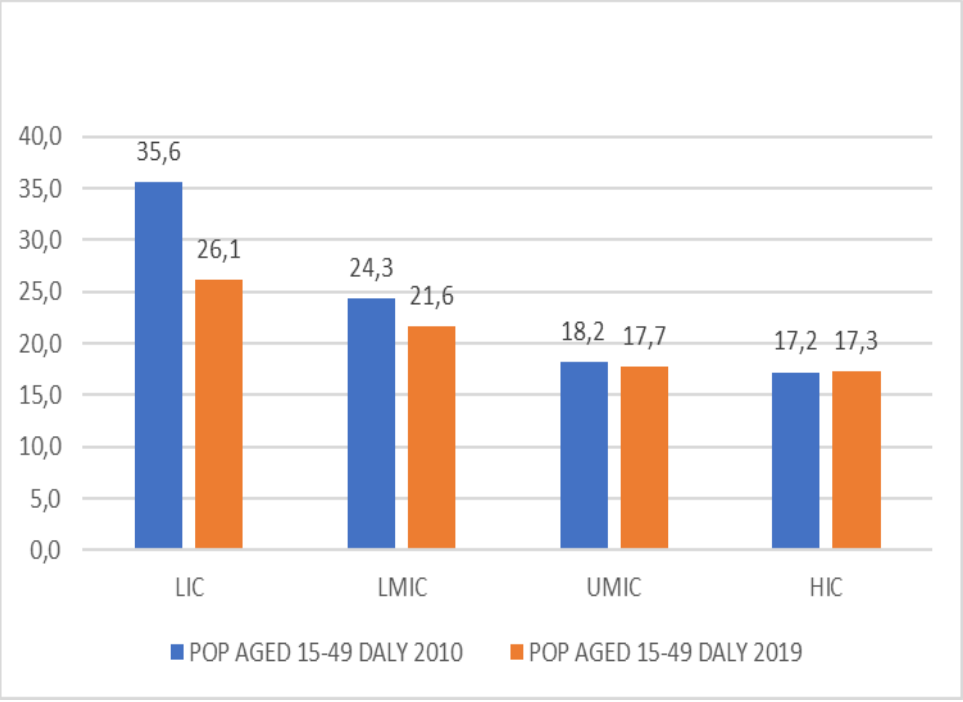
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A1.3. Disability-adjusted life years for population aged 5-14 by income group, 2010 and 2019



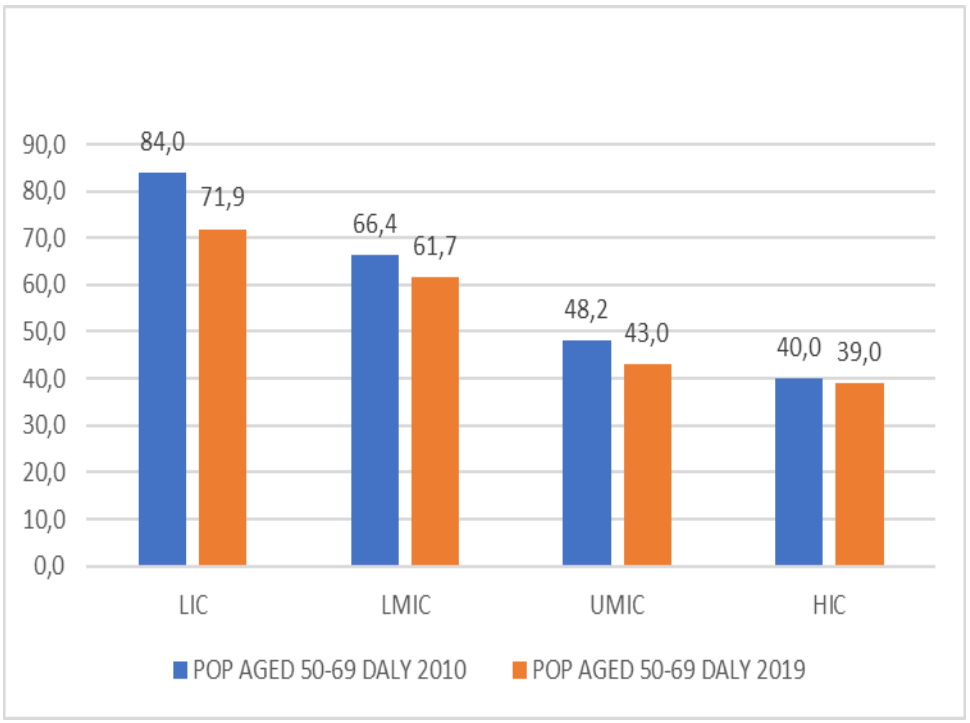
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A1.4. Disability-adjusted life years for population aged 15-49 by income group, 2010 and 2019



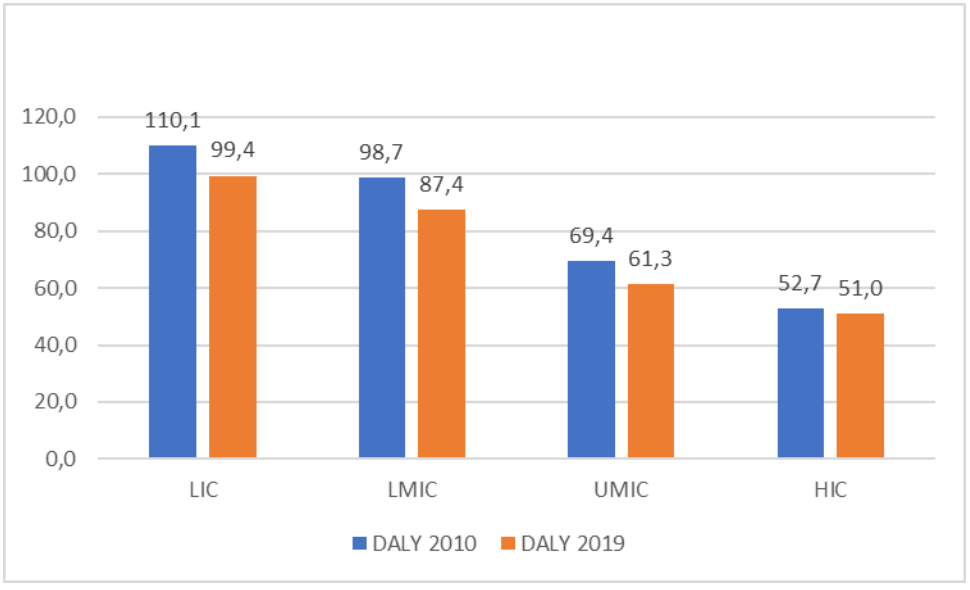
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A1.5. Disability-adjusted life years for population aged 50-69 by income group, 2010 and 2019



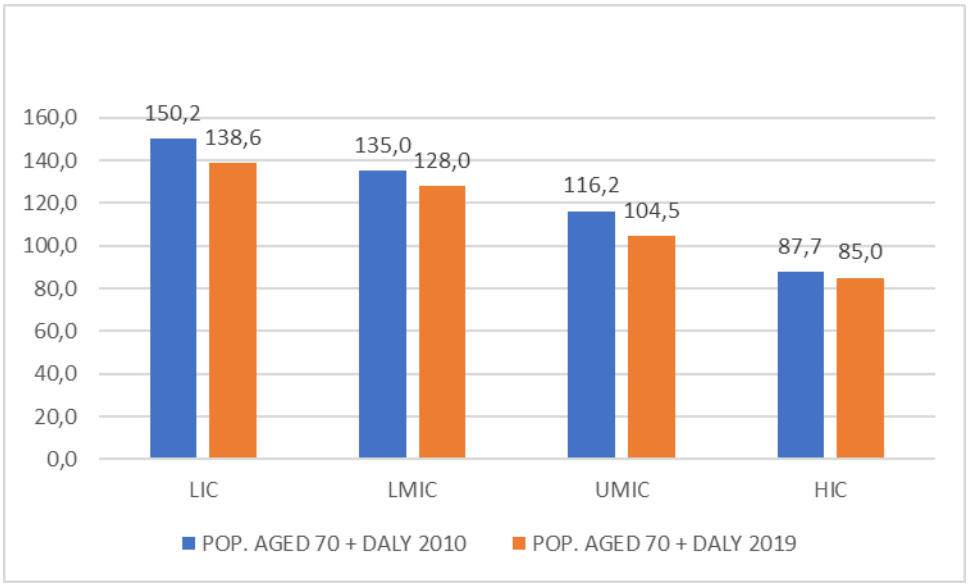
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A1.6. Disability-adjusted life years for population aged 65-69 by income group, 2010 and 2019



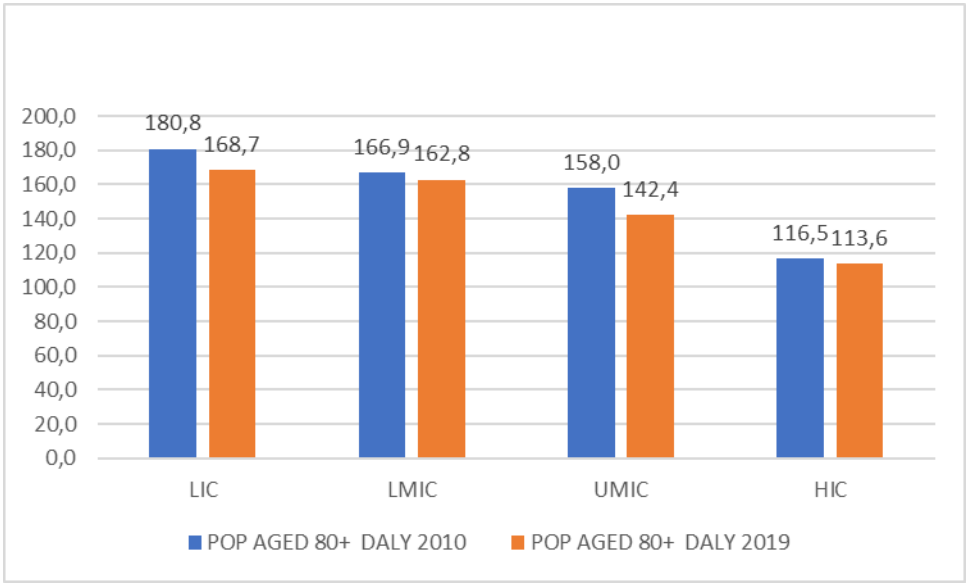
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A1.7. Disability-adjusted life years for population aged 70 or over by income group, 2010 and 2019



Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A1.8. Disability-adjusted life years for population aged 80+ by income group, 2010 and 2019

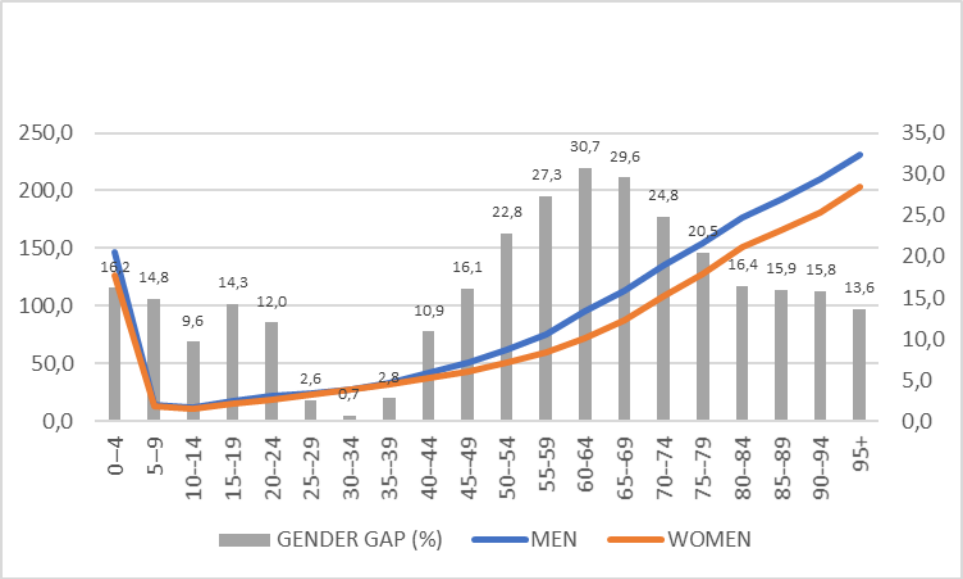


Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

ANNEX II

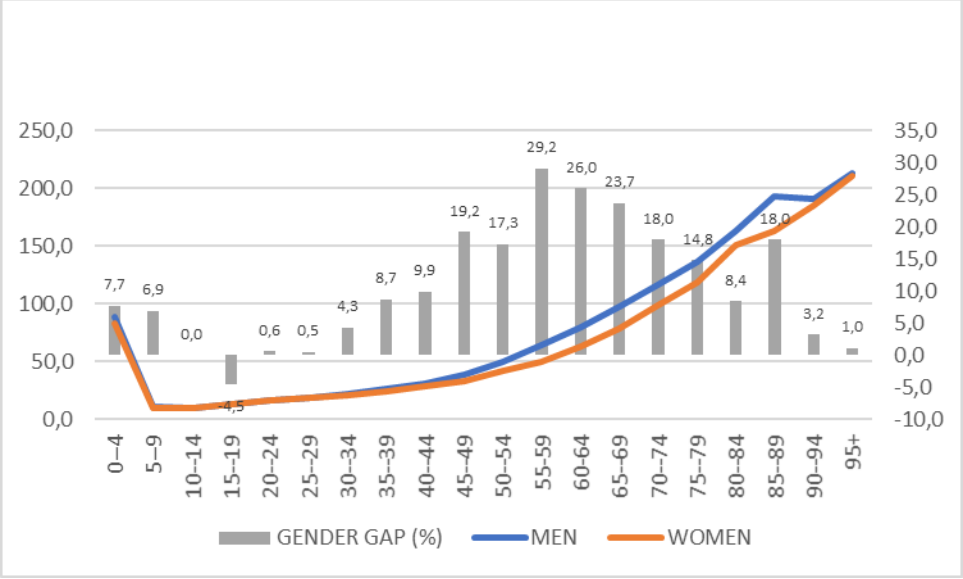
AGE SPECIFIC DISABILITY -ADJUSTED LIFE YEARS (DALYS) BY SEX AND INCOME GROUP

Figure A2.1. Disability-adjusted life years by age and sex and gender gap (men DALY/women DALY) for low-income countries, 2019



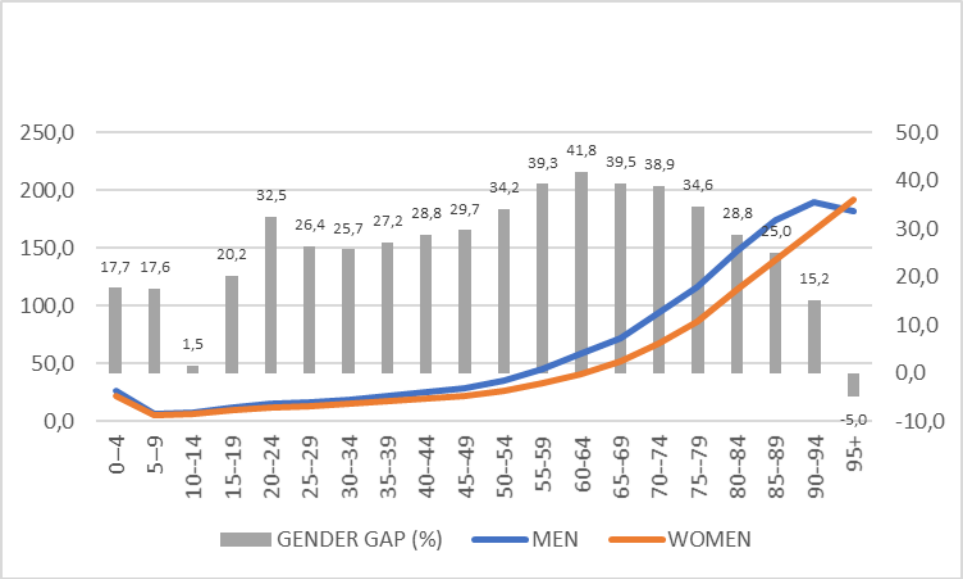
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A2.2. Disability-adjusted life years by age and sex and gender gap (men DALY/women DALY) for lower –middle income countries, 2019



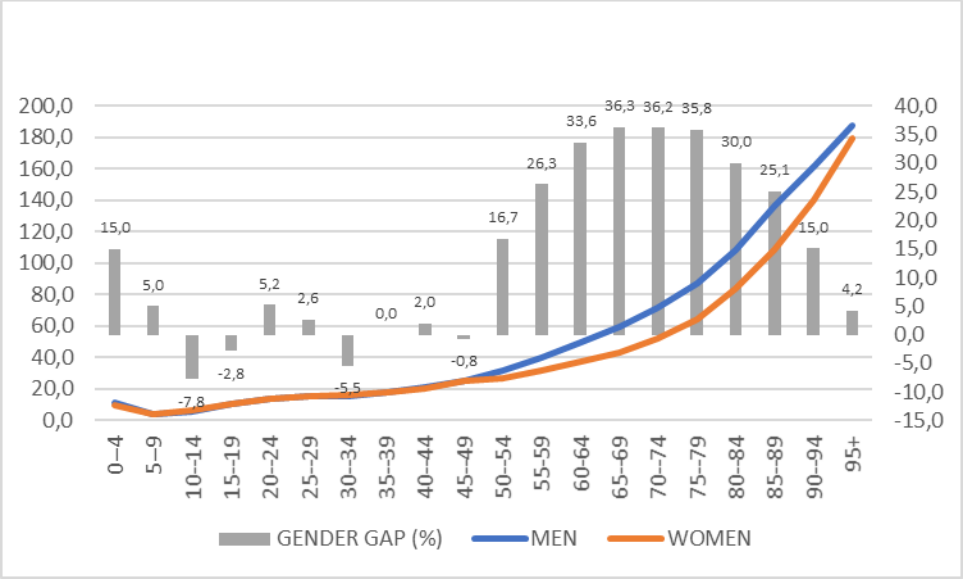
Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A2.3. Disability-adjusted life years by age and sex and gender gap (men DALY/women DALY) for upper-middle income countries, 2019



Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

Figure A2.4. Disability-adjusted life years by age and sex and gender gap (men DALY/women DALY) for high income countries, 2019



Source: Authors' elaboration based on data from the Institute of Health Metrics and Evaluation. Accessed on 10 May 2021.

ANNEX III

Issues on access to NCD care services and achieving universal health care

However, the information about NCD access service coverage index is not easy to measure or interpret. According to WHO, population-level risk estimates may not directly reflect patterns in treatment coverage or disease control and, this has implications, not only for how well the NCD component of the UHC Service Capacity Index captures country performance on NCD service coverage, but also for how the progress on this indicator has been monitored (WHO, 2019). Even so, preliminary correlations shows that the greater the access to coverage of NCDs screening, the lower the number of DALYs lost for the population aged 70 and older.

Within each country, inequalities in access to health services in old age are also due to other determinants, such as socioeconomic status and patterns of behaviour. Even in high-income countries like the United States of America, where UHC is virtually awarded to people aged 65 and over and poor citizens, through public health insurance programmes such as Medicare and Medicaid, elderly people living in poverty received worse health care than high-income seniors, according to 47 per cent of health quality measures monitored by the Agency for Health and Quality (AHRQ). These indicators show that people 65 and older generally received the worse care than adults from 18 to 44 years, according to 39 per cent of health quality measures (AHRQ, 2012).

Moreover, elderly people belonging to ethnic and racial minorities may be at high risk to face access barriers to services as well as to have adverse health behaviours. Having generally low levels of health literacy, they become reluctant to use health services, to perform preventive procedures and to be served by other health promotion activities. (Fredriksen-Goldsen and others, 2014). In other words, achieving universal health coverage does not necessarily mean equal quality of care. Efforts to improve equity in access to health must continue even after UHC be established.

The latest WHO reports on UHC are not optimistic about how SDG 3.8 can be achieved by 2030. According to them, progress toward that goal has slowed since 2010 and countries are required to strengthen their health systems at a faster pace to reach this goal, and especially to sustain solid gains in the accessibility of NCD services.[32] This trend has been recently intensified by the COVID-19 pandemic during 2020 and 2021, which expands the difficulties in achieving universal health coverage by 2030, due to reduced access to regular health services and increasing morbidity and mortality for a large part of the population worldwide throughout the pandemic. This slowing pace of UHC implementation has imposed some negative implications for health coverage of the older populations.[33]

[32] According to WHO (2019), in 2017, between one third and half of the world's population (33 per cent to 49 per cent) was covered by essential health services, but the real slow pace of global health coverage was offset by population growth.

[33] In 2017, about 25-65 per cent of women aged 50 to 69 in the HICs and UMICs did not undergo mammography screening in 2017 (OECD, 2019). The average influenza vaccination rate among the elderly population decreased among OECD countries from 49 per cent in 2007 to 42 per cent in 2017. Influenza vaccination rates for older citizens were less than 10 per cent in Estonia, Latvia and Turkey. Only the Republic of Korea attained the 75 per cent target recommended by WHO, with a coverage of 82.7 per cent (WHO, 2019).