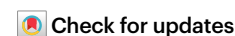


# A global roadmap to seize the opportunities of healthy longevity

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The US National Academy of Medicine (NAM)'s first global grand challenge is dedicated to healthy longevity. We summarize the NAM's *Global Roadmap for Healthy Longevity*, highlighting evidence that societies can benefit from untapped human, social and economic capital through investments throughout the life course.

We are undergoing a demographic revolution. Societal investments in human capital development – health, education and poverty alleviation – have led to substantial increases in life expectancy in every country of the world, and declines in fertility have amplified the increased ratio of older to younger individuals. Global life expectancy at birth and at 65 has risen from 47 and 76 in 1950 to 73 and 82 at present, and is projected to rise to 77 and 84 by 2050 (refs. 1–3).

The unprecedented success of longevity interventions puts low- and middle-income, as well as high-income, countries on paths to becoming aging societies, in which the number of individuals aged 65 and older is equal to the number aged 15 and younger<sup>4</sup>. Countries, such as China, that have seen both increasing longevity and major declines in fertility are experiencing a particularly rapid transition.

These marked changes in population distribution have raised grave concerns that the needs of older individuals will overwhelm societies, and could consume resources that are needed for younger individuals and for other priorities. These concerns exacerbate longstanding ageism (in which age is used to categorize and divide people in ways that lead to harm, disadvantage and injustice, and erode solidarity across generations<sup>5</sup>) and are thought to escalate intergenerational tensions and build resistance to investing in the potential opportunities of longer lives – which could benefit those of all ages, and society. Compounding this are numerous negative assumptions about the older population as uniformly dependent<sup>6</sup> or deficient in capabilities of value to communities<sup>7</sup> that are not supported by the evidence.

As we assess the evidence for both the opportunities and needs of our demographic revolution, and the costs of inaction, a central question is whether we must choose between younger and older individuals or whether we can design societies for longer lives that benefit all.

There are two challenges to be understood: (1) how to maintain health and function across our longer lives such that lengthening lifespan is not also a lengthening of illness span, and (2) how we can realize the opportunities offered by a long-lived and healthy population. We are at a critical inflection point, perhaps even a “precipice between an optimistic future of healthy longevity and avoidable disability and social challenges”<sup>8</sup> and our current negative assumptions. With most



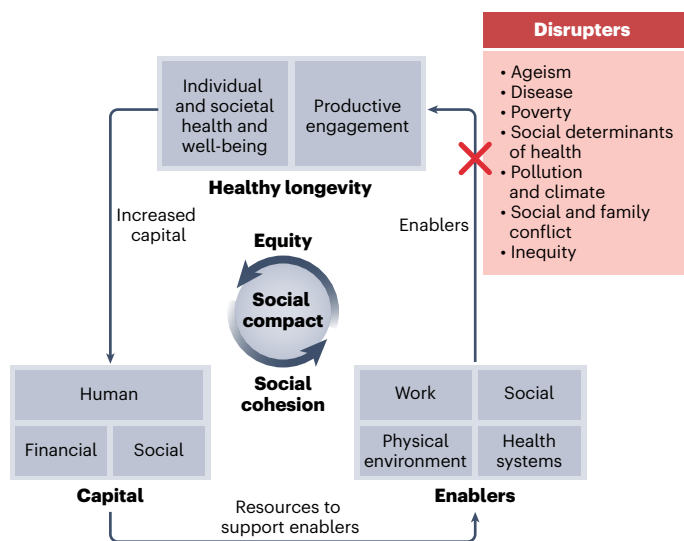
**Fig. 1 | Relevant actors for an all-of-society approach to healthy longevity.** Healthy longevity requires government leadership and cooperation across all sectors. Adapted with permission from figure S-2 of ref. <sup>8</sup>.

countries expected to be aged societies (with more than 15% of the population aged 65 and older) by 2050, the lead time is short. With no country fully prepared, the time to begin is now.

## Generating a global roadmap for healthy longevity

Building from this background the NAM took on these issues as its first-ever grand challenge, as a critical issue of import and urgency for us all. In 2018, the NAM empaneled an international, independent and multidisciplinary commission to create a global roadmap for healthy longevity, complete with evidence-based, targeted and actionable recommendations to move societies forward from an almost-exclusive focus on ‘coping with aging populations’ toward enabling individuals and societies to age successfully, and to reap the economic and societal benefits of longevity. The commission offers a way forward for governments and societies by beginning with recommendations for the next five years, and how these solutions can be financially sustainable through the creation of a virtuous cycle.

To support these goals, the commission was to “(1) comprehensively address the challenges and opportunities presented by global aging population; (2) catalyze breakthrough ideas and research that will extend the human healthspan; and (3) generate transformative and scalable innovations world wide”<sup>8</sup>. The resulting comprehensive report, which was delayed in good measure by the COVID-19 pandemic, was released in June 2022 (ref. <sup>8</sup>). We report here a summary of the high-level vision, goals, findings and recommendations of this global roadmap.



**Fig. 2 | The virtuous cycle of healthy longevity.** Healthy longevity (top) is an outcome of a virtuous cycle, itself contributing to capital development (bottom left). Bottom right, capital (human, financial and social) supports enablers (work, physical environment, health systems and social infrastructure). The enablers propel the cycle, contributing to healthy longevity. Intentional investment for healthy longevity across all enabling sectors will create new capital that will benefit all of society. Adapted with permission from figure 1-4 of ref. <sup>8</sup>.

**The evidence for opportunities of longevity and the costs of inaction.** We are seeing longer lives with increasing years spent in ill health (that is, the decompression of morbidity)<sup>9</sup>. The implications of longevity without health are costly ones for the individual, their families and for society. By contrast, scientific evidence shows that the majority of chronic diseases are preventable, and that prevention works at every age and stage of life. Further, the subset of individuals who are the beneficiaries of cumulative health-promoting conditions across the life course are demonstrating healthy longevity, defined as “the state in which years in good health approach the biological lifespan, with physical, cognitive and social functioning, enabling well-being across populations”<sup>8</sup>. However, only a minority of people in any country have the benefit of the necessary investments that promote health, and disparities in access to these investments across the life course are a major cause of unhealthy longevity. The costs of inaction in the face of widening disparities include the high risk of young people aging with more ill health, and the attendant costs to them and society.

Further, the commission reports that when people have health and function in older age, the considerable cognitive and socioemotional capabilities and expertise that accrue with aging, and the prosocial goals of older age, constitute human and social capital assets that are unprecedented in both nature and scale. Contrary to disproven myths, workforce participation not only brings these valuable capabilities (such that intergenerational teams in the workplace are more productive and innovative than single-age-group teams), but older people working is also associated with more jobs for younger individuals<sup>10</sup>. In the USA and EU, it has been shown that older adults contribute 7% of gross domestic product (GDP) through paid work and the economic value of volunteering and caregiving<sup>11</sup>, even before opportunities are specifically expanded for the increasing older population. Societies that recognize this potential and invest to create both healthy longevity

and the societal organizations and policies through which older adults can contribute to societal good will develop the opportunity for all ages to thrive. The return on investment will be to create older ages with health, function, dignity, meaning, purpose and opportunities – for those who desire it – to work longer, care for others or contribute in ways that they value to their community and future generations.

**The definition, principles and vision of ‘Vision 2050’ for healthy longevity.** The global roadmap builds on the WHO ‘Decade of Healthy Ageing’, the UN Sustainable Development Goals for 2030 and other reports. It sets out principles for achieving healthy longevity using data and meaningful metrics to track achievement of outcomes and guide decision making. The report offers a vision empowered by the evidence: that, by 2050, societies will value the capabilities and assets of older people; all people will have the opportunity to live long lives with health and function; barriers to full participation by older people in society will have been solved; and that older people, with such health, will have the opportunity to engage in meaningful and productive activities. In turn, this societal engagement will create unprecedented social, human and economic capital, contributing to intergenerational well-being and cohesion, and to GDP.

**Implementing Vision 2050.** Accomplishing this vision demands ‘all-of-society’ intent – with aligned goals for healthy longevity and transformative action across public, private and academic sectors, and all of civil society and communities – and the implementation of evidence across the full and extending life course. Transforming only one component or sector (for example, health systems) will not be sufficient to create healthy longevity or its full opportunities. Rather, given that nations are complex systems, this vision for our future requires governmental leadership and transformation of all sectors of our complex societal system (Fig. 1).

Investment for healthy longevity – across the enabling sectors of health systems, social infrastructure and protections, the physical environment, and work and volunteering contributions – will require intentional planning and leadership to transform those components in tandem, and to resolve disrupters such as ageism, the social determinants of health and inequity, and pollution. These investments across all sectors will create the conditions for achieving healthy longevity and build new capital (human, social and economic) that will benefit all of society. As a result of these investments, society will see younger people thrive and move into a position to age with healthy longevity; those individuals who are already older will be recognized as valuable contributors to society in a ‘pay-it-forward’ stage of life. The underpinning social compact between citizens and government will support valuing each age group’s capabilities and goals, and the building of a society of well-being and cohesion across generations. This is at the center of the virtuous cycle for healthy longevity (Fig. 2)

**Goals for initiating the transformation to healthy longevity.** The commission identified the following changes that should occur from now to 2027 to start transformation of all of society, towards Vision 2050 and the creation of healthy longevity for all:

- Creating social cohesion, social engagement and addressing the social determinants of health through social infrastructure are among the most effective determinants of slowed aging and the prevention of chronic conditions across the life course. Financial security in older age is essential for all.

## BOX 1

### Goals for 2022–2027 to initiate the transformation to healthy longevity

These goals are reproduced from *Global Roadmap for Healthy Longevity*<sup>8</sup>.

#### Social infrastructure

- Develop evidence-based multipronged strategies to reduce ageism against all groups.
- Develop plans for ensuring basic financial security for all older people.
- Develop strategies to increase financial literacy and mechanisms for promoting working longer, pension options and savings over the life course.
- Plan opportunities for purposeful and meaningful engagement by older people at the family, community and societal levels.

#### Physical environment

- At the societal level, improve broadband accessibility to reduce the digital divide and develop public transportation solutions that address first- and last-mile transportation.
- At the city level, implement mitigation strategies to reduce the negative effects of the physical environment and related emergencies on older people (for example, air pollution and climate-induced events, including extreme heat and flooding) and design environments for connection and cohesion.
- At the neighborhood level, promote and measure innovative policy solutions for healthy longevity, including affordable housing and intergenerational living, zoning and design for connection and cohesion, and the enabling of social capital.
- At the home level, update physical infrastructure and policies to address affordability, provide coliving arrangements that match people's goals and needs, and resolve insufficiencies and inefficiencies in housing stock.

#### Health systems

- Establish healthy longevity as a major goal.
- Increase investments in public health systems, which are needed to promote health and prevent disease, disability and injury at the population level, across the full life course. This may require rebalancing investments between this type of public health and medical care, recognizing that such public health is a public good and, as such, tends to be underinvested in.
- Provide adequate primary care that includes preventive screening, addresses risk factors for chronic conditions and promotes positive health behaviors, and offers a continuum of medical care, including geriatrically knowledgeable care for older adults.
- Make culturally sensitive, person-centered and equitable long-term care systems available, which (to the degree possible) offer dignity and honor people's preferences about care settings.

#### Building the healthy longevity dividend

- Governments, in collaboration with the business sector and civil society, should design (1) work environments and develop new policies that enable and encourage older adults who want or need to remain in the work force longer, and (2) engagement opportunities that strengthen communities at every stage of life.
- Governments, employers and educational institutions should prioritize redesigning education systems to support lifelong learning and training, and invest in the science of learning and training for middle-aged and older adults.
- Pilot innovations that incentivize and allow middle-aged and older adults to retool for multiple careers and/or participate as volunteers across their lifespan in roles with meaning and purpose.

- Governments, the private sector and civil society should partner to design physical environments and infrastructure that are user-centered, and function as cohesion-enabling intergenerational communities for healthy longevity. Initiatives should focus on the inclusion of older people in the design, creating public spaces that promote social cohesion and intergenerational connection as well as mobility, physical activity and access to food, transportation, social services and engagement.
- By 2027, governments should develop strategies and plans to arrive at adequately sized, geriatrically knowledgeable public health, clinical and long-term care workforces, and an integration of the pillars of the health system and social services. Together, these dimensions would foster and extend years of good health and support the diverse health needs and well-being of older people.
- Governments should work to build the dividend of health longevity in collaboration with the business sector and civil society, to

develop policies, incentives, and supportive systems that enable and encourage lifelong learning, and greater opportunities and necessary skills to engage in meaningful work or community volunteering across the lifespan.

We summarize the commission's recommended goals for each of these sectors in brief in Box 1. Across all sectors, the key first steps that the commission identified are ones that can resolve obstacles to change and plan the change needed to shift multiple complex systems through both top-down and bottom-up approaches, in ways appropriate to each country and context. These initiatives should create enough momentum to foster early returns on investment and optimism to propel sustained investment for subsequent stages. This would need to begin for all governments by 2023, establishing calls to action to develop and implement data-driven, all-of-society plans to build the systems, policies, organizations and infrastructure needed, and for tracking change.

## Conclusion

The commission highlights the evidence and action required if societies are to realize healthy longevity. This is an unprecedented opportunity that, if missed, will be increasingly difficult to realize as populations age with attendant ill health.

Enabling healthy longevity will result in the generation of substantial social and economic benefits for all ages from people living, working, volunteering and engaging for longer. Younger generations will have the opportunity to thrive through the creation of a lifetime of healthy longevity, with increased multigenerational support and mentorship and increased jobs for all from a strengthened economy.

By contrast, the costs of inaction are high: globally, we are at risk of a continuing increase in years of ill health associated with longevity and widening disparities across the socioeconomic spectrum. Further, current approaches – framed by ageism and outdated policies and practices – forfeit the benefits to all from the capabilities of older adults with healthy longevity. And, finally, for individuals who are aging, the illness burden, loneliness and isolation and lack of dignity, purpose and value currently experienced threatens the personal value of these added years of life.

The NAM commission recognizes that having created longevity, a realistic future can be an optimistic one with the potential of all of us to age with health and to contribute the human, economic and social capital for a longevity dividend that will transform society for the better: “To the extent that healthy longevity is accelerated on a global scale, a social resource can be developed that has never existed in human history: age diverse societies that build on the complementarity of skills and qualities typical of both younger and older”<sup>11</sup>. The success of this goal depends upon all of us working together to achieve the promise of healthy longevity by enabling all sectors and all countries to cooperate for transformation, with equity of opportunity at the center of solutions.

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## Author contributions

All authors contributed to the writing of this paper.

## Competing interests

The authors declare no competing interests.