

REVIEW

A review of healthy aging in China, 2000–2019

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Abstract

In 2021, China became an aged society when the share of its elderly population (age 65 years and above) exceeded 14%. In China, as in other upper-middle-income and high-income countries, life expectancy gains are increasingly concentrated at older ages with below-average health and economic activity. Governments worldwide are hence actively pursuing healthy and productive aging. Healthy aging by some measures is taking place. Similar with other upper-middle-income countries, China's young old in their 60s are healthier than the same age group two decades ago. The picture is more complex for the older age group (70 years and above). Although there is a substantial decline in leading disease burdens such as stroke and chronic obstructive pulmonary disease, diseases such as Alzheimer's and other dementia are on the rise. To meet the challenge of a rapidly aging population, China's healthy aging agenda should improve its multipronged approach that seeks to promote healthy lifestyles, enhance the healthcare system, create age-friendly communities, and tackle socioeconomic and health disparities.

KEYWORDS

disability-adjusted life year, disease burdens, healthy aging, life expectancy, morbidity

1 | BACKGROUND

China became an aging society in 2000 as the share of its elderly population—the age of 65 years old and above—surpassed the benchmark of 7%. It reached another milestone in 2021 when that share doubled to 14.2%, marking China's demographic transition into an aged society [1]. China's rapid population aging has been driven by declining fertility and growing longevity. After decades of decrease, its total fertility rate had dropped to a very low level in 1.3. Meanwhile, its life expectancy (LE) at birth has

increased steadily, from 71.4 in 2000 to 74.8 in 2010 and 77.9 in 2020 [2].

Globally, growing longevity is viewed as an accomplishment, achieved through sustained economic and social development. On the other hand, it has brought about unprecedented challenges such as rising health costs, which are normally higher for older adults than for young and midlife adults. The healthcare system has to reconfigure itself due to the epidemiologic transition from acute infectious and deficiency diseases to chronic noncommunicable diseases. A bigger challenge is whether the aging (or aged) society can provide enough

List of Abbreviations: DALYs, disability-adjusted life years; HALE, health-adjusted life expectancy; LE, life expectancy; WHO, World Health Organization.

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workers to care for the elderly and generate enough economic resources to finance pension, health care, and social care. The issue boils down to the relationship of LE, health, and productivity.

In the 20th century, LE gains in developed societies were concentrated at life stages with better health and productivity. LE, health, and productivity were converging to produce the demographic dividend for the economy and society. However, the 21st century is witnessing a diverging trend as LE gains are shifting to older ages where health and productivity are below average from the life course perspective. If adding years to life is the preoccupation of the 20th century, adding life to years has become a major aspiration for the 21st century. Pursuing healthy and productive ageing has emerged as the main paradigm and policy agenda to regain a “three-dimensional longevity dividend,” conceptualized by Scott [3] as a positive correlation between LE, health, and the economy (or productivity).

A growing body of research has examined the global and country-specific trend in health measured by age-standardized disability-adjusted life years (DALYs). At the global level, the Global Burden of Diseases, Injuries, and Risk Factors Study coordinated by the Institute for Health Metrics and Evaluation at the University of Washington has shown a steady improvement in global health between 1990 and 2019, although the progress differs considerably across age groups and countries [4]. Research on China has examined broad health trends in the previous decades, including the period between 1990 and 2010 [5] and between 1990 and 2017 [6]. Findings suggest China's substantial progress in reducing the burden of many diseases and disabilities. Meanwhile, existing research calls for greater policy attention to chronic diseases in the elderly. A larger number of studies have focused on changes in specific diseases, such as cancer [7], cardiovascular diseases [8], depression [9], diabetes [20], and so on. There is a need for more research on how the elderly fare in China and how China's progress in healthy aging compares with other countries with a similar level of economic development.

This article aims to estimate China's progress in healthy aging between 2000 and 2019, based on data compiled by the World Health Organization (WHO). It focuses on the elderly Chinese rather than the entire population. It also seeks to put China in perspective, by comparing the trend of China's healthy aging with that of other countries, especially upper-middle-income countries. This article begins with an analysis of changes in LE at the age of 60 years old and health-adjusted LE (HALE) at the age of 60 years old between 2000 and 2019. It then presents 10 leading disease burdens measured by DALYs among 2 age groups (60–69 years and 70 years and above)

in China in 2000 and 2019, and reports the growth rate of cause-specific DALYs between 2000 and 2019. It continues with a comparison of cause-specific DALYs in China and upper-middle-income countries in 2019 for the 2 age groups of 60–69 years and 70 years and above, followed by a brief discussion of China's healthy aging agenda, as well as broad changes in China's social, economic, and health systems. In conclusion, this article discusses ways forward for China.

2 | LIVING LONGER, NOT NECESSARILY HEALTHIER

The relationship between long lives and healthy lives has become an important question. People are evidently living longer, but it is less clear if they are living healthier. Scholars have proposed three scenarios to describe possible changes in healthy lives along with growing longevity.

Gruenberg [10] is the first to propose the scenario of the “expansion of morbidity.” In this scenario, the advancing medical technology focuses on saving lives but not curing diseases, leading to growing longevity with chronic diseases. Consequently, falling mortality is accompanied by an increase in morbidity. People live longer, but they also spend more years in poor health.

The second scenario—the “compression of morbidity”—was proposed by Fries [11]. In this more optimistic scenario, morbidity—disability and frailty—is compressed towards the end of life, leading to the postponed onset of morbidity and impairment. When it occurs at a faster pace than increases of LE, people spend shorter periods in ill health.

In between is the third scenario known as the “dynamic equilibrium,” in which time periods spent in good health and ill health remain proportionally constant to the total length of life [12]. Gains in healthy LE occur at roughly the same pace as gains in LE.

To assess which scenario holds better in the real world, Table 1 presents HALE and LE at age 60 years for China and country groups defined by the World Bank income classification in 2000, 2010, and 2019, based on data from the WHO. LE is the average number of years a person expects to live, while HALE is the average number of years a person expects to live in good health.

In China, there was a gain of 1.2 years in LE at the age of 60 years old between 2000 and 2010, and a somewhat larger gain of 1.5 years between 2010 and 2019. In terms of HALE at age 60 years, China gained 0.9 years between 2000 and 2010, and 1 year between 2010 and 2019. From a comparative perspective, China's gain in LE and HALE at age 60 years kept pace with that of

TABLE 1 HALE and LE at age 60 years in China and countries by World Bank Income Classification: 2000, 2010, and 2019

	HALE			LE		
	2000	2010	2019	2000	2010	2019
China	14.0	14.9	15.9	18.4	19.6	21.1
Low-income countries	11.4	12.4	13.0	15.2	16.5	17.4
Lower-middle income countries	12.1	12.9	13.5	16.6	17.8	18.6
Upper-middle income countries	14.0	15.0	16.0	18.5	19.8	21.2
High-income countries	16.6	17.8	18.2	21.9	23.5	24.3
Global average	14.1	15.1	15.8	18.8	20.1	21.1

Note: Data source: WHO LE and healthy LE data, <https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/life-expectancy-and-healthy-life-expectancy>, accessed on 30 March 2022.

Abbreviations: HALE, health-adjusted life expectancy; LE, life expectancy; WHO, World Health Organization.

TABLE 2 The ratio of HALE to LE at the age of 60 years old in China and countries by World Bank Income Classification: 2000, 2010 and 2019

	2000	2010	2019
China	0.76:1	0.76:1	0.75:1
Low-income countries	0.75:1	0.73:1	0.75:1
Lower-middle income countries	0.73:1	0.72:1	0.73:1
Upper-middle income countries	0.76:1	0.76:1	0.75:1
High-income countries	0.76:1	0.76:1	0.75:1
Global average	0.75:1	0.75:1	0.75:1

Note: Data source: Author's calculation based on WHO LE and healthy LE data, <https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/life-expectancy-and-healthy-life-expectancy>, accessed on 30 March 2022.

Abbreviations: HALE, health-adjusted life expectancy; LE, life expectancy; WHO, World Health Organization.

upper-middle-income countries in the past two decades. Countries in other income categories, including high-income countries, had a comparable gain in the first decade of the 21st century, but lost momentum in the second.

Table 2 presents the ratio of HALE to LE at the age of 60 years old in 2000, 2010, and 2019. Despite varying paces of gains in LE and HALE across countries and over time, the ratio of HALE to LE at the age of 60 years old has been remarkably stable. For every 1-year gain in LE, there is roughly a gain of 9 months in HALE. This finding is consistent with evidence from the Global Burden Disease data set, which also shows that the proportion of life in good health has largely remained constant [19].

Overall, the scenario of “dynamic equilibrium” applies better to China and other countries than the two other scenarios. On a positive note, people are living longer; however, a faster gain in LE also implies a more rapid increase in the number of years lived in ill health. The desired scenario of compressed morbidity has yet to be realized in China and other countries.

3 | CHANGING PATTERNS OF DISEASE BURDENS

A growing attention to the population's health and well-being has led to an expanded focus on not only mortality but also morbidity. Along with a stronger interest in healthy LE, the health literature increasingly looks at the leading causes and risk factors that contribute to not only premature mortality but also compromised health.

DALYs is a widely used measure that considers both reduction in LE due to premature death and diminished quality of life due to ill health. Based on WHO data, Figure 1 lists the Top 10 causes of age-standardized DALYs—measured by the number of DALYs per 100,000 population—in China for age group 60–69 years in 2000 and 2019, and presents the share of each cause in total disease burdens. It also shows the growth rate of cause-specific age-standardized DALYs between 2000 and 2019.

Evidently, noncommunicable diseases have been the leading causes of disease burden in China. In particular, stroke, chronic obstructive pulmonary disease, ischemic heart disease, lung cancer, and stomach cancer were on the Top 5 list for the age group 60–69 years in 2000 and 2019. They combined to account for 47.6% of total DALYs in 2000% and 42.0% in 2019.

Notably, stroke and chronic obstructive pulmonary disease have contributed substantially to the overall reduction of DALYs in the past two decades because of their fast pace—a decrease of 37.6% and 64.1%, respectively—and large share in DALYs. At a comparable pace, stomach cancer and esophagus cancer decreased 38.8% and 43.2%, respectively. Liver cancer, due to a 60.8% reduction, had dropped out of the Top 10 list in 2019.

Some diseases have changed little in terms of age-standardized DALYs, including ischemic heart disease, diabetes, and hearing loss. In contrast to other leading causes of DALYs on the 2000 list, lung cancer was the only disease to have a positive growth between 2000 and 2019, albeit small at 4.1%. Colon and rectum cancers, after a growth of 29.3%, made it to the 2019 Top 10 list. Back and neck pain also entered the list, although it actually decreased by 5.2% in terms of age-standardized DALYs.

Figure 2 analyzes the age group 70 years and above. In this group, as in the 60–69 years age group, stroke,

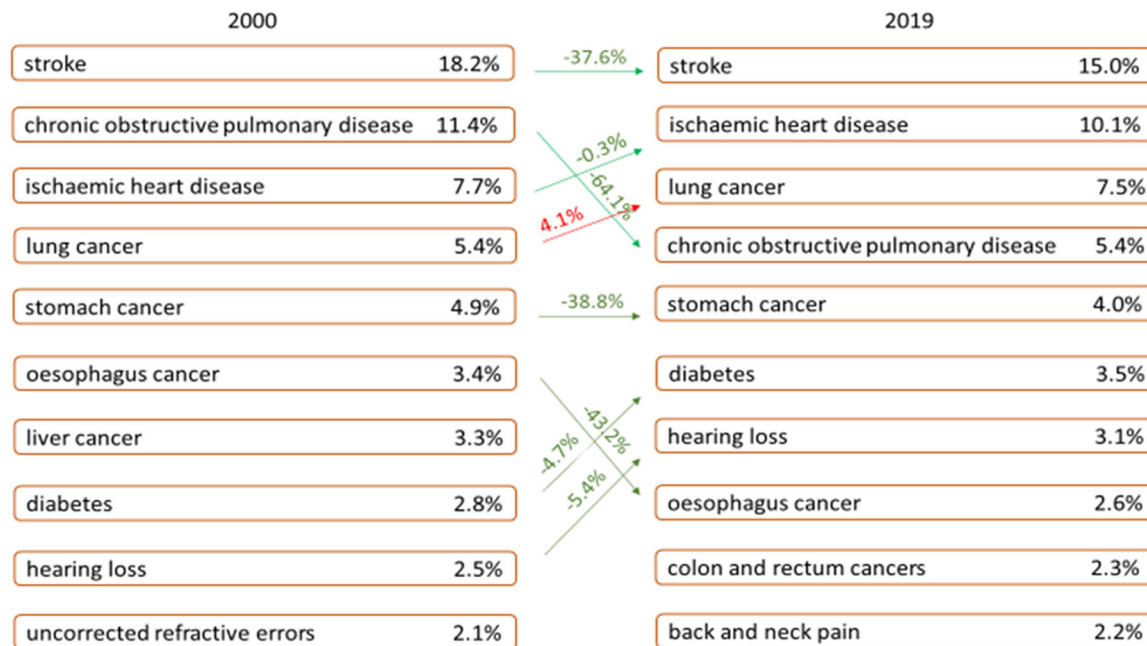


FIGURE 1 Ten leading causes of disability-adjusted life years (DALYs) in China for age group 60–69 years in 2000 and 2019, and % change in DALYs per 100,000 population between 2000 and 2019. Notes: Arrows in the figure show percentage change in age-standardized DALYs—DALYs per 100,000 population—between 2000 and 2019. Liver cancer dropped out of the 2019 Top 10 list, accounting for 1.7% of total DALYs. DALYs per 100,000 population caused by liver cancer decreased 60.8% between 2000 and 2019. Uncorrected refractive errors also dropped out of the 2019 Top 10 list, making up 2.2% of the total in 2019. There was a decrease of 22.5% in age-standardized DALYs caused by uncorrected refractive errors. Two diseases made it to the 2019 Top 10 list. DALYs per 100,000 population caused by colon and rectum cancers increased 29.3% between 2000 and 2019, whereas DALYs per 100,000 population caused by back and neck pain decreased 5.2% during the same period. Data source: Author’s calculation based on World Health Organization (WHO) data, <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys>, retrieved on March 30, 2022.

chronic obstructive pulmonary disease, ischemic heart disease, and lung cancer were the leading causes of DALYs in the past two decades. However, there is a marked difference: their share in total DALYs was considerably higher in the age group of 70 and above than in the younger 60–69 years group.

In a nutshell, mainland Chinese in their 60s in 2019 were generally healthier than those of the same age two decades earlier. However, the picture is more complex for the older age group, in which the improvement in some aspects of health was accompanied by the deterioration in some other aspects. Ischemic heart disease, Alzheimer’s disease, and lung cancer have become more prominent in the recent two decades for mainland Chinese aged 70 years and above.

4 | CHINA IN PERSPECTIVE

As described earlier, China’s gain in HALE since 2000 is comparable to that of upper-middle-income countries, which on average have a faster pace than countries in other income groups. China’s current level of HALE at

60 years—15.9 years in 2019—is also very close to the average of 16.0 years for upper-middle-income countries. To put China in perspective, Table 3 compares China and upper-middle-income countries in terms of 10 leading causes of age-standardized DALYs in 2019 for the age group 60–69 years.

China and other upper-middle-income countries share many commonalities. Stroke and ischemic heart disease are the top two leading causes of DALYs on both lists. Some other diseases, including lung cancer, chronic obstructive pulmonary disease, diabetes, hearing loss, and back and neck pain, also appear on both lists.

Differences include stomach cancer, which ranked fifth on China’s list, and is not 1 of the 10 leading causes of DALYs in upper-middle-income countries. The same is true for esophagus cancer and colon and rectum cancers. Meanwhile, breast cancer, kidney diseases, and other musculoskeletal disorders appear on the list of upper-middle-income countries, but not that of China. DALYs per 100,000 population give a measure of the prevalence level of listed diseases. The top diseases of the two lists, such as stroke, ischemic heart disease, lung cancer, and chronic obstructive pulmonary, have a

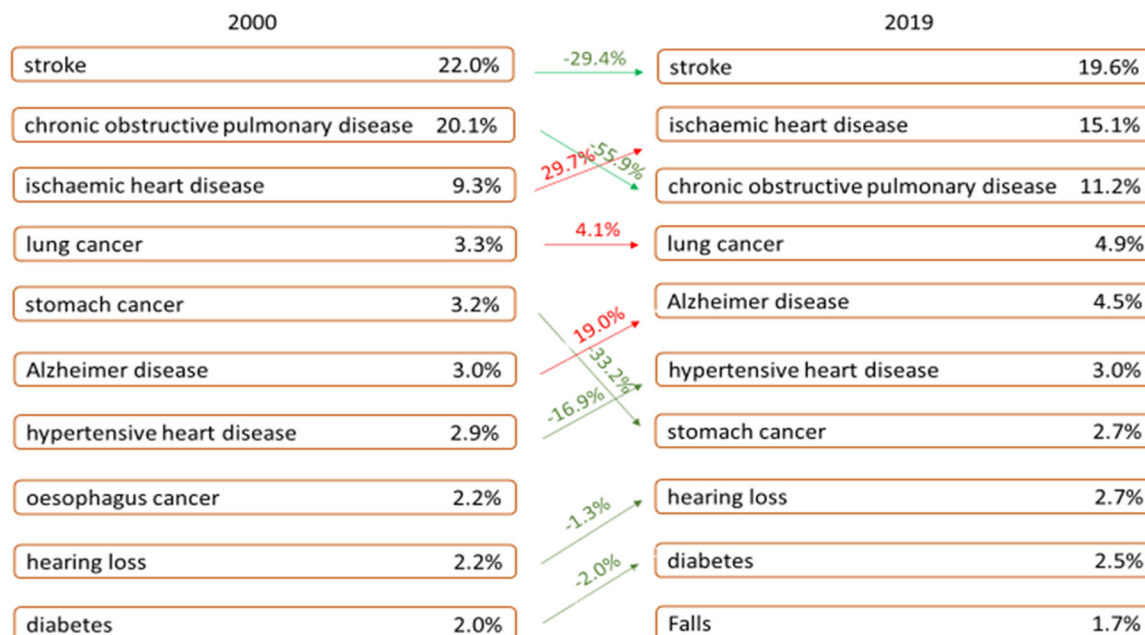


FIGURE 2 Ten leading causes of disability-adjusted life years (DALYs) in China for age group 70 years and above in 2000 and 2019, and % change in DALYs per 100,000 population between 2000 and 2019. Notes: Arrows in the figure show percentage change in age-standardized DALYs—DALYs per 100,000 population—between 2000 and 2019. Esophagus cancer dropped out of the 2019 Top 10 list, accounting for 1.7% of total DALYs. There was a decrease of 38.0% in age-standardized DALYs caused by esophagus cancer. Falls made it to the Top 10 list in 2019. DALYs per 100,000 population caused by falls increased 37.8% between 2000 and 2019. Data source: Author's calculation based on World Health Organization (WHO) data, <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys>, retrieved on March 30, 2022.

TABLE 3 Ten leading causes of DALYs in 2019 among age group 60–69 years in China and upper-middle income countries

China		Upper-middle income countries	
Leading causes	DALYs per 100,000 population	Leading causes	DALYs per 100,000 population
1. Stroke	7841	1. Stroke	5487
2. Ischemic heart disease	5263	2. Ischemic heart disease	4716
3. Lung cancer	3901	3. Diabetes	3010
4. Chronic obstructive pulmonary disease	2826	4. Chronic obstructive pulmonary disease	1885
5. Stomach cancer	2074	5. Lung cancer	1642
6. Diabetes	1820	6. Hearing loss	1443
7. Hearing loss	1626	7. Back and neck pain	1435
8. Esophagus cancer	1340	8. Breast cancer	1221
9. Colon and rectum cancers	1177	9. Kidney diseases	1176
10. Back and neck pain	1166	10. Other musculoskeletal disorders	1133

Note: Data source: Author's calculation based on WHO data, <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys>, retrieved on March 30, 2022.

Abbreviations: DALYs, disability-adjusted life years; WHO, World Health Organization.

considerably higher prevalence level in China than in upper-middle-income countries. In contrast, China has a lower prevalence level in diseases such as diabetes and back and neck pain.

Taken together, China has much in common with other upper-middle-income countries in terms of leading causes of DALYs. It also demonstrates some country-specific features (i.e., the prominence of stomach cancer,

esophagus cancer, and colon and rectum cancers). Overall, mainland Chinese in their 60s are generally less healthy than their counterparts in other upper-middle-income countries, evidenced in higher prevalence levels of most leading causes of DALYs in China.

Table 4 presents cause-specific age-standardized DALYs for the age group 70 years and above. Unsurprisingly, the prevalence level of each disease is much higher in this group than in the 60–69 years group in China, as well as in upper-middle-income countries. Alzheimer's disease, which is not on the Top 10 list for the 60–69 years group, ranks fifth and fourth, respectively, on China's list and the list of upper-middle-income countries.

From a comparative perspective, diseases with a considerably higher prevalence level in China include stroke, chronic obstructive pulmonary disease, lung cancer, stomach cancer, and falls. To a lesser extent, ischemic heart disease, hypertensive heart disease, and hearing loss are also more prevalent in China. On the other hand, diabetes, kidney diseases, and lower respiratory infections are considerably more prevalent in upper-middle-income countries than in China, whereas Alzheimer's disease is somewhat more prevalent in the former than in the latter.

By age-standardized DALYs, mainland Chinese aged 70 years and above are generally less healthy than their counterparts in other upper-middle income countries, except for several diseases such as diabetes, Alzheimer's, kidney diseases, and lower respiratory infections. Overall,

there is considerable room for China to improve the health of its citizens aged 60 years and above, if the average performance of upper-middle income countries is used as a benchmark. It should be pointed out that China data includes both urban and rural Chinese. Urban Chinese aged 60 years and above are likely to be as healthy as their counterparts in other upper-middle-income countries, if not more.

5 | CHINA'S HEALTHY AGING AGENDA

China has undergone profound changes in its social, economic, and health systems over the past 20 years, which have long-term health effects on its population, including the elderly. Decades of sustained economic and social development have raised the standards of living for Chinese people across the country. Notably, government expenditures on social programs have increased dramatically, since the Hu-Wen leadership, driven by a shift from the market-driven approach in the 1980s and 1990s to a new notion that prioritized equity and affirmed the role of government in financing education, healthcare, and other public goods [13, 14]. Pension and health insurance have been extended to previously excluded groups, including rural residents, urban nonworking population, and those working in the informal sectors [15].

Health and healthcare have received unprecedented policy attention in the past decade. A major overhaul of

TABLE 4 Ten leading causes of DALYs in 2019 among age group 70 years and above in China and upper-middle income countries

China		Upper-middle income countries	
Leading causes	DALYs per 100,000 population	Leading causes	DALYs per 100,000 population
1. Stroke	21,471	1. Stroke	16,448
2. Ischemic heart disease	16,628	2. Ischemic heart disease	16,109
3. Chronic obstructive pulmonary disease	12,242	3. Chronic obstructive pulmonary disease	7033
4. Lung cancer	5432	4. Alzheimer disease	5380
5. Alzheimer disease	4937	5. Diabetes	4269
6. Hypertensive heart disease	3334	6. Hypertensive heart disease	2774
7. Stomach cancer	2966	7. Hearing loss	2760
8. Hearing loss	2943	8. Kidney diseases	2248
9. Diabetes	2712	9. Lower respiratory infections	2240
10. Falls	1920	10. Lung cancer	2131

Note: Data source: Author's calculation based on WHO data, <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys>, retrieved on March 30, 2022.

Abbreviations: DALYs, disability-adjusted life years; WHO, World Health Organization.

the healthcare system was initiated in 2009 to provide accessible and affordable basic health care for all with reasonable quality [16]. In 2016, the Healthy China 2030 Initiative was launched, a signature project that marks China's first-time adoption of a population-based health strategy to tackle noncommunicable diseases [6]. This was followed by the 13th 5-Year Plan for Healthy Aging (2016–2020), China's first national policy on healthy aging. The Plan identified nine domains for policy action, including health promotion and education, integration of health care and social care, health industry, professional workforce, and so on. [17] China issued the 14th 5-Year Plan for Healthy Aging (2021–2025) in February 2022, which largely retains the policy framework of the previous plan, while placing more emphasis on policy implementation to achieve measurable results regarding health literacy, incidence of disability, and health services.

Broad socioeconomic changes and major health initiatives described above have bearings on China's progress in healthy aging. Results presented in this article show China's rapid gain in LE and healthy LE, at a pace comparable to that of other upper-middle-income countries but much faster than countries in other income groups, particularly in the past decade. Results also reveal a downward trend of many leading causes of disease burden. Measured by the reduction of DALYs, China's young old (age 60–69 years) have become considerably healthier in twenty years' time, whereas the older old have benefited to a lesser extent. The health literature has attributed China's achievements to sustained economic growth, educational expansion, improvements in access to healthcare, targeted programs to reduce maternal mortality, and so on. [6]

Nonetheless, WHO data also suggest challenges facing China's healthy aging agenda. From a comparative perspective, China has higher prevalence levels of leading diseases such as stroke and chronic obstructive pulmonary disease than other upper-middle-income countries. Some causes of premature death and compromised health, including lung cancer and stomach cancer, are remarkably more prominent in China. Although the overall trend is encouraging, evidence shows that some cause-specific DALYs are on the rise, notably lung cancer for the age group of 60–69 years and ischemic heart disease, Alzheimer disease, and lung cancer for the age group of 70 years and above.

The health literature has identified leading risk factors, including high systolic blood pressure, smoking, diet high in sodium, and particulate matter pollution [6]. These risk factors in turn are linked to slow progress in tobacco control, persistence of diet-related risks, and lack of environmental overhauls until recently [6, 18]. Other major obstacles to China's healthy aging agenda include

regional disparities in health and socioeconomic status [6], and the lack of breakthroughs in reforming the hospital-centric and treatment-based health system into one that features a larger role of primary healthcare, public education, and prevention [16].

6 | CONCLUSION

In high-income and upper-middle-income countries, LE gains are increasingly concentrated at later stages with below-average health. Hence, governments worldwide are actively pursuing a healthy aging agenda. China has joined the global effort with the 13th 5-Year Plan for Healthy Aging (2016–2020) and the 14th 5-Year Plan for Healthy Aging (2021–2025).

Healthy aging is taking place in China and globally. Today's young old in their 60s are healthier than those in the same age group two decades ago, evidenced in the lower prevalence level of almost all leading causes of premature death and disability. The picture is more mixed for the older age group (70 years and above). Although there is a substantial decline in leading disease burdens such as stroke and chronic obstructive pulmonary disease, diseases such as Alzheimer's disease and other dementias are evidently on the rise.

Although substantial progress has been made to achieve healthy aging, China has yet to reduce all-cause and cause-specific DALYs to a level attained by other upper-middle-income countries. Apart from tackling diseases that are looming large globally, it also needs to address diseases that are more prominent in China. This requires a systemic approach to address a wide range of risk factors and challenges, from dietary adjustment, tobacco control, to healthcare reform, environmental overhaul, to inclusive growth and greater social equity.

Moving forward, China's healthy aging agenda can benefit from a multipronged approach that seeks to promote behavioral changes for attaining healthier lifestyles, improve the physical and social environment for aging well, address socioeconomic inequalities across localities, improve delivery of healthcare and social care, and advance medical technology for better treatment and assisted living.

AUTHOR CONTRIBUTIONS

Litao Zhao: Conceptualization (equal); data curation (equal); formal analysis (equal); funding acquisition (equal); investigation (equal); methodology (equal); project administration (equal); resources (equal); software (equal); supervision (equal); validation (equal); visualization (equal); writing—original draft (equal); writing—review and editing (equal).

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CONFLICT OF INTEREST

The author declares no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available at <https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/life-expectancy-and-healthy-life-expectancy> and <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys>.

ETHICS STATEMENT

This study uses data that are published by WHO, which should comply with ethics standards.

INFORMED CONSENT

None.

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REFERENCES

- National Bureau of Statistics of China. The statistical communiqué on the People's Republic of China's national economic and social Development in 2021 (in Chinese). 2022. Available from: http://www.stats.gov.cn/tjsj/zxfb/202202/t0220227_1827960.html.
- China Statistical Yearbook. Beijing: China Statistics Press; 2021.
- Scott AJ. Achieving a three-dimensional longevity dividend. *Nat Aging*. 2021;1:500–5. <https://doi.org/10.1038/s43587-021-00074-y>
- GBD 2019 Demographics Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020;396:1204–22.
- Yang G, Wang Y, Zeng Y, Gao GF, Liang X, Zhou M, et al. Rapid health transition in China, 1990–2010: findings from the Global Burden of Disease Study 2010. *Lancet*. 2013;381:1987–2015. [https://doi.org/10.1016/S0140-6736\(13\)61097-1](https://doi.org/10.1016/S0140-6736(13)61097-1)
- Zhou M, Wang H, Zeng X, Yin P, Zhu J, Chen W, et al. Mortality, morbidity, and risk factors in China and its provinces, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2019;394:1145–58.
- Qiu H, Cao S, Xu R. Cancer incidence, mortality, and burden in China: a time-trend analysis and comparison with the United States and United Kingdom based on the global epidemiological data released in 2020. *Cancer Commun*. 2021;41(10):1037–48. <https://doi.org/10.1002/cac2.12197>
- Liu S, Li Y, Zeng X, Wang H, Yin P, Wang L, et al. Burden of cardiovascular diseases in China, 1990–2016: findings from the 2016 Global Burden of Disease Study. *JAMA Cardiol*. 2019;4(4):342–52. <https://doi.org/10.1001/jamacardio.2019.0295>
- Ren X, Yu S, Dong W, Yin P, Xu X, Zhou M. Burden of depression in China, 1990–2017: findings from the global burden of disease study 2017. *J Affect Disord*. 2020;268:95–101. <https://doi.org/10.1016/j.jad.2020.03.011>
- Gruenberg EM. The failures of success. *The Milbank Memorial Fund Quarterly. Health and Society*. 1. 55. Wiley; 1977. p. 3–24. <https://doi.org/10.2307/3349592>
- Fries JF. Aging, natural death, and the compression of morbidity. *N Engl J Med*. 1980;303(3):130–5. <https://doi.org/10.1056/NEJM198007173030304>
- Manton KG. Changing concepts of morbidity and mortality in the elderly population. *The Milbank Memorial Fund Quarterly. Health and Society*. 60. Wiley; 1982. p. 183–244. <https://doi.org/10.2307/3349767>
- Yip W, Hsiao W. What drove the cycles of Chinese health system reforms? *Health Systems & Reform*. 2015;1(1):52–61.
- Zhao L, Li L, Huang C. Mobilizing resources for education: the 2012 'great leap' in a province in western China. *J Contemp China*. 2018;27:440–56. <https://doi.org/10.1080/10670564.2018.1410980>
- Zhao L, He X. Lessons from China on different approaches to pension coverage extension. *Int Soc Secur Rev*. 2021;74(1):5–34. <https://doi.org/10.1111/issr.12255>
- Yip W, Fu H, Chen AT, Zhai T, Jian W, Xu R, et al. 10 years of health-care reform in China: progress and gaps in universal health coverage. *Lancet*. 2019;394:1192–204. [https://doi.org/10.1016/S0140-6736\(19\)32136-1](https://doi.org/10.1016/S0140-6736(19)32136-1)
- Ye P, Jin Y, Er Y, Duan L, Palagyi A, Fang L, et al. A scoping review of national policies for healthy ageing in mainland China from 2016 to 2020. *Lancet Region Health Western Pacific*. 2021;12:100168. <https://doi.org/10.1016/j.lanwpc.2021.100168>
- Li X, Galea G. Healthy China 2030: an opportunity for tobacco control. *Lancet*. 2019;394:1123–4. [https://doi.org/10.1016/S0140-6736\(19\)32048-3](https://doi.org/10.1016/S0140-6736(19)32048-3)
- GBD Demographics Collaborators. Global age-sex-specific fertility, mortality, healthy life expectancy (HALE), and population estimates in 204 countries and territories, 1950–2019: a comprehensive demographic analysis for the global burden of disease study 2019. *Lancet*. 2020;396:1160–203.
- Liu M, Liu S, Wang L, Bai Y, Zeng X, Guo H, et al. Burden of diabetes, hyperglycaemia in China from to 2016: findings from the 1990 to 2016, global burden of disease study. *Diabetes Metab*. 2019;45(3):286–93. <https://doi.org/10.1016/j.diabet.2018.08.008>

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