

Chapter 2

Aging Trend of the World

Fanlei Kong

2.1 Population Aging Trend of the World

Population aging, the shift towards an increased proportion of older persons in the population, is a global phenomenon resulting from rapid declines in fertility rates coupled with reductions in mortality and increased longevity (United Nations 2012). At the global level, 1 in every 12 individuals was at least 60 years of age in 1950, and by the year 2010, those ratios had increased to 1 in every 10 aged 60 years or older (Fig. 2.1). By the year 2050, more than 1 in every 5 persons throughout the world is projected to be aged 60 or over.

Such a demographic change, which had its origin in the nineteenth and twentieth centuries and will surely be the distinctive trait of populations during the twenty-first century, is transforming the world. Initially started in the more developed countries, population aging is currently taking place almost everywhere in the world, and it has now become apparent in much of the developing world and it will affect virtually all countries over the medium-term, although its intensity will vary considerably among countries (United Nations 2009).

In 1950, there were 201,775,000 persons aged 60 or over throughout the world (Fig. 2.1), accounting for 8% of the world population. At that time, only 3 countries had more than 10 million people 60 or older: China (42 million), India (20 million), and the United States of America (20 million) (United Nations 2001). Fifty years later (the year of 2000), the number of persons aged 60 or over increased about three times to 609,876,000 (Fig. 2.1). In 2000, the number of countries with more than 10 million people aged 60 or over increased to 12, including 5 with more than 20 million older people: China (129 million), India (77 million), the United

F. Kong (✉)

Department of Social Medicine and Health Services Administration, Shandong University,
44 Wenhuxi Road, Jinan, Shandong Province 250012, China
e-mail: kongfanlei@sdu.edu.cn

© Springer Nature Singapore Pte Ltd. 2018

T. Hoshi and S. Kodama (eds.), *The Structure of Healthy Life Determinants*,
International Perspectives on Aging 18,
https://doi.org/10.1007/978-981-10-6629-0_2

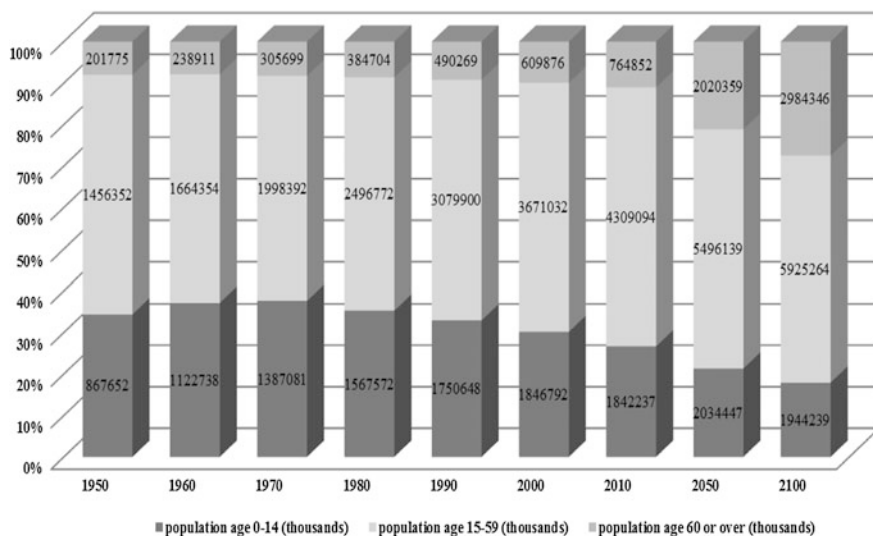


Fig. 2.1 The world population by broad age group 1950–2100

States of America (46 million), Japan (30 million) and the Russian Federation (27 million).

In contrast with the process of population aging experienced in the past by most countries in the more developed regions, the aging process in most of the less developed regions is taking place in a much shorter period of time, and it is occurring on relatively larger population bases. To date, population aging had been considerably slower in the less developed regions where fertility has been still relatively high. In 1970, the age pyramids had the triangular shape of a youthful population in both the less and more developed regions, and the base was much wider in the less developed regions (Fig. 2.2).

In 2010, the percentage of the population aged less than 15 years old decreased substantially comparing with 1970 for the less developed countries, while the percentage of the older persons who aged more than 60 years old age increased. Although the pyramid was still triangular in the less developed regions, its base had started to narrow. As for the more developed countries, the age pyramid had transitioned to one that bulged at the working ages, denoting a population where aging was already under way.

In 2050, the age pyramids are projected to be more rectangular in both the less and more developed countries, a sign of a more advanced stage of the population aging (Fig. 2.2). At that time, the proportion of older persons of the less developed countries is projected to reach 19%, whereas their proportion of children is projected to decline to 22%. Concerning the more developed countries, the percentage of the elderly aged more than 60 years will be two times bigger than that of children less than 15 years old (32% vs. 16% as shown in Table 2.1). At the global level, the

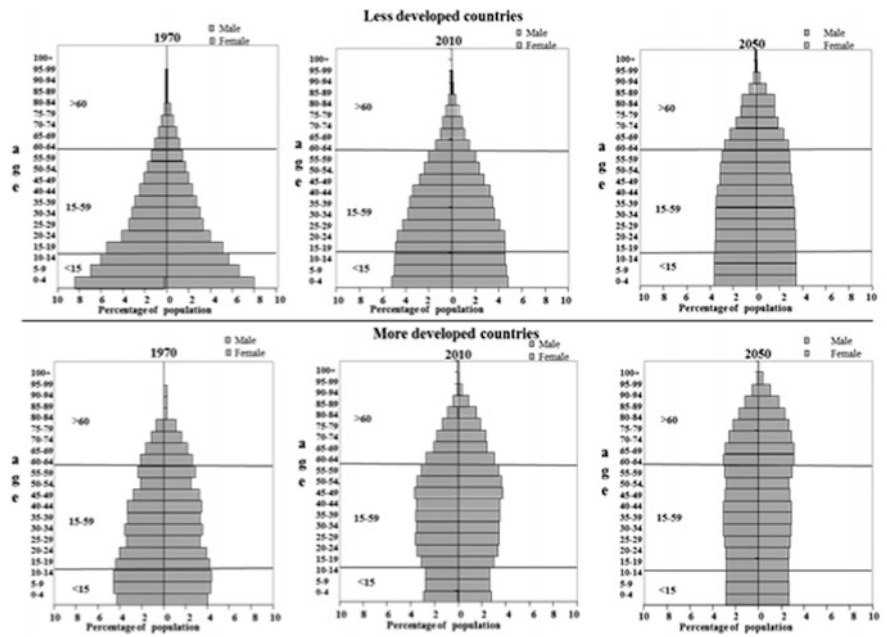


Fig. 2.2 Age distribution of the world’s population by development group, 1970, 2010, 2050. *Source* United Nations, Department of Economic and Social Affairs, Population Division (2013), World Population Prospects: The 2012 Revision

number of the population aged 60 or over will be almost same to that of the population aged 0–14, with the number of 2020 million versus 2034 million (Table 2.1).

Population aging, as a global phenomenon, had affected, is affecting and will affect both every individual in the micro level, no matter man or woman, child, adult or the elderly; and each society or country in the macro level. Specifically, population aging exerts its effect on our life in three ways: in the political sphere, it can influence the results and patterns of voting; in the economic area, it will have an impact on labour markets, intergenerational transfers, savings, pensions, investment and consumption; in the social filed, it can affect living arrangements, family composition and health and health care. Recognizing that the political, economic and social impact of population aging is both an opportunity and a challenge to all societies, issues related to older persons will play a more prominent role in the future.

Table 2.1 Global population distribution according to the development levels and age groups in 2013, 2050

Development group or major area	Population in 2013 (millions)		Population in 2050 (millions)							
	0–14	15–59	60+	80+	Total	0–14	15–59	60+	80+	Total
World	1878	4443	841	120	7162	2034	5496	2020	392	9551
More developed regions	206	760	287	57	1253	210	655	417	124	1303
Less developed regions	1672	3683	554	63	5909	1825	4820	1603	268	8248
Least developed countries	360	491	49	5	898	545	1082	183	21	1811
<i>Percentage distribution by age group</i>										
World	26	62	12	1.7	100	21	58	21	4.1	100
More developed regions	16	61	23	4.5	100	16	52	32	9.5	100
Less developed regions	28	63	9.4	1.1	100	22	58	19	3.2	100
Least developed countries	40	55	5.4	0.5	100	30	60	10	1.1	100

Note Estimates and projections are based on the medium variant

Source Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2013)

World Population Prospects: The 2012 Revision

2.2 Population Aging in Japan

As stated previously, populations in the developed countries are aging rapidly, while for population aging in Japan, it is aging the quickest. In 1950, Japan had a very young population, there were 6,344,000 of older persons aged 60 years or over, constituting 7.7% of the total population; in 2010, the number of the elderly older than 60 years increased to 39,085,000 about 30.7% of Japanese people were aged 60 years or older (Fig. 2.3), the highest proportion in the world at that time. The median age of the population, another indicator which is usually used to assess the aging condition of specific country or areas, is 45.9 years in Japan in 2013 (Table 2.2), indicating that Japan was the oldest country in the world. Although the rank of Japan will fall to sixth in 2050 and eighth in 2100 while the absolute number of the median age will keep increase since 2013, it will remain in the top ten during this century.

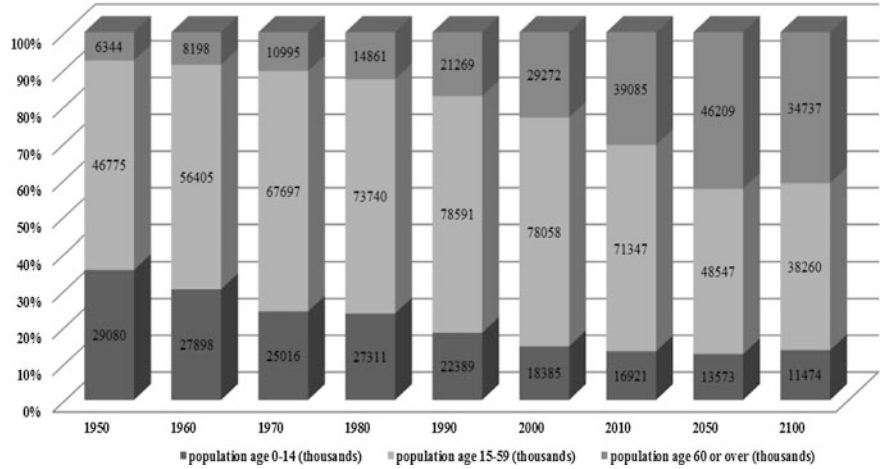


Fig. 2.3 Population by broad age group of Japan 1950–2100. *Note* Estimates and projections are based on the medium variant. *Source* United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: The 2004 Revision, Vo*

It is projected that the absolute number of the older person older than 60 years old will increase to 46,209,000 in 2050, accounting for 42.7% of the Japanese population; by then, Japan’s population will still have the largest proportion of old people in the world. The increase of the absolute number of the older persons from 1950 to 2100 demonstrated explicitly in Fig. 2.3.

On the other hand, while the proportion of the elderly aged 60 years and more increased, the percentage of children (0–14 years) will decrease. In 1950, the child population aged less than 15 years in Japan was 29,080,000 accounting for 35.4% of the Japanese population (Fig. 2.3). This number decreased to 16,921,000 (13.3%) in 2010 and 13,573,000 (12.5%) in 2050. The trend of decline of the children population will sustain until 2100, by then, the absolute number will fall to 11,474,000 constituting 11.0% of the total population. It is worth noting that in terms of the proportion of the total population, the old persons have surpassed the children group since 1997 in Japan.

As the primary cause of the population aging, the total fertility rate of Japan declined sharply to 1.99 in 1960–1965 after the postwar baby boom, and then underwent a slight growth to 1970–1975 (Fig. 2.4). Since then, from 1970–1975 to 2000–2005, during these 30 years, the total fertility rate of the Japanese population dropped from 2.13 to 1.30. Although the fertility rate will gradually increase from 1.41 in 2010–2015 to 1.85 in 2095–2100, the fertility rate of the Japanese population is always less than the replacement level (total fertility rate equal 2.1) and the world and Asia during the whole twenty-first century, which represents the key feature of the population aging.

Table 2.2 Ten countries or areas with the oldest populations in 2013, 2050 and 2100

2013		2050		2100 (years)	
Country or area	Median age	Country or area	Median age	Country or area	Median age
1. Japan	45.9	1. Qatar	55.8	1. Singapore	56.4
2. Germany	45.5	2. Other non-specified areas	54.5	2. United Arab Emirates	53.6
3. Italy	44.3	3. Cuba	54.1	3. China, Hong Kong SAR	52.9
4. Bulgaria	43	4. China, Hong Kong SAR	53.9	4. Cuba	52.8
5. Greece	42.8	5. Republic of Korea	53.5	5. Republic of Korea	52.6
6. Austria	42.7	6. Japan	53.4	6. Qatar	52.5
7. Croatia	42.6	7. Portugal	52.5	7. Portugal	52.2
8. Slovenia	42.4	8. Germany	51.5	8. Japan	51.8
9. China, Hong Kong SAR	42.4	9. Thailand	51.1	9. Maldives	51.7
10. Finland	42.3	10. Oman	50.8	10. Lebanon	51.4

Note Estimates and projections are based on the medium variant

Source United Nations, Department of Economic and Social Affairs, Population Division (2013) World Population Prospects: The 2012 Revision

As another example of population aging, the life expectancy of the Japanese population climbed sharply after World War II, amounted from 62 years in 1950–1955 to 69 years in 1960–1965 (Fig. 2.5), with an increase of 7 years. A remarkable fact worth noting is the huge gap between Japan and Asia on the life expectancy, 20 years in 1950–1955 and 23 years in 1960–1965. After 1960–1965, the life expectancy of Japan increased gradually. It was over 80 years and reached to 82 years in 2000–2005, while the life expectancy of the world and Asia was still under 70 years.

It is projected that the life expectancy of Japan will increase to 88 years in 2045–2050 and 94 years in 2095–2100. Although the life expectancy of the world and Asia also increased and will increase since 1950–1955, their gap with Japan is still large and will sustain across this century, with a minimum of 11 years to the maximum of 23 years.

In fact, the life expectancy of the Japanese population was not just higher than the world and Asia, it was the highest one in the world in 2005–2010 (Table 2.3). Although the rank of the life expectancy of the Japanese population will decline to third both in 2045–2050 and 2095–2100, the absolute number of life expectancy will remain on the increase. With the higher and higher life expectancy and the lower and lower total fertility rate, such a demographic situation means that Japan's experiences so far and its prospects in the future hold important lessons for the other countries, since they will soon be facing similar demographic situations.

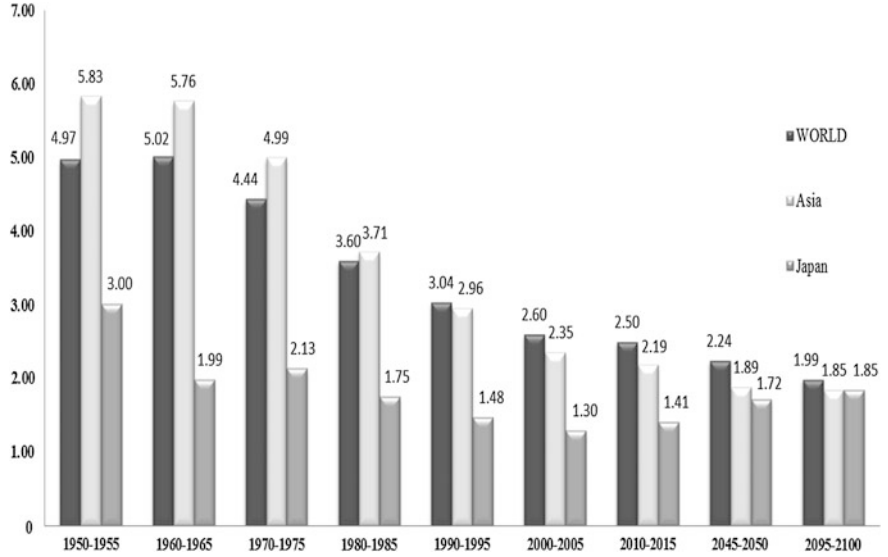


Fig. 2.4 Total fertility of Japan and its comparison with the world and Asia. *Source* United Nations, Department of Economic and Social Affairs, Population Division (2015), World Population Prospects

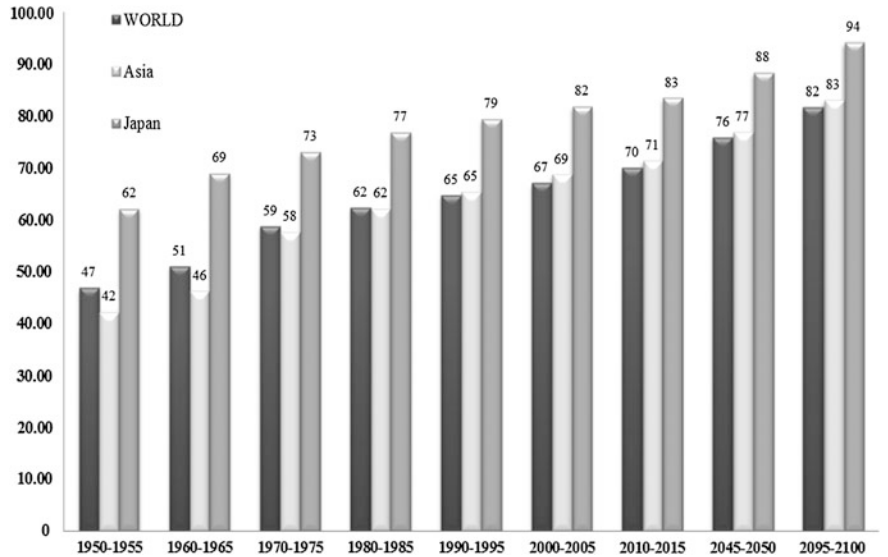


Fig. 2.5 Life expectancy at birth of Japan compared with the world and Asia. *Source* United Nations, Department of Economic and Social Affairs, Population Division (2015), World Population Prospects

Table 2.3 Ten countries or areas with the highest life expectancy in 2005–2010, 2045–2050, 2095–2100

2005–2010		2045–2050		2095–2100 (years)	
Country or area	Life expectancy	Country or area	Life expectancy	Country or area	Life expectancy
1. Japan	82.7	1. China, Hong Kong SAR	89.0	1. Republic of Korea	95.5
2. China, Hong Kong SAR	82.4	2. Republic of Korea	88.4	2. China, Hong Kong SAR	94.9
3. Switzerland	81.8	3. Japan	88.4	3. Japan	94.2
4. Australia	81.7	4. Singapore	87.7	4. Martinique	94.1
5. Italy	81.5	5. Martinique	87.7	5. Singapore	94.0
6. Iceland	81.4	6. Italy	87.3	6. Guadeloupe	93.5
7. Singapore	81.2	7. Switzerland	87.2	7. Italy	93.3
8. Spain	81.2	8. Australia	87.2	8. Australia	93.2
9. Sweden	81.1	9. Guadeloupe	87.1	9. Switzerland	93.0
10. France	80.9	10. Spain	86.8	10. Spain	92.5

Note Estimates and projections are based on the medium variant

Source United Nations, Department of Economic and Social Affairs, Population Division (2013) World Population Prospects: The 2012 Revision

2.3 Higher and Higher Long-Term Care Expenditure of the Elderly

2.3.1 The Rise of the Need for Long-Term Care

With the aging of the society, the need for long-term care is increasing. The main reasons could be contributed to the increase of the life expectancy and the smaller household size, despite some factors could also account for this trend, such as the higher and higher percentage of the working rate among the females who are supposed to be the main force for caring the elderly in the family.

The higher and higher life expectancy at birth is truly the great success of our human's development, however, this increase also means the longer time interval of being cared for the elderly group who are vulnerable to chronic diseases and being disabled. As seen in Fig. 2.6, the general trend of the life expectancy at birth in the world is becoming higher and higher, so is for Japan and China. The life expectancy was relatively low in 1950–1955, especially for the Chinese population (45 years),

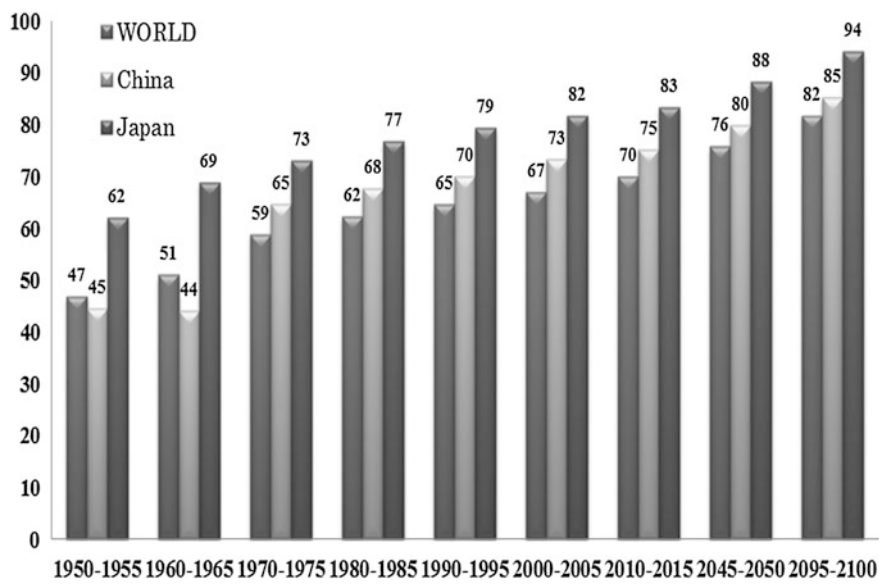


Fig. 2.6 Life expectancy at birth in Japan, China and the world: 1950–2100. *Note* Estimates and projections are based on the medium variant. *Source* United Nations, Population Division (2015), World Population Prospect

lower than the world average number (47 years). It gradually increased to 67 years for the world, 73 years for China and 82 years for Japan in 2000–2005 (all increased more than 20 years during these 50 years). The life expectancy will further amount to 82, 85 and 94 for the world, China and Japan separately in 2095–2100. As the life expectancy at birth increases, the need for the long-term care also amounts.

Another main factor caused the rising of the need for long-term care was the change of household structure, specifically, the smaller household size. Taking Japan for example, the average number of persons per household was 3.41 in 1970; it then declined to 2.99 in 1990 and 2.42 in 2010, despite the total number of the households in Japan increased gradually since 1970 (with a number of 30,297,000) until 2010 (with a number of 51,842,000) (Table 2.4). Such a trend could be contributed to the growth on the numbers of the nuclear-family households and the one-person households, while the shrinking of the three-generation households (Fig. 2.7).

Concerning the number of elderly households (defined as households consisting of individuals aged 65 years or over, with or without unmarried dependents below the age of 18), it also increased as the total households amounted and reached 9,581,000, accounting for 20.5% of the total households in 2011 as presented in Table 2.5. Among them, the number of one-person elderly households was 4.70 million, and three out of four one-person elderly households were females.

Table 2.4 Changed of the numbers of the Japanese households and household size

Year	Households (1000)	Average annual rate of increase (%)	Household members (1000)	Number of persons per household
1970	30,297	3.00	103,351	3.41
1975	33,596	2.09	110,338	3.28
1980	35,824	1.29	115,451	3.22
1985	37,980	1.18	119,334	3.14
1990	40,670	1.38	121,545	2.99
1995	43,900	1.54	123,646	2.82
2000	46,782	1.28	124,725	2.67
2005	49,063	0.96	124,973	2.55
2010	51,842	1.11	125,546	2.42

Note Annual rate of increase of 1970 was calculated based on the data of 1960–1970

Source Statistics Bureau, Ministry of Internal Affairs and Communications, Japan

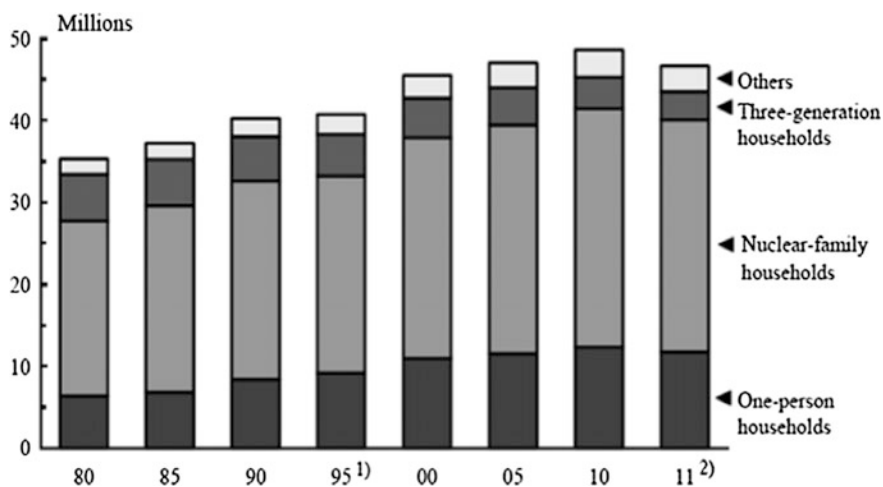


Fig. 2.7 Changes in household composition among the Japanese population. *Note* (1) Hyogo prefecture was excluded in 1995. (2) Iwate, Miyagi and Fukushima Prefecture was excluded in 2011. *Source* Ministry of Health Labour and Welfare, Japan

2.3.2 Higher and Higher Long-Term Care Expenditure of the Japanese Elderly

As the life expectancy increases higher and higher, household size becomes smaller and smaller. Meanwhile, thanks to the improvement of medical science and technology, more and more elderly's lives have been saved, all of these resulted in a rapid increasing number of frail elderly who need for the long-term care.

Table 2.5 Trend of the Japanese elderly households (thousands)

Type pf households	1980	1985	1990	1995	2000	2005	2010	2011
All households	35,338	37,226	40,273	40,770	45,545	47,043	48,638	46,684
Elderly households	1684	2192	3113	4390	6261	8349	10,207	9581
(percentage)	4.8	5.9	7.7	10.8	13.7	17.7	21	20.5
One-person households	910	1131	1613	2199	3079	4069	5018	4697
Males	192	218	295	449	682	1010	1420	1303
Females	718	913	1318	1751	2398	3059	3598	3394
Elderly couples	722	996	1400	2050	2982	4071	4876	4596
Other elderly households	52	65	100	141	199	209	313	288

Note Hyogo Prefecture was excluded in 1995; Iwate, Miyagi and Fukushima Prefecture was excluded in 2011

Source Ministry of Health, Labour and Welfare, Japan

In fact, from the perspective of one society as a whole, fewer working-age adults (aged 15–64) are supporting an increasing number of older persons. However, it is the working-age adults provide the bulk of the contributions to finance social security programs and familial transfers for the older population.

This will finally bring great pressure for the working-age adults and the continuity of the social security systems. The impact of demographic aging is visible in the “potential support ratio (PSR)”, defined as the number of persons aged 15–64 years per one older person aged 65 years or older, could be used to indicate the dependency burden on potential workers.

The change of the PSR from 1950 to 2100 is shown in Fig. 2.8. As clearly illustrated in Fig. 2.8, the PSR has been falling in tandem since 1960. The absolute number of the PSR decreased from 14.2 in 1960 to 8.8 in 2010 in China, and it will further decline to 2.0 in 2100. This means every 2.0 working ages need to support one old persons 65 years or older in 2100.

As for Japan, the situation is even worse, the PSR of Japan declined since 1950 (with the number of 12.1), and fell to 4.0 in 2000. It is estimated that by mid-century, the PSR in Japan will fall to 1.4. At then, every 1.4 working persons need to support one old person aged 65 years or above.

Under such a circumstance, the long-term care (LTC) insurance system was introduced in Japan in April 2000, which has made long-term care an explicit and universal entitlement for every Japanese person aged 65 and older based strictly on physical and mental status, and the government rather than the family responsible for the care of the elderly. Under this care model, the level of services provided would be important to the degree of a recipient’s impairment, and it provides only services rather than cash for care. Another distinctive feature of the Japanese LTC system is the services-only strategy. The insured elderly could choose the service

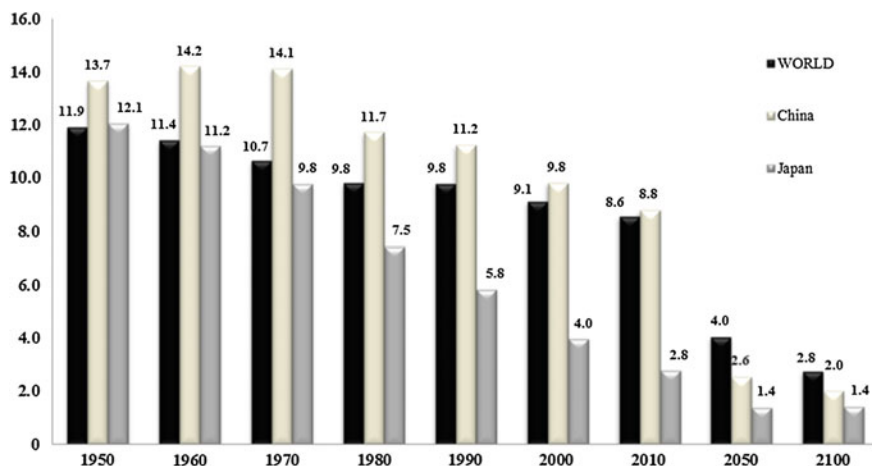


Fig. 2.8 Potential support ratio of Japan, China and the world: 1950–2100. *Note* Estimates and projections are based on the medium variant. *Source* United Nations, Population Division (2013), *World Population Prospects: The 2012 Revision*

combining the advice from the expert, the management of the service-supplied comprehensive organization is flexible for the elderly and the staff are well-trained specialized for older people. According to the “people’s opinions concerning the long-term care insurance system,” which was collected by the Ministry of Health, Labour and Welfare in 2010, more than 60% of people said that they “value the long-term care insurance system.” This means that the long-term care insurance system is steadily functioning as the core of the social security systems, which support the lives of people in their senior years, and that the system is vital to Japan’s aging society combined with declining birthrate.

Since the implementation of the LTCI from April 2000 to April 2011, the total number of elderly admitted to the entry of LTCI has increased by 7,414,450 during these 12 years, the absolute number amounted from 21,654,769 to 29,069,219 (Fig. 2.9). The trend is more and more elderly were and will be admitted to the entry of the LTCI, which help them substantially improve their quality of life and enhance their ability to live independently.

As both the absolute number and percentage of older persons in Japan increase, the expenditure of the social security system increases substantially. The changes in social security benefits expenditure from 1950 to 2010 are shown in Fig. 2.10. As we can see, both the national benefit expenditure and the per capita social security expenditure had a sharp increase since 1970, and then amounted gradually until 2010. The total expenditure on the healthcare (with long-term care for the elderly included) increased from 26.0 trillion Japanese Yen in 2000 to 32.1 trillion Japanese Yen in 2010.

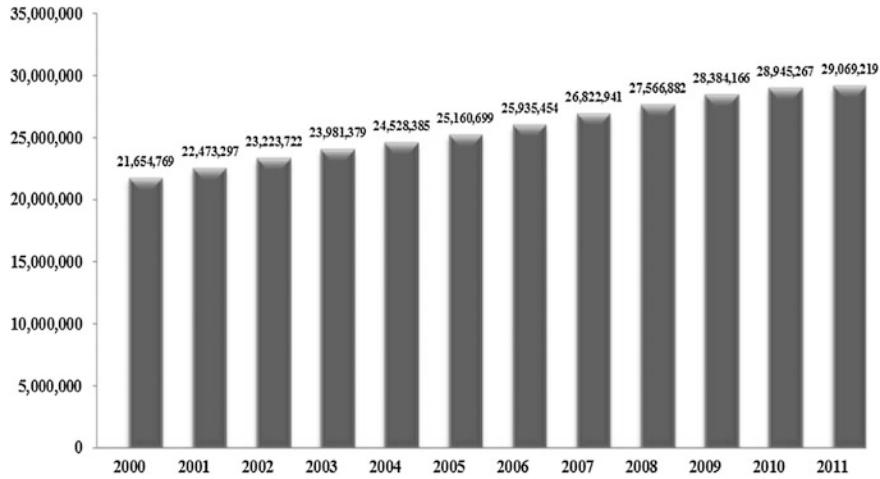


Fig. 2.9 Changes in the number of Japanese elderly insured by the LTCL. *Source* “Status Report on the Long-term Care Insurance Projects”, Health and Welfare Bureau for the Elderly, Ministry of Health, Labour and Welfare, Japan

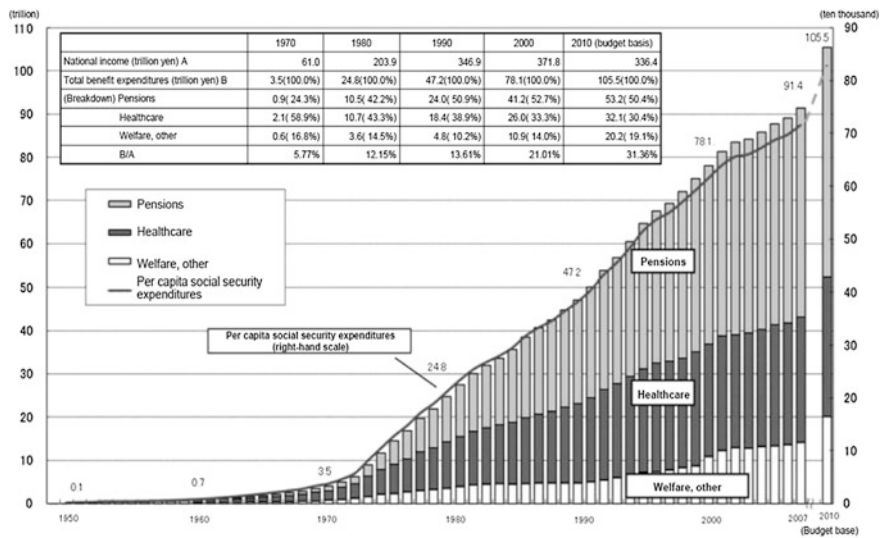


Fig. 2.10 Changes in social security benefit expenditures of Japan. *Note* Figures in the chart are social security benefits expenditures (trillion yen) for fiscal years 1950, 1960, 1970, 1980, 1990, 2000, 2007 and 2010 (budget basis). *Source* National Institute of Population and Social Security Research, “FY 2007 Social Security Benefits Costs”; FY 2010 (budget basis) is from Ministry of Health, Labour and Welfare statistics; FY 2010 national income is from 2010 Economic Outlook and Basic Stance on Economics and Fiscal Management (Cabinet decision of January 22, 2010)

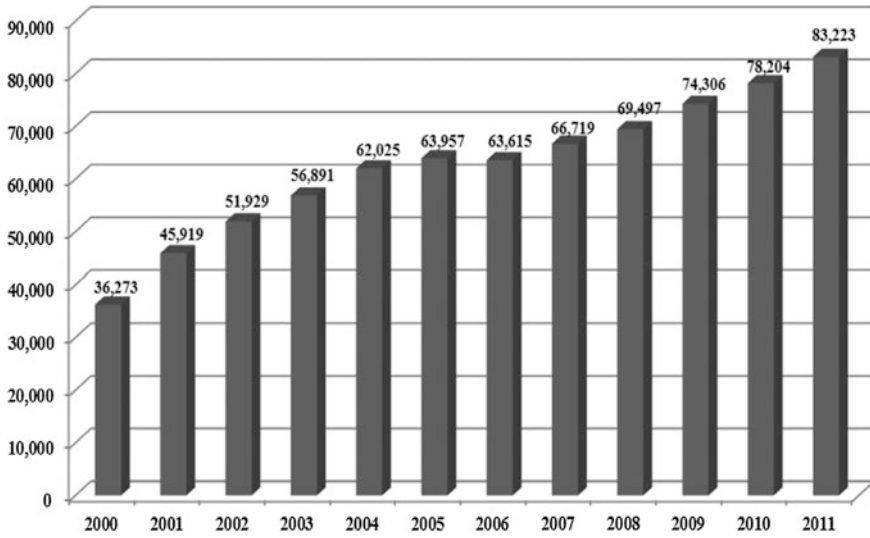


Fig. 2.11 Changes in total amount of LTCI expenses in Japan. *Note* The figure of Fiscal Year; 100 million/month. *Source* “Status Report on Long-term Care Insurance Projects”, Ministry of Health, Labour and Welfare, Japan

Specifically, the total cost of long-term care insurance amounted 2.3 times from 2000 to 2011 (from 36,273 trillion Japanese Yen to 83,223 trillion Japanese Yen) (Fig. 2.11). It is projected that if the aging of the population progresses like this and when the baby boomer generation of Japanese population turns to be 75 years old or above in 2025, the long-term care expenditures are expected to be approximately 17–21 trillion yen (Ministry of Health Labour and Welfare 2013).

The dramatic increase in the total expenditure of LTCI has resulted in a social concern which can be addressed by preventing further increase of the NLTC in order to balance the benefits and burdens carried by each Japanese elderly, and maintain a stable and sustainable system that can support the longevity society.

References

- Baron-Epel, O., and G. Kaplan. 2009. Can subjective and objective socioeconomic status explain minority health disparities in Israel? *Social Science and Medicine* 69 (10): 1460–1467.
- Campbell, J.C., and N. Ikegami. 2000. Long-term care insurance comes to Japan. *Health Affairs (Millwood)* 19 (3): 26–39.
- Gong, F., J. Xu, and D.T. Takeuchi. 2012. Beyond conventional socioeconomic status: Examining subjective and objective social status with self-reported health among Asian immigrants. *Journal of Behavioral Medicine* 35 (4): 407–419.
- Hoi, L.V., P. Thang, and L. Lindholm. 2011. Elderly care in daily living in rural Vietnam: Need and its socioeconomic determinants. *BMC Geriatrics* 11: 81.

- Huijts, T., T.A. Eikemo, and V. Skalicka. 2010. Income-related health inequalities in the Nordic countries: Examining the role of education, occupational class, and age. *Social Science and Medicine* 71 (11): 1964–1972.
- Kim, N.H., G.E. Hoyek, and D. Chau. 2011. Long-term care of the aging population with intellectual and developmental disabilities. *Clinics in Geriatric Medicine* 27 (2): 291–300.
- Laporte, A., R. Croxford, and P.C. Coyte. 2007. Can a publicly funded home care system successfully allocate service based on perceived need rather than socioeconomic status? A Canadian experience. *Health and Social Care in the Community* 15 (2): 108–119.
- Martikainen, P., H. Moustgaard, M. Murphy, E.K. Einio, S. Koskinen, T. Martelin, and A. Noro. 2009. Gender, living arrangements, and social circumstances as determinants of entry into and exit from long-term institutional care at older ages: A 6-year follow-up study of older Finns. *Gerontologist* 49 (1): 34–45.
- Mavrinac, G.V., D.M. Sersic, and A. Mujkic. 2009. Cardiovascular and behavioral risk factors in relation to self-assessed health status. *Collegium Antropologicum* 33 (Suppl 1): 99–106.
- McKevitt, C., N. Fudge, J. Redfern, A. Sheldenkar, S. Crichton, A.R. Rudd, and C.D. Wolfe. 2011. Self-reported long-term needs after stroke. *Stroke* 42 (5): 1398–1403.
- Ministry of Health Labour and Welfare. (2013). *Health and Welfare Bureau for the Elderly. Long-term care system in Japan-current situation and its role in the future.* http://www.mhlw.go.jp/seisakunitsuite/bunya/hukushi_kaigo/kaigo_koureisha/gaiyo/dl/hoken.pdf.
- Reid, K.A., E. Smiley, and S.A. Cooper. 2011. Prevalence and associations of anxiety disorders in adults with intellectual disabilities. *Journal of Intellectual Disability Research* 55 (2): 172–181.
- Samuelsson, G., G. Sundstrom, O. Dehlin, and B. Hagberg. 2003. Formal support, mental disorders and personal characteristics: A 25-year follow-up study of a total cohort of older people. *Health and Social Care in the Community* 11 (2): 95–102.
- Sani, F., M.E. Magrin, M. Scignaro, and R. McCollum. 2010. In-group identification mediates the effects of subjective in-group status on mental health. *British Journal of Social Psychology* 49 (Pt 4): 883–893.
- Sorrell, J.M., and S. Durham. 2011. Meeting the mental health needs of the aging veteran population. *Journal of Psychosocial Nursing and Mental Health Services* 49 (1): 22–25.
- Theodossiou, I., and A. Zangelidis. 2009. The social gradient in health: The effect of absolute income and subjective social status assessment on the individual's health in Europe. *Economics and Human Biology* 7 (2): 229–237.
- United Nations. 2001. *Department of economic and social affairs, population division. World population aging: 1950–2050.* New York: United Nations Publications.
- United Nations. 2009. *Department of economic and social affairs, population division. World population aging: 2009.* New York: United Nations Publications.
- United Nations. 2012. *Department of economic and social affairs, population division. Population ageing and development: Ten years after Madrid population facts*, 1. New York.
- WHO. 1948. *Constitution of the World Health Organization.* Geneva.
- Wolfe, C.D., S.L. Crichton, P.U. Heuschmann, C.J. McKevitt, A.M. Toschke, A.P. Grieve, and A. G. Rudd. 2011. Estimates of outcomes up to ten years after stroke: Analysis from the prospective South London Stroke Register. *PLoS Medicine* 8 (5): e1001033.

The Structure of Healthy Life Determinants

Lessons from the Japanese Aging Cohort Studies

Hoshi, T.; Kodama, S. (Eds.)

2018, XIII, 196 p. 53 illus., 1 illus. in color., Hardcover

ISBN: 978-981-10-6628-3