



Japan: Super-Aging Society Preparing for the Future

Naoko Muramatsu, PhD,^{*,1,2} and Hiroko Akiyama, PhD^{3,4}

¹Division of Community Health Sciences, School of Public Health, University of Illinois at Chicago.

²Institute for Health Research and Policy, University of Illinois at Chicago.

³Institute of Gerontology, University of Tokyo, Japan.

⁴Institute for Social Research, University of Michigan, Ann Arbor.

*Address correspondence to Naoko Muramatsu, PhD, Division of Community Health Sciences, School of Public Health (M/C 923), University of Illinois at Chicago, 1603 W. Taylor St., Chicago, IL 60612. E-mail: naoko@uic.edu

Received May 2, 2011; Accepted May 24, 2011
Decision Editor: Rachel Pruchno, PhD

Japan has the highest proportion of older adults in the world. Aging is not only an immediate personal issue but also a salient factor in crucial public policies, such as pensions, health, and long-term care. The Great East Japan Earthquake, tsunami, and nuclear power plant disaster of March 2011 has highlighted current and emerging issues of a “super-aging” society, especially the need for community-based support systems.

Key Words: *Global aging, Long-term care, Social security policies, Disaster preparedness, Earthquake, Community, Social support, Labor force participation, Urban, Life course/life span*

The Great East Japan Earthquake of March 11, 2011, coupled with subsequent tsunami and nuclear power plant disasters was the largest catastrophe in Japan since World War II. The magnitude 9.0 earthquake hit the dominantly rural

Tohoku district. In some of the devastated areas, one in three people was aged 65+ years. As in most natural disasters, the oldest people were the hardest hit. Older adults with functional disabilities had difficulties escaping the tsunami that killed more than 90% of the 15,000+ people who lost their lives in the earthquake. Surviving older adults were vulnerable to cold temperatures, influenza, relocation, and mental and physical stress. Many struggled without access to medications and treatments needed to control their chronic conditions (e.g., hypertension medication, dialysis), which could result in premature deaths. Persons aged 65+ years account for more than 90% of the growing number of such “earthquake-related deaths” (524 deaths at 241 hospitals in Miyagi, Fukushima, and Iwate prefectures as of May 13, 2011; [NHK, 2011](#)). Two months after the earthquake, the nuclear power plant disaster is far from ending, and 9,500 people are still missing.

This historic catastrophe occurred in an earthquake-prone super-aging society. Its profound implications go far beyond its immediate impact on the most vulnerable. This earthquake revealed positive aspects of the Japanese society: older adults' wisdom and resilience for survival and coping, active social and labor participation at old ages, and strengths of social relationships. However, the disaster highlighted challenges that Japan is facing, especially rebuilding disaster area communities and addressing population aging in urban communities where Japanese traditional qualities are fading. Understanding the societal backdrops helps us appreciate the meanings of the March 11 earthquake for the aging society, older persons, and gerontology.

Thus, our goal here is to provide a broad overview of Japan's societal and gerontological research contexts. After a brief review of Japan's demography of aging and gerontological research, we highlight on-going and emerging public policy issues faced by the super-aging society. Historic events, like the recent disaster, add critical layers to societal contexts of aging individuals. We argue that disasters, while tragic, can provide opportunities to rebuild communities to prepare for the 2030 Japan, a super-aged society.

Demography of Aging in Japan: Unprecedented Population Aging

Japan is experiencing population aging that is unprecedented in the world. The proportion of people aged 65+ years in the total population is highest in the world: 23% in 2009 (Statistics Bureau, 2010). By 2030, one in every three people will be 65+ years and one in five people 75+ years. Rapid declines in mortality and fertility after World War II accelerated population aging in Japan. Reflecting improvements in health and longevity, life expectancy at birth is highest in the world: 86 for women and 80 for men (2009; World Health Organization, 2011). The critical contributor to population aging, however, is rapidly declining fertility. The relatively brief post-World War II baby boom (1947–1949) ended when the government loosened abortion laws and encouraged family planning and birth control to prevent overpopulation. The total fertility rate declined from 4.54 births per woman in 1947 rather quickly to 2.04 in 1957 (National Institute of Population and Social Security Research, 2010b). When the first baby boomers reached child-bearing ages, the second

baby boom (1971–1974) occurred but without changing the number of births per woman. As labor participation increased among women, they delayed marriages or stayed single. Even among the married, fertility rates declined because of the lack of societal support for working women to have children as well as increased financial burdens of raising children. Since the late 1990s, the total fertility rate has been consistently low (1.37 in 2009), much below the replacement level for a population. The total population of Japan in 2004 peaked at 128 million and projects to shrink to 75% of its peak size by 2050. The results are reflected in the top-heavy population pyramid. Figure 1 illustrates that the 75 years and older population is growing rapidly as the younger age population is declining between 2005 and 2030. The ratio of 65 years and older population to the working-age (15–64) population is rising rapidly: In 2030, one person aged 65+ years will be supported by two working-age persons compared with 11.2 and 2.9 persons in 1960 and 2009, respectively (National Institute of Population and Social Security Research, 2010a; Statistics Bureau, 2003). Japan's population is aging and declining in size simultaneously. Remarkably, population aging is no longer limited to rural areas that suffer from outmigration of younger people; it is an urban phenomenon. Japan precedes other countries in embracing population aging as an urban issue.

Research on Aging: Overview

Recognized as a critical societal issue, aging is a major research theme in almost all academic disciplines and industries. Research topics range from biomedical aspects (e.g., mechanism of aging, genomics for longevity and health, aging and lifestyle-related disease, brain function) to psychology and social science-related themes (e.g., social participation and community health, prevention of aging and disability, long-term care, and social security). Notably, gerontechnology constitutes a pillar of gerontology (Ouchi & Akiyama, 2010). Engineers with expertise in fields such as robotics and information technology have contributed to the development of assistive technology and aging-friendly environments since the early stage of gerontology in Japan.

Aging research is conducted at various public and private institutions, including universities. The institutes that specialize in gerontology include Tokyo Metropolitan Institute of Gerontology, established in 1972 to promote interdisciplinary

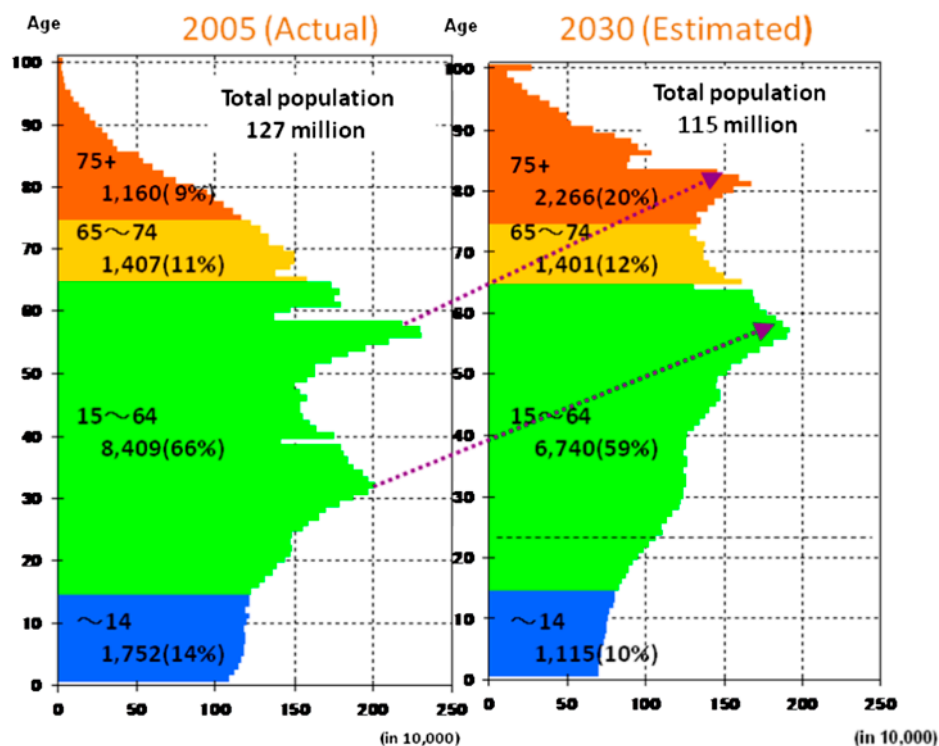


Figure 1. Population pyramid of Japan: 2005 and 2030. Notes: The 2005 data are based on the census. The 2030 data are based on medium estimates. Source: National Institute of Population and Social Security Research.

aging research, and the National Center for Geriatrics and Gerontology, founded in 2004. The Japan Gerontological Society, founded in 1959, has been a member of the International Association of Gerontology and Geriatrics since 1960 and currently involves seven academic societies that represent social gerontology, geriatrics, biomedical gerontology, gerontology, psychogeriatrics, care management, and gerontological nursing.

Research funding comes from the national government as well as private industries and foundations. Although there is no national institute that functions like the U.S. National Institute on Aging, the Ministry of Health, Labour, and Welfare (MHLW), and the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) provide competitive grants-in-aid for scientific research.

Secondary Data Sets on Aging

Longitudinal, internationally comparable data are critical to advance knowledge on global aging. Table 1 lists major longitudinal data sets on aging that are partially comparable to data from the United States and other countries and are publicly available, partly supported by the U.S. National Institute on Aging. In addition, the University of Tokyo Social Science Japan Data Archive distributes

publicly available data sets, including those useful for aging research (<http://ssjda.iss.u-tokyo.ac.jp/en/index.html>). The Japanese government conducts a number of surveys on persons (e.g., National Survey of Family Income and Expenditure, Basic Survey on People's Life, Longitudinal Survey of Middle and Elderly Persons) and organizations (e.g., Survey on Health Care Facilities; MHLW, 2010). Access to the micro data was strictly limited until recently. However, the new Statistics Act of 2007 (<http://www.stat.go.jp/english/info/guide/2009ver/11.htm>) acknowledges the importance of secondary analysis to inform policies. Japan Statistics Bureau started providing deidentified micro survey data for research purposes in 2009, opening up opportunities for secondary data analysis of governmental data.

Public Policy Issues

Population aging affects local and national economies as well as pension, health, and long-term care systems. The shrinking working-age population and increasing number of older nonworking adults hamper economic expansion and challenge the pension system. Japan achieved universal coverage in public pension and health insurance in 1961 (National Institute of Population and Social

Table 1. Publicly Available Longitudinal Survey Data of Older Adults in Japan

Title (years)	Design	Contents and comparability	Notes
National Survey of the Japanese Elderly (1987, 1990, 1993, 1996, 1999, 2002, 2006, 2012)	Longitudinal panel design with refresh samples (60+ years). Nationally representative samples.	Demographics, social integration, health, subjective well-being and mental health status, financial status, memory. Partially comparable in content to the U.S. Americans' Changing Lives, and the National Health Interview Survey, Supplement on Aging, and the Health and Retirement Study (HRS). Strong in psychosocial aspects of aging.	Micro data publicly available via www.icpsr.umich.edu . Currently, the first four waves of data are publicly available. The first four waves of data are also available (for a fee) on Data Archive of Social Research on Aging Web site http://www.socio.com/agingdata.php . PIs: Liang, J., Maeda, D., Shibata, H., & Akiyama, H. Funded by the U.S. National Institute on Aging (NIA), Japan Ministry of Health, Labour, and Welfare (MHLW), and the Ministry of Education, Culture, Sports, Science and Technology (MEXT).
Nihon University Japanese Longitudinal Study of Aging (1999, 2001, 2003, 2006, 2009)	Longitudinal panel design with refresh samples in 2001 and 2003. Nationally representative samples of noninstitutionalized adults aged 65+ years at Wave I.	Health and functioning, mental health, health behavior, demographic and family characteristics, income, health care and long-term care service utilization, intergenerational exchange, and norms and values relevant to aging. Comparable in content to the U.S. Longitudinal Study of Aging II (LSOAI) and the AHEAD sample of the HRS. Strong in health, family, and inclusion of long-term care items.	Micro data available for free by submitting applications to Nihon University. Currently, the first two waves of data are publicly available. PI: Saito, Y. Funded by Nihon University and MEXT, supplemented by the U.S. NIA for data distribution. http://www.nihon-u.ac.jp/affiliate/institute/information_networking/nuijsoa/index.html http://www.usc.edu/dept/gero/CBPH/nuijsoa/index.htm
Japanese Study of Aging and Retirement (2007, 2009, 2011)	Random sample of adults aged 50–75 years in five municipalities at Wave I. Expanded to include seven municipalities in 2009.	Economic, social, and health conditions. Comparable to HRS in the United States, the Survey of Health, Aging, and Retirement in Europe in continental Europe, and the English Longitudinal Study of Aging in the United Kingdom. Strong in economic and social security policy-related items and linkages with municipal official records of medical and long-term care.	Micro data available for researchers who belong to universities and/or research institutes (subject to approval by the Research Institute of Economy, Trade and Industry). Currently, the first wave of data are publicly available. PIs: Ichimura, H., Hashimoto, H., & Shimizutani, S. Funded by RIETI, MEXT, and MHLW. http://www.rieti.go.jp/en/projects/jstar/index.html

Security Research, 2011). Long-term care for older adults has been a priority issue for the past two decades. The proportion of 65 years and older population living alone or living with spouse only is increasing dramatically (increased from 4% to 16% and from 7% to 37% in the 65 years and older population, respectively, between 1960 and 2006), whereas the proportion of those living with a child or other relatives is decreasing (decreased from 87% to 48%; National Institute of Population and Social Security Research, 2010b). Traditionally, eldest sons' wives have been primary caregivers for older parents, but such caregiving norms are rapidly changing. Anticipating rising long-term care needs, the Japanese government developed a vision in 1989 (Tsutsui & Muramatsu, 2007) and expanded long-term care services within the tax-based social security system. In 2000, Japan implemented a universal social long-term care insurance system, under the slogan, "from care by family to care by society" (Campbell & Ikegami, 2000; Tsutsui & Muramatsu, 2005). This historic policy has made a variety of home, community-based, and institutional services, a universal entitlement for every Japanese person aged 65+ years based strictly on physical and mental status, regardless of family availability and economic status.

The rapidly growing oldest old population that is often cognitively impaired drives increasing long-term care costs and work force shortages. Health promotion, disability prevention, and care for the cognitively impaired are important policy and research agenda. Immigration of foreign workers will be a controversial but important issue in long-term care industries as well as in other industries. So far, in contrast to European countries, Japan has not actively recruited foreign workers to health and long-term care fields (Tsukada, 2010). Pension, health, and long-term care systems are continuously being reformed to adjust to ongoing demographic, economic, and social changes.

Emerging Issues

Community rebuilding and old age labor participation have emerged as pressing issues, especially in urban communities. The significance of these issues lies in the historical and social contexts in which current and future older adults have lived their lives.

The end of World War II in 1945 is the largest historical event in Japan's modern history. The total devastation of the country and the complete

renewal of political, social, economic, and educational systems under the U.S. occupation remain vivid memories among those who are currently aged 75+ years (born in 1936 or earlier). Among those seniors, men worked long hours to drive the rapid economic growth of 1955–1972. When young, many moved from rural to metropolitan areas and bought homes there. Most married and had children. Women typically stayed home to raise family. Geographic mobility has been low among the Japanese, and thus, those men and women, who constitute the core of the current oldest old, are now aging in urban communities. Social isolation is a salient issue in modern highly urbanized Japan. A five-country survey revealed that Japanese older adults are more socially isolated than their counterparts in France, Germany, Korea, and the United States: Japan ranked last in the frequencies of contacts with noncoresiding children and second from the bottom for contacts with their neighbors (above the United States; Cabinet Office, 2005). It is critical to develop and strengthen community-based support systems, especially for those with limited physical and cognitive function.

Future older adults will differ drastically from today's seniors who know sheer poverty and value frugality. Baby boomers grew up during the rapid economic growth, entered the workforce before the bubble economy (1986–1991), and have just started retiring. The majority of women have participated in the labor force and have fewer children than their predecessors. These baby boomers, who will constitute the core of the older old in 2030, are less likely than their predecessors to save money for future generations and depend on their adult children. Their children, on the other hand, grew up and entered the workforce mostly during the recession. These young adults are more likely to be worse off, stay single, and have even fewer children than their parents. Japan simply cannot afford having older adults not working. In 2030, they will constitute one third of the total population and can expect limited support from the working-age population. Labor participation among older adults is essential for sustaining the Japanese society.

Disasters, Preparedness, and Community-Based Support in Aging Societies

The 2011 earthquake reminded Japan of its traditional societal strengths, exemplified by the predominantly rural Tohoku district. Older adults'

wisdom saved numerous lives. Teachings handed down from parents and ancestors prompted people to run to higher grounds immediately after the massive earthquake to escape a series of anticipated tsunamis. In the earthquakes that hit the same area in 1896 and 1933, many people were killed by the second or third tsunami that was larger than the first one. Lessons from previous disasters have remained effective in Tohoku, where teachings from old days are still valued. A mayor's insistence on building a 15.5-m high levee ended up saving the whole village decades later. High costs and political opposition did not sway his decision based on lessons that he and his ancestors had learned from previous tsunamis that had killed hundreds of villagers. The resilience of older adults, who have endured prior natural disasters and World War II, impressed and inspired people throughout Japan and the world. The media circulated images of older adults who remain active in farming and fishing, formerly Japan's main industries. Partly reflecting its tradition that values working, Japan has high labor participation rates among older adults, especially the self-employed. Overall, the rates for men were 50% for age 65–69 years and 23% for age 70+ years in 2007. The corresponding figures for women were 24% and 9.4%. Many older adults want to work: 40% of workers aged 60+ years wished to continue working “for as many years as they can” (Cabinet Office, 2010).

The earthquake also revealed strengths of traditional social relationships rooted in close family and neighborhood networks. Social networks that encompass multiple generations within families and communities are sources of instrumental support as well as happiness and stress in Japan (Akiyama, Antonucci, & Campbell, 1997). Elaborate emergency preparedness plans, which had been in place in local communities and neighborhood mutual aid systems, were effectively activated to facilitate evacuation and coping. Close-knit community-based social networks enhanced provision and receipt of social support. To preserve social support systems in earthquake-stricken communities, local governments have relocated whole communities as intact as possible. Beyond the disaster areas, relief activities activated social capital throughout Japan. New information and communication technologies (e.g., the internet, twitter) connected people in ways that are new since previous disasters. Although Internet connection became unavailable in the hard-hit areas, spoken or hand-written information travelled from disaster

areas throughout the country (and beyond) by multiple links of cell phones, social network sites, and Web sites. The Internet allowed geographically distant people to contribute their unique resources and collaborate with people unknown to them. For example, the identified need for reading glasses among older evacuees activated a geographically distant network of eyeglass manufacturers to provide glasses. The social networking service utilization rates are lower among those who are older (36% for 60+, 45% for 40–59, and 65% for 15–39 years), and Internet use remains low in the oldest cohorts who are unfamiliar with typewriting or computer keyboards (58% for 65–69, 33% for 70+, and 19% for 80+ years; Ministry of Internal Affairs and Communications, 2010). However, future elders, who are current caregivers of their older parents, will age with their Internet skills. The role of social media in emergency preparedness for older adults will continue to grow.

On the other hand, the earthquake highlighted Japan's emerging challenges. Total destruction of many waterfront communities necessitates rebuilding. Whether to replicate old communities that are familiar to their residents or to build completely new ones is controversial. However, the disaster, although certainly tragic, provides opportunities to rebuild communities in innovative ways that accommodate the “super-aging” society and protect against the natural disasters that hit Japan periodically. Building such communities will require close collaboration among local governments, industries, health care providers, academic communities, and residents.

The disaster was a wake-up call for urban communities, especially those in the Tokyo Metropolitan Area. Although not comparable to the devastating damages of the Tohoku district, most people in the Tokyo Metropolitan area experienced the strongest earthquake in their lifetime, numerous aftershocks, fears of radiation, and inconveniences (i.e., lack of transportation, electricity, fuel, and bottled water). Japan's economy, industries, culture, and politics are highly concentrated in Tokyo. If a magnitude 9.0 earthquake hit Tokyo, the effects would far exceed those of the Great East Japan Earthquake. Realizing the likelihood of strong earthquakes in the foreseeable future and the vulnerability of urban communities, Japan is reviewing and reinforcing its emergency preparedness at multiple levels. Rebuilding broken social relationships, reintegrating isolated older adults, and encouraging

older adults' labor participation are major challenges in rapidly aging urban communities.

Conclusions

Japan is enjoying the highest life expectancy in the world with relatively low health care costs (7.9% of its gross national product spent on health care compared with 16% in the United States). Under the universal Long-Term Care Insurance System, people aged 65+ years are entitled to receive long-term care if determined to have care needs. Despite this seemingly rosy picture, Japan faces major challenges stemming from simultaneous population aging and population decline. Japan precedes other countries in experiencing a "super-aging" society not only in rural but also in urban communities.

Japan's experience could provide lessons from which other countries might learn. First, recognizing population aging as a critical societal issue for the past two decades, Japan has implemented a number of policies. For example, to contain skyrocketing long-term care costs, Japan incorporated disability prevention services into long-term care benefits in 2005 (Tsutsui & Muramatsu, 2007) and is exploring effective ways to maintain older adults' functional abilities and promote independent living. Such social experiments could inform other countries, especially the Asian countries that are undergoing even faster population aging than Japan (e.g., South Korea). Second, Japan's new community-building efforts present examples for other countries that seek to strengthen social relationships. For example, proposed postearthquake rebuilding plans include temporary housing for evacuees that incorporates elements of "engawa," an inviting space for social interactions with neighbors or a long veranda that is partly inside traditional Japanese buildings with sliding doors protecting it from rain. Emerging urban neighborhood rebuilding efforts include incorporation of traditional neighborhood customs into modern apartment buildings, such as "kairan-ban," weekly circulated bound copies of information on community events and emergency preparedness plans. Neighborhood members check off signature boxes to ensure that everybody views the information. The pendulum is swinging back after people have experienced isolating urban lives. A national consensus exists that old social relationships that tend to suppress individualism would not work anymore. Creative rebuilding efforts, however, can incorporate old local customs, just like traditional

kimono fabrics can make modern art or fashion innovative and attractive. The marriage of new technology and traditional wisdoms holds promise. Third, high labor force participation among Japanese older adults can provide insights for aging societies. Anticipating a society where one of three people is aged 65+ years, Japan is implementing policies to encourage older adults to engage in productive activities. Research using internationally comparable secondary data listed in Table 1 is enhancing our understanding of the interplay among labor force participation, family support, and health (Ichimura, Shimizutani, & Hashimoto, 2009; Ogawa, Retherford, & Saito, 2010; Raymo, Liang, Kobayashi, Sugihara, & Fukaya, 2009).

Finally, the benefit of learning from other countries' experience cannot be overemphasized. Each country, however, should develop systems that suit its local systems and cultures. Japan continuously learns from other countries and incorporates foreign elements that would fit Japan. Efforts have already begun to encourage comparative scholarship and international exchange. For example, the U.S. National Academy of Science recently organized conferences among five countries: China, India, United States, and Indonesia, the four most populated countries in the world, and Japan, the most aged country (<http://www.nationalacademies.org/AgingInAsia.html>). The five countries' National Academies have produced two conference reports on preparing for the challenges of population aging, one published (National Academies, 2011) and another forthcoming.

The Great East Japan Earthquake of 2011 highlights the importance of community-based support systems and emergency preparedness. Such systems should incorporate innovation (e.g., new technology) and collaboration of multiple stakeholders including older residents. Building on existing societal strengths may enhance the effectiveness of new systems to prepare for the future. Although tragic, this earthquake provides an opportunity to understand how such a large-scale historic natural disaster can impact people's life course and, in turn, how individual and collective lives can affect societal responses to natural disasters and population aging.

Acknowledgments

The authors would like to thank Yasuhiko Saito, Erika Kobayashi, Satoshi Shimizutani, Jersey Liang, Joan M. Bennett, and Marshall H. Chin, as well as Rachel Pruchno, and two anonymous reviewers for their helpful inputs and comments.

References

- Akiyama, H., Antonucci, T. C., & Campbell, R. (1997). Exchange and reciprocity among two generations of Japanese and American women. In J. Sokolovsky (Ed.), *The cultural context of aging: World-wide perspectives* (2nd ed., pp. 163–178). Westport, CT: Bergin & Garvey.
- Cabinet Office. (2005). Sixth cross-national comparative survey: Lives among older adults. Retrieved May 16, 2011, from <http://www8.cao.go.jp/kourei/ishiki/kenkyu1.htm>
- Cabinet Office. (2010). *Annual report on the aging society: 2010*. Retrieved from <http://www8.cao.go.jp/kourei/whitepaper/w-2010/zenbun/html/s1-2-4-01.html>
- Campbell, J. C., & Ikegami, N. (2000). Long-term care insurance comes to Japan. *Health Affairs (Millwood)*, 19, 26–39. doi:10.1377/hlthaff.19.3.26
- Ichimura, H., Shimizutani, S., & Hashimoto, H. (2009). JSTAR first results 2009 report. Retrieved May 18, 2011, from <http://www.rieti.go.jp/en/publications/summary/09090002.html>
- Ministry of Health, Labour and Welfare. (2010). List of Statistical Surveys conducted by Ministry of Health, Labour and Welfare. Retrieved April 30, 2011, from <http://www.mhlw.go.jp/toukei/itiran/eiyaku.html>
- Ministry of Internal Affairs and Communications. (2010). White paper information and communications in Japan 2010 (Jouho Tsushin Hakusho Heisei 22-nendo-ban). Retrieved May 22, 2011, from <http://www.soumu.go.jp/johotsusintokei/whitepaper/eng/WP2010/2010-outline.pdf>
- National Academies (Chinese Academy of Social Sciences; Indian National Science Academy; Indonesian Academy of Sciences; National Research Council of the U.S.; National Academies, Science Council of Japan). (2011). Preparing for the challenges of population aging in Asia: Strengthening the scientific basis of policy development. Retrieved from <http://www.ncbi.nlm.nih.gov/books/NBK53399/>
- National Institute of Population and Social Security Research. (2010a). Population & household projection. Retrieved April 30, 2011, from http://www.ipss.go.jp/site-ad/index_english/population-e.html
- National Institute of Population and Social Security Research. (2010b). Population statistics. Retrieved April 30, 2011, from http://www.ipss.go.jp/site-ad/index_english/Population%20%20Statistics.html
- National Institute of Population and Social Security Research. (2011). Social security in Japan. Retrieved April 30, 2011, from <http://www.ipss.go.jp/s-info/e/Jasos2011/ss2011.pdf>
- Nippon Hoso Kyokai (NHK), Japan Broadcasting Cooperation. (2011). Earthquake-related deaths exceed 500 ("Saigai-kanren-shi" 500-nin Koeru). Retrieved from <http://www3.nhk.or.jp/news/html/20110513/k10015881245000.html>
- Ogawa, N., Retherford, R. D., & Saito, Y. (2010). Care of the elderly and women's labour force participation in Japan. In S. Tuljapurkar, N. Ogawa, & A. H. Gauthier (Eds.), *Ageing in advanced industrial states: Riding the age waves—Volume 3, International Studies in Population* 8 (pp. 223–261). Heidelberg, Germany: Springer.
- Ouchi, Y., & Akiyama, H. (Eds.). (2010). *Gerontology: Overview and perspectives*, 3rd Ed. (Shin Ronen-gaku, Dai 3-han). Tokyo, Japan: University of Tokyo Press.
- Raymo, J. M., Liang, J., Kobayashi, E., Sugihara, Y., & Fukaya, T. (2009). Work, health, and family at older ages in Japan. *Research on Aging*, 31, 180–206. doi:10.1177/0164027508328309.
- Statistics Bureau. (2003). Aged population: Current and future (Korei-sha Jinko-no Genjo-to Shorai). Retrieved April 30, 2011, from <http://www.stat.go.jp/data/topics/topics051.htm>
- Statistics Bureau. (2010). Portal site of official statistics of Japan. Retrieved April 30, 2011, from <http://www.e-stat.go.jp/SG1/estat/ListE.do?lid=000001063433>
- Tsukada, N. (Ed.). (2010). *Foreign workers in long-term care: How is long-term care changing in Japan? (Kaigo Gemba-no Gaikokujin Rodosha: Nihon-no Care Gemba-wa Dou Kawaremonaka)*. Tokyo, Japan: Akashi Shoten.
- Tsutsui, T., & Muramatsu, N. (2005). Care-needs certification in the long-term care insurance system of Japan. *Journal of the American Geriatrics Society*, 53, 522–527. doi:JGS53175 [pii] 10.1111/j.1532-5415.2005.53175.x.
- Tsutsui, T., & Muramatsu, N. (2007). Japan's universal long-term care system reform of 2005: Containing costs and realizing a vision. *Journal of the American Geriatrics Society*, 55, 1458–1463. doi:JGS1281 [pii] 10.1111/j.1532-5415.2007.01281.x.
- World Health Organization. (2011). *World Health Statistics 2011*. Retrieved May 17, 2011, from http://www.who.int/whosis/whostat/EN_WHS2011_Full.pdf