a: Health care challenges

Despite a rise in obesity and lifestyle diseases because of a more westernized lifestyle, adult obesity in Japan is still low compared to other OECD countries.[1] Age-adjusted mortality and infant mortality has decreased, while life expectancy has improved.[2] The most immediate challenge to the Japanese health care system of is the multiple effects of demographic change.

Japan is a rapidly aging society with a total fertility rate of 1,39 and a life expectancy of 83,9 years.[3] As a result Japan experienced negative population growth in the late 2000's,[4] and now 24,1% of the total population are aged 65 or older.[5] These demographic trends are expected to continue an the Japanese government estimates a population decline to 97 million by 2050, of which 38,8 % will be over 65 years old.[6]

This means that a shrinking working population will have to take care of an increasing population of elderly. A smaller workforce will put the Japanese economy under pressure,[7] [8] at a time where spending on health care and welfare are expected to rise. On top of this, there will also be a shortage of workers to provide care for the elderly.

Traditionally the older generations have been living with their family and received care from their children, especially the daughters or daughters-in-law.[9] Home-based care is still the norm, with 83% of the 5,06 million people certified as requiring long-term care lived at home in 2010.[10] Of the total population over 65, 41% still live with their family, and 20% of the primary carers of frail elderly are daughters-in-laws.[11] The carers (both formal and informal) are overwhelmingly female and 50% of them are over 60 years old.[12]

As immigration control is strict, it is hard to import foreign labour to the welfare sector. Furthermore public opinion is divided on foreign workers in welfare, with many preferring raising the age of retirement, mobilization of female workers and higher efficiency achieved through use of welfare technology.[13] [14]

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[1] Mariko Nishikitani, Shinobu Tsurugano, Mariko Inoue, Eiji Yano (2012). Effect of unequal employment status on workers' health: Results from a Japanese national survey, Social Science & Medicine 75 (2012), p 439
[2] http://www.oecd.org/els/health-systems/BriefingNoteJAPAN2012.pdf
[3] CIA world fact book https://www.cia.gov/library/publications/the-world-factbook/geos/ja.html
[4] The Organisation for Economic Co-operation and Development (OECD) http://www.oecd-ilibrary.org/economics/country-statistical-profile-japan_20752288-table-jpn
[5] http://www.stat.go.jp/data/jinsui/2012np/index.htm
[6] Ministry of Internal Affairs and Communication
http://www.stat.go.jp/english/data/handbook/c02cont.htm
[7] Eberstadt, Nicholas (2010).
[8] Hewitt, Paul S. (2002).
[9] Tamiya Nanako et al (2011). Population ageing and wellbeing: lessons from Japan's long-term care insurance policy, in www.thelancet.com, Vol 378 September 24, 2011, p 1187
[10] http://www.mhlw.go.jp/english/policy/care-welfare/care-welfare-elderly/dl/ri_130311-01.pdf
[11] Tamiya Nanako et al (2011). Population ageing and wellbeing: lessons from Japan's long-term care insurance policy, in www.thelancet.com, Vol 378 September 24, 2011, pp 1183-4, 1187
[12] http://www.mhlw.go.jp/english/topics/elderly/care/2.html
[13] Coulmas 2007
[14] Morgan 2001

The Japanese society needs systems that

- Enable people over 65 to remain active in the workforce
- Relieve burdens of formal and informal carers
- Support care at home - assistive living
- Support people suffering from geriatric diseases, such as dementia
- (Supporting childcare, edutainment)

b: Health care investment focus

The Japanese state have a history of investing in research and development of robot technology, for example The Humanoid Project initiated in 1998 by the Ministry of Economy, Trade and Industry (METI).

In 2007 the Shinzo Abe administration published *Innovation 25*, a vision of how innovation in robotics, and especially household-robotics, would help reverse the declining birth-rate and help sustain the needs of the rising population of elderly.[15]

The main actors on the welfare policy field is the Ministry of Health, Labour and Welfare (MHLW), METI and the semi-government organisation NEDO (the New Energy and Industrial Technology Development Organisation), with the latter two most active in supporting and funding R&D. Lastly the Ministry of Land, Infrastructure, Transport and Tourism involved in cooperation with MHLW to construct housing for elderly.[16]

In November 2012 METI and MHLW published a report on what they see as the four key areas of welfare and nursing robots:

1. Robots/technology that relieve or assist carers when lifting and moving.
2. Robots/technology that enable to move more freely, or help users transport items.
3. Robots/technology processing excretion
4. Protective robots/technology aimed at users suffering from dementia.

METI further pledges to work with NEDO and related organisations and corporations to implementation of robot technology that meets the needs of the users and carers.[17]

To support the 4 areas above, METI started a new program in March 2013 for "Promotion of Implementation and Development of Nursing Robots", with a budget of ¥3.26 billion (190 million DKKR) for the fiscal year of 2013. The program will support private companies in research and development and implementation of robot technology that meets the needs of elderly people or carers, while working with the Ministry of Health, Labour and Welfare to create an environment for actual testing were the nursing is provided.[18] Corporations and organisations based in Japan will be able to apply for up to ¥7 billion (4 million DKKR).[19]

[15] http://www.kantei.go.jp/jp/innovation/index.html
[16] http://www.mhlw.go.jp/english/policy/care-welfare/care-welfare-elderly/dl/ri_130311-01.pdf
[17] http://www.mhlw.go.jp/stf/houdou/2r9852000002p8sl.html
[18] http://www.meti.go.jp/main/yosangaisan/fy2013/pdf/07.pdf
[19] http://www.meti.go.jp/information/publicoffer/kobo/downloadfiles/k130325002_01.pdf

c: Health care structure

Japan has universal health care coverage through mandatory insurances.

Overview

A 2011 survey shows that Japan has 8605 hospitals and 99.547 medical clinics. 17,8% of the hospitals are national or public, 70,7% are driven by private organisations, 1,4% by organisations affiliated with the social insurance system and 10% by others. 4,3% of the medical clinics are national or public, 83,4% are driven by private organisations, 0,6% by organisations affiliated with the social insurance system and 11,7% by others.[20] In 2010 Japan had 2,2 practicing physicians per 1000 population, which is less than the OECD average of 3,1.[21] Investor-owned for-profit hospitals are prohibited in Japan.[22]

There are several types of housing and institutions for the elderly: [23]

Type	Run by	Number
Intensive care facilities	Local governments; special welfare corporations	6.213 (2010)
Long-term rehabilitation	Local governments; medical corporations	
Sanitary wards at hospitals	Local governments; medical corporations	1.990 (2010)
Fee-based home	No restriction (mainly business corporations)	5.232 (2010), 7,563 (2012)
Moderate-fee home for low income elderly	Local governments; social welfare corporations; corporation approved by prefectural governments	2.114 (2010)
Care facility for environmentally and economically deprived	Local governments; social welfare corporations;	978 (2010)
Dementia group homes	No restriction (mainly business corporations)	N/A
Elderly housing with care	No restriction (mainly business corporations)	N/A

Health Care – the National Health Insurance

Virtually all Japanese are covered through around 3500 health care plans according to place of residence or place of work.[24] Citizens pay a premium according to their employment status and income. Municipalities act as insurers and administrators.

[20] http://www.mhlw.go.jp/toukei/saikin/hw/iryosd/11/dl/1-1.pdf
[21] http://www.oecd.org/els/health-systems/BriefingNoteJAPAN2012.pdf
[22] http://content.healthaffairs.org/content/10/3/87.full.pdf p 89
[23] http://www.mhlw.go.jp/english/policy/care-welfare/care-welfare-elderly/dl/ri_130311-01.pdf
[24] Future of Japan's system of good health at low cost with equity: beyond universal coverage
Kenji Shibuya, Hideki Hashimoto, Naoki Ikegami, Akihiro Nishi, Tetsuya Tanimoto, Hiroaki Miyata, Keizo Takemi, Michael R Reich, www.thelancet.com Vol 378 October 1, 2011, p. 1266

Nationally the financing of health expenses are distributed in the following way: municipalities and prefectures 12,2%, state 25,9%, 20,1% by employers, 28,3% by insurance premiums and 12,7% by patient co-payment.[25] Depending on family income and age he insured has to pay 20% or 30% of the medical fee, while the rest is covered by the government.[26]

Care for the elderly

The Japanese state has supported older citizens for a long time. In the sixties it began small scale public funding for nursing homes and home-care, and in the 70's it abolished medical co-payment for people 65, which resulted in a rise of social admissions, without much medical justification, into hospitals. Around 500.000 elderly still live in special wards in hospitals. In 1989 the government initiated the Gold Plan, with the goal of doubling institutional beds and tripling care services for older people over 10 years. The Gold Plan struggled with administration problems, regional and local quality differences, and increasing spending.

In 2000 it was replaced by a the public mandatory long-term care insurance (LTCI), which is financed 50% by taxes and 50% by premiums paid by Japanese aged 40 or older. The LTCI is managed by the municipalities. Premiums are adjusted according to income.

Japanese aged 65 years and older, or aged 40–64 years and suffering from geriatric diseases, are entitled to LTCI services. Clients are categorized into one of seven groups according to the level of their care needs. Each group sets a ceiling amount of services that can be purchased as benefits per month ranging from ¥53.200 (3.800 DKKR) to ¥383.400 (27.383 DKKR). Clients pay a co-payment of around 10%.[27] [28]

LTCI covers institutional services, include nursing homes, homes with more medical service, chronic-care hospitals, out of home services such as day care centres, rehabilitation and short-stay respite care, and care at home such as home help services, at home nursing, bathing, remodelling, and rental of assistive devices.[29]

A care manager draws a plan for the care. Care managers are required to take a training corse and an exam. They are employed by a specialized agency or a service provider. Their main tasks are to coordinate with different service providers, manage service provision and reimbursement, and help recipients make decisions.[30] Clients choose freely between providers.[31] Providers include local governments, semi-public welfare corporations, non-profit organisations, hospitals, and for-profit companies (for-profit companies are not allowed in institutional care). All providers are licensed and supervised by the local government. Service fees are set by the national

[25] http://www.mhlw.go.jp/seisakunitsuite/bunya/kenkou_iryou/iryouhoken/iryouhoken01/index.html
[26] http://www.its-kenpo.or.jp/html_main/h_b.html
[27] Ministry of Health, Labour and Welfare http://www.mhlw.go.jp/english/topics/elderly/care/
[28] Tamiya Nanako et al (2011). Population ageing and wellbeing: lessons from Japan's long-term care insurance policy, in www.thelancet.com Vol 378 September 24, 2011, pp. 1185 & 1190
[29] Ministry of Health, Labour and Welfare http://www.mhlw.go.jp/english/topics/elderly/care/2.html
[30] Tamiya Nanako et al (2011). Population ageing and wellbeing: lessons from Japan's long-term care insurance policy, in www.thelancet.com Vol 378 September 24, 2011, p 1185
[31] Ishiguro Nobu (2012). "Er valgfrihed altid ønskelig?", Gerontologi Årgang 28, December 12, nr. 04, s. 16-17

government and revised every 3 years.[32]

Once assessed as eligible, the client selects a care manager who draws up a care plan, setting the weekly schedule of care services.

[32] Tamiya Nanako et al (2011). Population ageing and wellbeing: lessons from Japan's long-term care insurance policy, in www.thelancet.com Vol 378 September 24, 2011, p 1185

d: Health care company structure

Care technology market

According to a 2006 survey predicts that the Japanese market for partner robots (term covering robots for entertainment, surveillance, cleaning, lifestyle support, education and nursing care) will grow to 18,6 million units or ¥3,26 billion (187 million DKKR) by 2016.[33] METI estimates that the market for care alone will be ¥16,7 billion (970 million DKKR) by 2015 and ¥400 billion (23,25 billion DKKR) by 2035.[34]

However, care technology is usually expensive, and therefore only implemented in some care facilities. METI and MWHL are working on expanding on expanding the public insurance to cover more welfare robots. The plan is to reimburse 9% of the cost.[35]

Because of the high pricing, most technology can also be leased. The walking assistance suit HAL by Cyberdyne has an initial cost of about ¥550.000 (32.200 DKKR) followed by a monthly fee of about ¥158.000 (9.250 DKKR) for 5 years.[36] MySpoon be SECOM will cost ¥399,000 (23.360 DKKR) to buy or ¥6.405 (375 DKKR) pr. month for 5 years.[37]

Companies

It is not easy to give a clear overview of the Japanese companies developing welfare technology as many of them also do many other things. The most famous companies developing partner and care robots, SONY (Aibo, Qrio), Mitsubishi Heavy Industries (Wakamaru), Honda (Asimo, walking assistance) and Toyota (walking assistance), are mainly known for other activities.

Some of the smaller companies team up with larger ones to get promotion, e.g. AIST (Paro), Moritoh (Popo) and NWIC (Minelet) have teamed up with housing giant Daiwahouse for promotion and sales. Daiwahouse is also responsible for the sale of Wakamaru by Mitsubishi.[38]

Some of the larger companies also offer care services, build and run care facilities, or senior housing sell or lease care equipment, and even provide care management support. These include Airwater (bathing system), SECOM (myspoon), Daiwahouse (represents Paro, HAL, POPO and more) and Panasonic.

The technology is sold to private buyers and health care facilities. Many companies ask private persons to buy through their care organisation or care manager,[39] and will only lease to institutions and organisations.[40] [41]

[33] http://www.robocasa.com/pdf/press_release.pdf
[34] http://www.nikkei.com/article/DGXNASFS2901R_Z20C12A7MM8000/
[35] http://www.nikkei.com/article/DGXNASFS2901R_Z20C12A7MM8000/
[36] http://www.cyberdyne.jp/customer/index_3.html#cs07
[37] http://www.secom.co.jp/personal/medical/myspoon.html
[38] http://www.mhi.co.jp/products/detail/wakamaru_basic-package.html
[39] http://www.cyberdyne.jp/robotsuithal/faq.html
[40] http://www.cyberdyne.jp/customer/index_3.html#cs07
[41] http://www.daiwahouse.co.jp/release/20121212093333.html

Technology is sold through organisations targeting the health and welfare markets[42]. They sell or lease a wide variety of equipment for care to institutions or private customers. There are at least 7000 of these companies,[43] but not all sell products that fall under the definition of welfare technology. Two examples are Yamashita Corporation[44] and Frontier,[45] and also Airwater who runs a chain called AI Land with 27 stores.[46]

List of companies:
ActiveLink - lifting assistance
http://psuf.panasonic.co.jp/alc/en/index.html

Airwater - Bathing System
http://www.awi.co.jp/english/business/medical/service.html

AIST - Paro
http://www.aist.go.jp/aist_e/latest_research/2004/20041208_2/20041208_2.html

Honda Motor Co. Ltd - Walking assistance
http://www.honda.co.jp/robotics/

Moritoh Corporation - Lift “popo”
http://www.moritoh.co.jp/?page_id=10

NWIC - Waste disposal system “Minelet”
http://www.minelet.com/

Panasonic - Robotic bed turned wheelchair
http://panasonic.co.jp/ism/robot/robot01.html

RIKEN – Riba transfer robot
http://rtc.nagoya.riken.jp/

SAKAImed - Bathing system
http://www.sakaimed.co.jp/index.html

Sales on Demand - Representing iRobot[47] in Japan
http://www.salesondemand.co.jp/

Sanyo - Electronic bed
http://www.sanyo-inc.co.jp/kaigo/

SECOM co. ltd. - Eating assistant robot Myspoon

[42] The Japanese term for these businesses is *fukushi yougu rentaru/hanbai jigyou* (福祉用具レンタル・販売事業)
[43] http://www.mhlw.go.jp/toukei/saikin/hw/kaigo/service11/dl/sankou.pdf
[44] http://www.yco.co.jp/service/homecare/service.html
[45] http://www.frontier-ph.com/homecare/kaigo/index.html
[46] http://www.awi.co.jp/business/medical/welfare/tools.html
[47] iRobots cleaning robots are not particularly associated with care, and are sold in normal chain stores selling electronic equipment, tv’s, cameras etc.

http://www.secom.co.jp/home/

TMSUK - Hospital care equipment, surveillance robot
http://www.tmsuk.co.jp/english/robots.html

Toyota
http://www2.toyota.co.jp/en/news/11/11/1101.html

Toshiba
Cleaning robots
http://www.toshiba.co.jp/living/lineup/cleaners/0163_k2_pic_01.html

e: Health care product approvals and acceptance

Certification of products in Japan falls into two categories: mandatory technical standards and non-mandatory voluntary standards.[48]

Japanese Industrial Standards Mark (JIS) is a voluntary standard but it is used widely. Electrical appliances imported to Japan are subject to the Electrical Appliance and Material Safety Law and are required to get the Product Safety Electric Appliance and Materials Mark (PSE).[49]

Testing and certification in connection to JIS and PSE is carried out by government-approved third-body certifying organizations.

There are a variety of organizations offering guidance, testing and certifications, e.g.:

- JET (Japan Electrical Safety & Environment Technology Laboratories) http://www.jet.or.jp/
- JQA (Japan Quality Assurance Organization) http://www.jqa.jp/english/index.html
- TÜV SÜD Group http://www.tuv-sud.jp/english/eec/japanese_market.html
- UL Japan http://www.ul.com/japan/eng/pages/aboutus/

Many of the certifying organizations also have their own voluntary quality or costumer safety marks.

There are also moves to bring Japanese standards into harmony with international standards, and certification organizations usually offer to certify using ISO (International Organization for Standardizations) or IEC (International Electrotechnical Commission) standards as well as Japanese ones.

New standards for welfare technology

Part of METI's "Promotion of Implementation and Development of Nursing Robots" is to develop assessment and standardization methods for safety and functions. METI proposes to base the safety standard on the ISO safety requirements for non-medical care robots ISO / DIS 13482, and the functional standard on the JIS standards for similar technology.[50]

Although ISO / DIS 13482 is still under development,[51] JQA used this standard to certify the first personal care robot (HAL by Cyberdyne) in February 2013.[52]

Further information

For further information on JIS:
http://www.jisc.go.jp/eng/jis-mark/pdf/JISpamphlet.pdf

[48] http://ita.doc.gov/td/standards/Final%20Site/CCG/CCG%20PDFs/Japan.pdf
[49] http://www.meti.go.jp/english/policy/economy/consumer/pse/index.html
[50]研究基本計画 from http://www.meti.go.jp/information/publicoffer/kobo/k130325002.html
[51] http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=53820
[52] http://www.jqa.jp/service_list/fs/topics/topics_fs_04.html

For full list of designated JIS certification bodies:
http://www.jsa.or.jp/eng/jiscba/p4.asp

For further information on PSE:
http://www.meti.go.jp/english/policy/economy/consumer/pse/index.html

Kilder

Eberstadt, Nicholas (2010).* ”The Demographic Future,” *Foreign Affairs*, Vol. 89 Issue 6, Nov/Dec2010, pp 54-64. Hentet 5. april 2012. Link: http://search.ebscohost.com.ep.fjernadgang.kb.dk/login.aspx?direct=true&db=a9h&AN=54624934&site=ehost-live

Hewitt, Paul S. (2002). ”Depopulation and ageing in Europe and Japan: The hazardous transition to a labor shortage economy,” *Internationale Politik und Gesellschaft*, Volume 1 2002, pp. 111-120. Hentet 7. april 2012. Link: http://www.fes.de/ipg/ipg1_2002/ZEITSCHRIFT.HTM