

Future Institutional Care Needs of the Elderly in Japan

Tetsuo Fukawa*

Institution for Future Welfare, Tokyo, Japan

*Corresponding author: Tetsuo Fukawa, Institution for Future Welfare, 1-26-16-302 Shoto, Shibuya-ku, Tokyo, Japan, Tel: 03 6407 9700; E-mail: fukawa@ifwj.org

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Abstract

Incorporating a theoretical logic into a dynamic micro-simulation model named INAHSIM, we estimated future institutional care needs of the elderly in Japan. Among the elderly aged 65 or over, the proportion of those who stay in institutions (institution rate) will increase from 4.7% in 2015 to 12.4% for Standard case or 6.6% for Independent case in 2065. After an international comparison on the institution rate of the elderly, we discussed the importance of alternative ways for the elderly care other than institutional care.

Keywords: Population-household projection; Dependency level of the elderly; Institutional care; Institution rate

Introduction

How to provide long-term care (LTC) services for the frail elderly is a sticking issue in Japan since the introduction of the LTC Insurance in 2000. The need for LTC increases with age, and it is quite common among very old population. Consequently, per capita LTC expenditure increases quite rapidly with age increase, much faster than per capita medical expenditure. Whether a frail elderly should be taken care of at an institution or at his/her own home will depend not only on individual concerned but also on historical and cultural contexts of each country.

In view of ageing of the population and rising consumer expectations about the quality and quantity of LTC services, it is a common concern among developed countries how to increase incentives for efficiency and consumer direction in the LTC system as well as how to finance LTC expenditure [1]. Most elderly people prefer to remain in their homes because they are able to maintain the integrity of their social network, preserve environmental landmarks and enjoy a higher quality of life [2]. Living in institutions is not only expensive in terms of both public and private finances, but also associated with several negative outcomes such as increased mortality and restricted quality of life [2]. If we consider all social costs associated with elderly care, home care is not necessarily an inexpensive way. In any case, investigations of risk factors leading to institutionalization have been conducted in order to avoid all those adverse outcomes accompanying institutionalization.

The purpose of this paper is to estimate future institutional care needs of the elderly in Japan using the results of a population-household projection in Japan for the period of 2015-2065 (INAHSIM 2017 Simulation). Method and logic evaluating institutional care needs of the elderly are explained in Section 2. Future institutional care needs of the elderly are described in Section 3. Based on an international comparison of the percentage of the elderly who live in institutions (institution rate), we discussed the importance of alternative ways for the elderly care in section 4.

Method and Logic Evaluating Institutional Care Needs of the Elderly

Possibility of the elderly to move into institutions

Concerning the dependency of the elderly aged 65 or over, the same classification defined in Fukawa et al. [3] was used. Levels 2 and 3 correspond to persons eligible for the Japanese LTC Insurance, and Level 3 corresponds to care need assessments 4 and 5 in particular. Those elderly in levels 2 and 3 are supposed to use the LTC services.

Concerning the possibility of the elderly to move into institutions, we assumed two cases: Standard Case (S) and Independent Case (I). In Standard Case, single elderly with dependency level 2 remains if co-residing with a child or otherwise moves to an institution with the probability of 0.2 per year. Single elderly with dependency level 3 moves to an institution with the probability of 0.4 per year if co-residing with a child or otherwise always moves to an institution. Movement of an elderly couple depends on the combination of dependency levels as shown below (number indicates dependency level):

- 0 & 0, 0 & 1, 0 & 2, 1 & 1: remains;
- 1 & 2: remains if co-residing with a child or otherwise L2 moves to an institution with the probability of
- 0.2 per year;
- 2 & 2: remains if co-residing with a child or otherwise moves to an institution with the probability of 0.3 per year;
- 0 & 3, 1 & 3: L3 moves to an institution with the probability of 0.4 per year if co-residing with a child or otherwise L3 always moves to an institution; and
- 2 & 3, 3 & 3: always moves to an institution.

In Independent Case, single elderly with dependency level 2 remains regardless of co-residing with a child or not. Single elderly with dependency level 3 moves to an institution with the probability of

0.4 per year if co-residing with a child or otherwise always moves to an institution. Movement of an elderly couple depends on the combination of dependency levels as shown below (number indicates dependency level):

- 0 & 0, 0 & 1, 0 & 2, 1 & 1, 1 & 2, 2 & 2: remains;
- 0 & 3, 1 & 3, 2 & 3: L3 moves to an institution with the probability of 0.4 per year if co-residing with a child (**Note 1**- It is quite feasible that (0 & 3) and (2 & 3) have different probabilities, but for convenience' sake we applied same probability) or otherwise L3 always moves to an institution; and
- 3 & 3: always moves to an institution.

INAHSIM 2017 Simulation

In INAHSIM 2017 Simulation, a population-household projection for the period of 2015-2065 was conducted. Events contained in the simulation model include not only such vital events as birth, death, marriage, divorce, and changes of household situations generated by them, but also merger of aged parent(s) with the child's household and other movements of households. The process of the elderly to move to institutions occurs separately from merger of aged parent(s) with the child's household. The dependency level of the elderly aged 65 or over was compatible with the data from the LTC Insurance implemented since April 2000.

Detailed explanation about the INAHSIM model is found in Fukawa [3] and more information about INAHSIM 2017 Simulation is found in Fukawa [4]. Yearly dependency transition of the elderly is discussed in Fukawa [5].

Results

According to the INAHSIM 2017 Simulation, the total number of population will decrease from 127.1 million in 2015 to 84 million (Total Fertility Rate=1.4) or 95 million (TFR=1.7) in 2065, and aging rate will increase from 26.6% in 2015 to 39% or 34% in 2065 [4]. Among the elderly aged 65 or over, the proportion of those who stay in institutions (institution rate) will increase from 4.7% in 2015 to 12.4% for Standard case or 6.6% for Independent case in 2065 (Table 1).

Elderly institution rate in 2015, obtained from the simulation as Initial Population, was 4.7%, which is lower than the result from the 2015

Population Census. Main reason for this discrepancy occurred at age group 85+ as seen in Table 1 [6]. There are remarkable differences in institution rate between Standard case and Independent case. Institution rate for the elderly as a whole will increase steadily because of the aging, but institution rate by age group remains stable except age group 85+ for both cases.

Figure 1 shows the institution rate for the elderly aged 65 or over as well as aged 85 or over. The institution rate for the elderly aged 65 or over for Standard Case will be just twofold compared to that for Independent Case. The institution rate for the elderly aged 85 or over absorbs all effect of the aging, and it will be much higher than that of the rate for the elderly aged 65 or over for both Standard Case and Independent Case.

Table 2 shows the number of the elderly (65+) living in institutions and their proportion relative to the number of the elderly with dependence level 3. Females continue to outnumber males in the number of the elderly in institutions. In Independent Case, the number of the elderly in institutions is equivalent to around 80% of the elderly with dependence level 3. However, the corresponding figure is around 170% for males and around 150% for females in Standard Case (**Note 2**- In Standard Case, the number of the elderly in institutions is more than 100% of the elderly with dependence level 3, because institutionalization occurs from dependence levels 2 and 3).

Tables 3 and 4 reveal the differences between Standard Case and Independent Case. In Independent Case, the elderly with dependency level 2 are supposed to stay at their own homes in principle (Table 3). Concerning the elderly with dependency level 3, the numbers of those who live in institutions are basically identical between Standard Case and Independent Case (Table 4). Among the elderly aged 85 or over with dependency level 3, the number of those elderly who live in institutions is biased towards females, but the ratio is declining from 72% in 2015 to 61 or 62% in 2065.

Figure 2 shows the proportion of those elderly with dependency levels 2 and 3 who live in institutions for Standard Case. According to the logic employed to evaluate institutional care needs of the elderly, the proportion is much higher for those elderly with dependency level 3 than dependency level 2. The number of those elderly with dependency level 3 who live in institutions is off course higher for females than males, as seen in Table 4.

Table 1: Proportion of those elderly who live in institutions according to age group: 2015-2065

(In %)

Age Group	(a)	Standard Case						Independent Case				
	2015	2015	2025	2035	2045	2055	2065	2025	2035	2045	2055	2065
65+	6.0	4.7	6.1	7.4	8.1	10.1	12.4	3.1	3.6	4.0	4.8	6.6
65-69	1.6	0.5	0.7	0.6	0.5	1.0	0.5	0.2	0.2	0.2	0.2	0.2
70-74		2.2	2.3	2.6	2.5	2.5	2.3	0.9	0.7	0.7	0.9	0.6
75-79	5.5	4.1	4.3	4.9	4.7	5.8	6.1	1.8	2.0	1.6	1.8	1.9
80-84		7.0	8.3	8.9	10.1	9.8	9.9	3.8	3.4	4.0	3.8	4.3
85+	22.4	15.2	17.0	18.0	22.2	24.9	28.1	10.3	10.1	12.8	13.6	16.4

Note (a): Results from Population Census 2015 based on Fukawa et al. [6]

Table 2: Number of the elderly (65+) living in institutions: 2015-2065

	Sex	Standard Case						Independent Case				
		2015	2025	2035	2045	2055	2065	2025	2035	2045	2055	2065
Number (million)	Total	1.59	2.20	2.70	3.06	3.63	4.06	1.12	1.29	1.52	1.72	2.14
	Males	0.66	0.96	1.19	1.35	1.65	1.80	0.48	0.58	0.66	0.76	0.91
	Females	0.94	1.23	1.51	1.71	1.98	2.26	0.63	0.71	0.86	0.96	1.23
Institution /L3 (%)	Total	147	163	165	158	164	156	87	77	77	79	81
	Males	161	171	178	175	185	171	87	81	85	84	87
	Females	140	156	156	146	149	146	85	75	72	75	78

Table 3: Number of those elderly with dependency level 2 who live in institutions: 2015-2065

(In thousand)

	Age Group	Standard Case						Independent Case				
		2015	2025	2035	2045	2055	2065	2025	2035	2045	2055	2065
Total	65+	836	1,186	1,435	1,540	1,835	1,932	139	14	0	0	0
	65-74	137	161	162	169	159	113	0	0	0	0	0
	75-84	360	510	554	545	690	531	57	0	0	0	0
	85+	339	515	718	826	986	1,288	82	14	0	0	0
Males	65+	347	517	643	698	876	879	35	2	0	0	0
	65-74	63	84	92	90	82	56	0	0	0	0	0
	75-84	160	248	262	285	367	288	17	0	0	0	0
	85	124	185	289	323	428	535	18	2	0	0	0
Females	65+	489	669	791	843	958	1,052	105	12	0	0	0
	65-74	74	77	70	79	77	56	0	0	0	0	0
	75-84	200	262	292	261	323	243	41	0	0	0	0
	85	215	330	429	503	558	753	64	12	0	0	0

Table 4: Number of those elderly with dependency level 3 who live in institutions: 2015-2065

(In thousand)

	Age Group	Standard Case						Independent Case				
		2015	2025	2035	2045	2055	2065	2025	2035	2045	2055	2065
Total	65+	756	1,009	1,264	1,519	1,796	2,121	976	1,274	1,522	1,717	2,140
	65-74	76	73	66	85	60	44	83	68	74	71	44
	75-84	240	337	303	339	419	323	312	333	338	392	334
	85+	440	599	894	1,095	1,317	1,754	581	872	1,110	1,254	1,762
Males	65+	307	446	547	651	773	915	448	578	662	755	913
	65-74	55	46	45	48	39	29	50	41	49	42	30
	75-84	127	195	184	199	230	202	192	203	188	226	210
	85+	124	205	318	404	504	685	206	334	425	486	673
Females	65+	449	563	716	867	1,024	1,206	529	696	860	962	1,227
	65-74	21	27	21	37	22	16	33	27	25	29	15
	75-84	113	142	120	140	189	122	121	130	150	166	124
	85+	315	394	576	691	813	1,069	375	538	685	768	1,089

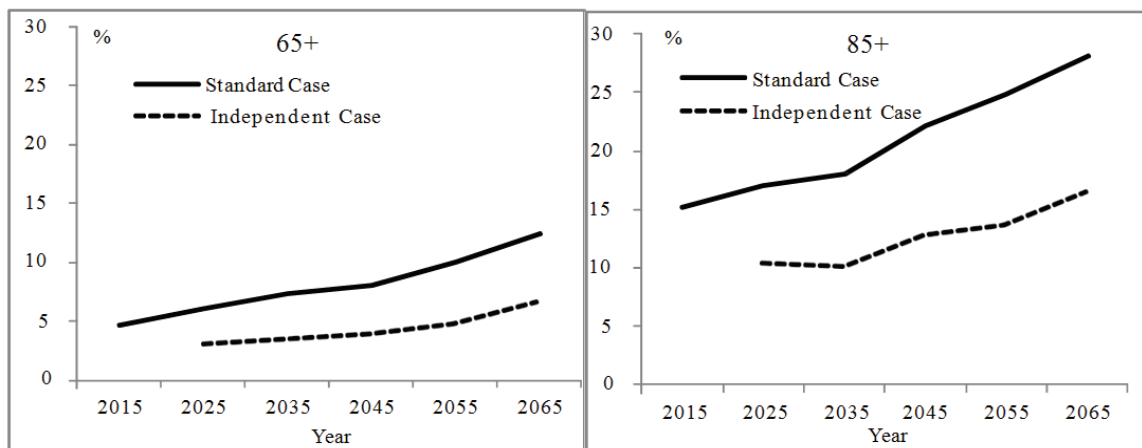


Figure 1: Institution rate for the elderly aged 65 or over (65+) and aged 85 or over (85+)

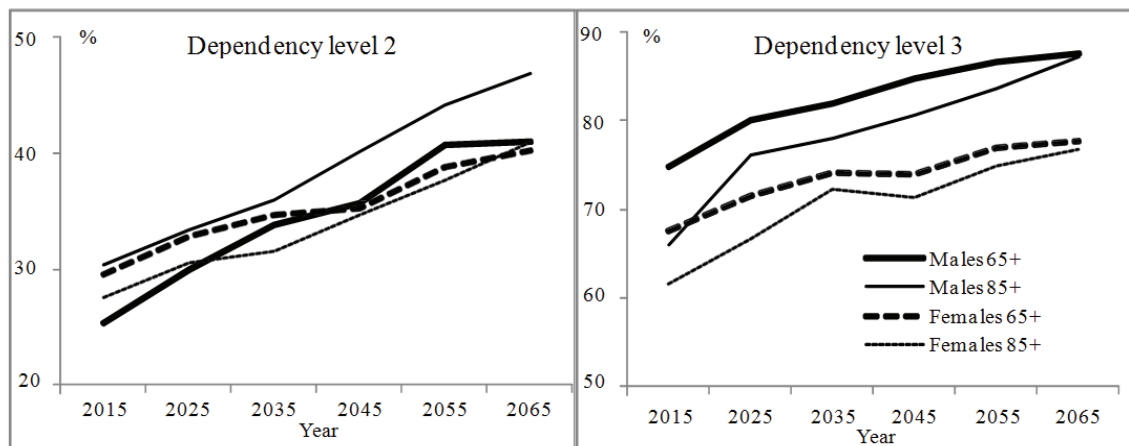


Figure 2: Proportion of those elderly with dependency levels 2 and 3 who live in institutions : Standard Case

However, the proportion is higher for males than females, which means more female elderly with dependency level 3 live with their children.

According to Fukawa [7], future elderly LTC expenditure based on 2015 prices without considering future developments such as technology advance and price increase will be 11.7 trillion Yen in 2025, 14.9 trillion Yen in 2045 and 18.1 trillion Yen in 2065 in Standard Case. Future elderly LTC expenditure will be similar in Independent Case.

Discussions

Based on a theoretical logic, we estimated future institutional care needs of the elderly in Japan, using the results of INAHSIM 2017 Simulation. The followings are among the main findings from the simulation:

- Among the elderly aged 65 or over, the proportion of those who stay in institutions (institution rat) will increase from 4.7% in 2015 to 12.4% for Standard Case or 6.6% for Independent Case in 2065.
- The number of female elderly staying in institutions is higher than that of male elderly.
- The proportion of those elderly with dependency level 3 who live in institutions is higher for males than females. The proportion for age group 85+ is lower than that for age group 75-84 for both males and females, but it increases steadily from 2015 to 2065.

Table 5 shows the proportion of LTC recipients among the elderly for eight countries. Concerning Japan in this table, the percentage of the elderly aged 65 or over receiving institutional care was 2.7%, because those elderly staying in private nursing homes are not included due to the particular definition of Japanese LTC Insurance. According to the 2015 Population Census, actual percentage was 6.0% as mentioned before. In view of Japanese example, comparison among countries should be done carefully.

More than 13% of the population aged 65 or over received benefits for LTC, of which 4.1% of them were recipients of LTC in institutions in Germany (Table 5). The proportion of institutionalized persons aged 80 and older was about 20% in 1950, reached 30% in 1975, but the rate has since steadily decreased, reaching 16% in 2007 in Sweden [8]. According to Table 5, the trend has continued and the rate was 13.1% in 2015. The number of places in institutional care has decreased by almost 10% from 1998 to 2008 in Sweden, taking into consideration that the elderly today in general are healthier and demand less care than before [8]. Larsson (2006) claims that the elderly (particularly men) have become more independent than before and are thus able to continue living at home for a much longer period, reducing the need for care even more [9].

In the United States, most policy analysts agree that the US is facing substantial problems with respect to LTC services and financing, but there is so far no consensus on the issue because these problems will occur farther in the future than the more immediate solvency problems faced by the Medicare program and the Social Security system. As of February 2015, the situations of LTC needs and nursing home care in the United States are described as follows [10]:

- Annually 8.4 million people receive support from the five main LTC services; home health agencies (4.7 million), nursing homes (1.4 million), hospices (1.2 million), residential care communities (0.7 million) and adult day service centers (0.3 million).
- An estimated 12 million Americans needed long-term care in 2007.
- By 2050, the number of individuals using paid LTC services in any setting will likely double from the 13 million using services in 2000, to 27 million people.
- Among the population aged 65+, 69% will develop disabilities before they die, and 35% will eventually enter a nursing home.
- The prevalence of cognitive impairment among the older population increased over the past decade, while the prevalence of physical impairment remains unchanged.
- Institutionalization is much more common at older ages; in 2010, 13 percent of people age 85 or older resided in institutions, compared with 1 percent of people ages 65 to 74.
- In 2012, there were 1.4 million people in nursing homes nationally [11].

Most elderly people value their independence and would prefer to continue to live in their own homes. LTC policies in many OECD countries aim to help people to live independently in the community for as long as possible and rates of home care have increased in recent years [12]. In 2011, the proportion of elderly persons in the EU who were aged 65-84 years and living in an institutional household (health care institutions or institutions for retired or elderly persons) was 1.7%, but the share was 12.6% among those aged 85 and over [13]. The proportion of very old women living in an institutional household (14.8%) was considerably higher than the corresponding share among very old men (7.6%) [13]. According to our simulation, the proportion of elderly aged 85 and over who live in institutions will increase from 15% in 2015 to 28% in 2065.

Table 5: LTC Recipients : 2015

	Canada		France	Germany		Japan		Korea		Spain		Sweden		Switzerland	
	65+	80	65+	65+	80	65+	80+	65+	80+	65+	80+	65+	80+	65+	80+
Total															
Institution	3.8	10.9	4.2	4.1	11.6	2.7	7.5	2.6	8.7	1.8	4.5	4.5	13.1	5.9	16.9
Home	---	---	6.1	9.3	22.2	---	---	4.8	13.5	6.7	15.9	12.5	31.6	15.7	35.0
Males															
Institution	2.7	7.9	---	2.4	6.6	---	---	1.4	4.6	1.1	2.5	3.2	9.4	3.6	10.8
Home	---	---	---	7.7	19.2	---	---	3.3	10.1	4.1	10.3	10.0	27.2	---	---
Females															
Institution	4.8	12.9	---	5.4	14.2	---	---	3.5	10.5	2.4	5.6	5.6	15.4	7.7	20.3
Home	---	---	---	10.5	23.8	---	---	5.9	15.0	8.6	19.2	14.6	34.3	---	---

Source: OECD Health Statistics 2017.

Most individuals in need of LTC prefer to live in their homes as long as possible in order to keep their social networks and to maintain their familiar environment. Predictors of institutionalization have been studied because admission to an institution may be associated with a tremendous financial burden from a public and private perspective [14]. Studies have shown that the delivery of home or community-based LTC services is a cost-effective alternative to nursing homes [15]. However, it is true that if we consider all social costs associated with elderly care, home care is not necessarily an inexpensive way. In any case, care in the home or community-not nursing home care-is what most Americans would prefer [16].

The knowledge about how marital status, depression, dementia, and physical impairments affect the probability of transitions to institutionalization is important in order to fully understand the causality leading to admission to a nursing home or old age-home [14]. The role of physical impairments is a highlight for institutionalization, however, the role of marital status and the occurrence of dementia should be emphasized [14]. Findings suggested that predictors of institutionalization are mainly based on underlying cognitive and/or functional impairment, and associated lack of support and assistance (**Note 3** - The presence of a companion for daily activities or of other social networks, such as neighbors and community groups, is of great importance to the health of the elderly and improves their self-esteem and autonomy) in daily living [2].

The identification of effective home care projects in delaying institutionalization will be useful to inform and empower home care providers, policy and related decision makers to manage and improve home care services [17]. The majority of institutionalized elderly adults were widowed, whereas the majority of those living in the community were either married or living with a partner. These results bring attention to the importance of socialization to the welfare of the elderly, suggesting that social isolation and loneliness in old age are linked to the decline of physical and mental health and subsequent institutionalization [18].

As population is aging quite rapidly in Japan, future institution rate of the elderly will have a profound impact on not only the quality of life for the elderly themselves but also future LCI expenditure. Starting from 4.7% in 2015, the institution rate of the elderly aged 65 or over as a whole will increase remarkably to 12.4% in 2065 in Standard Case. Actual institution rate depends on the availability of places on LTC institutions and their costs as well as on living arrangements, marital status and dependency level of the elderly. In fact, it is difficult to maintain a one-person household if his or her dependency level is high, and an elderly couple considers moving to an institution if the dependency level of the spouse

becomes high. Comparing Standard Case and Independent Case in 2065, institution rate of the elderly differs significantly, which has an important implication of the possibility to reduce future institution rate.

New approaches for prevention or delay of institutionalizations are essential as institutionalization can be viewed as a "last" and very expensive option [14]. Shorter hospital stays and increased usage of outpatient procedures-changes that have increased the effectiveness of medical care-have shifted responsibility toward unpaid providers of care from paid providers, increasing burdens on family caregivers in the USA [19]. It is already worrisome that in Japan the elderly have to pay medical and LTC insurance premiums as long as they live, and many elderly may face serious problems attaining needed medical and LTC services.

On the other hand, home care is often a more expensive way of managing severe needs than institutional care, but some older people prefer to remain in the community even with relatively severe needs, leading to a trade-off between controlling public expenditure and offering choice and independence to LTC users [12]. Due to the large variation between demented and non-demented, and physically dependent and non-dependent persons, it is not sufficient to use average cost for all residents when analyzing costs of care in institutions [20]. The support of informal caregivers to institutionalized elderly may have an impact on both quality of life but also on the costs of institutional care [20].

The weak match between the research and the challenges of institutional elderly care support the need for better co-operation between research, policy and practice, which is the only way how research can serve policy and practice to develop evidence-based decision-making and offer evidence-based information for the implementation of policy into practice [21]. Above mentioned results may change according to assumptions, but simulation results may have an important implication concerning a possibility of reducing the institutional care needs of the elderly, which will contribute towards sustainability of the LTC Insurance in Japan.

Conclusion

Among the elderly (65 years old or older), the proportions of those who live in institutions will increase from the present 5% to 12% in 50 years in Japan. Most elderly in need of LTC prefer to live in their homes as long as possible in order to keep their social networks and to maintain their familiar environment. Admission to an institution may be associated with a tremendous financial burden. Therefore, it is essential to develop alternative ways to care for frail elderly other than institutions. There are quite strong pressures for elderly care in Japan, and a paradigm change is necessary to construct a sustainable elderly care system.

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