

# End-of-Life Healthcare Expenditure for the Elderly in Japan

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## Abstract

End-of-life healthcare expenditure does have certain decisive impacts on the total healthcare expenditure. An upward shift of per capita healthcare expenditure for the very old elderly in recent years has again increased the concerns regarding end-of-life healthcare expenditure for the elderly in Japan. We analyzed healthcare expenditure for deceased elderly during the one year prior to death, using the National Database of Health Insurance Claim Information and Specified Medical Checkups. The average healthcare expenditure for the deceased elderly during the one year prior to death was 3.3 million yen, and it decreased rapidly with age increase: from 4.5 million yen for age group 65-69 to 2.2 million yen for age group 95+. Monthly healthcare expenditure increased slowly and started rising rather rapidly for just 2-3 months prior to the death month, and it persistently decreased as age increased. As a percentage of annual healthcare expenditure for the elderly as a whole, the elderly who died during the year concerned accounted for about 10 percent. End-of-life healthcare expenditure is certainly expensive, but the efficiency of the healthcare system in general is required to contain the total healthcare expenditure.

**Keywords:** End-of-life; Healthcare expenditure; Deceased elderly; Health insurance claim information; Age pattern of per capita healthcare expenditure

## Introduction

Japanese expectation of life at birth is about 84 years (80.5 for males and 86.8 for females in 2014), and further decline in mortality rate among the elderly is expected in future. In accordance with further population ageing, the Japanese Government has been pursuing the policy of reducing the length of hospital stays by promoting care in communities to reduce inefficiencies and thus to contain healthcare expenditure.

Regarding healthcare expenditure for the elderly, the efficiency and financing method of the system have been the central concerns. In the past, end-of-life healthcare expenditure was focused on in Japan as an unavoidable factor when trying to increase the efficiency of healthcare expenditure as a whole. It has since been recognized that end-of-life healthcare expenditure is certainly expensive, but containing it is not far from enough in order to contain the total healthcare expenditure. Moreover, an upward shift of per capita healthcare expenditure for the very old elderly in recent years has again increased the concerns regarding end-of-life healthcare expenditure for the elderly.

Most Japanese people want to spend their end-of-life period at home. However, the rate of deaths at home has been decreasing from 70% in 1960 through 38 percent in 1980 to 14 percent in 2000. The number of deaths per year was 1.27 million in 2014, of which 85 percent died in hospitals and 12.8 percent at home [1]. The Japanese Government has been promoting end-of-life care at home or at nursing homes, rather than at hospitals, which is expected to increase patients' choices of places to get care [2]. The guideline for supporting decision-making of end-of-life care by terminally ill patients and their families was firstly issued by the MHLW in 2007.

In this paper, we analyzed healthcare expenditure for deceased elderly during the one year prior to death using the National Database of Health Insurance Claim Information and Specified Medical Checkups (Note 1;

we abbreviate as the National Database of CI hereafter). After describing Japanese healthcare expenditure by age group, we focused on end-of-life healthcare expenditure for the elderly, based on the National Database of CI. An interesting comparison to the National Healthcare Expenditure was also attempted, and we held discussions based on the results obtained. Our main conclusion is that healthcare expenditure for the deceased elderly is certainly expensive and there is some room for saving, but the efficiency of the healthcare system in general is required to contain the total healthcare expenditure.

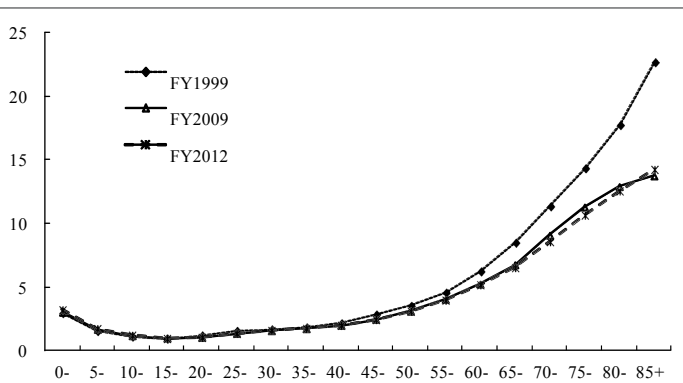
## Age Pattern of Healthcare Expenditure

National Healthcare Expenditure in Japan climbed to 40.1 trillion yen or 8.3 percent of GDP in fiscal year 2013. Among them, healthcare expenditure for the elderly aged 65 or over was 23.1 trillion yen, or 58% of the total. Figure 1 shows per capita National Healthcare Expenditure according to age group in FY 1999, 2009, and 2012. FY 1999 was the last year before implementation of the Long-term Care (LTC) Insurance in Japan. Since then, Japanese so-called social hospitalization (use of hospital beds for non-medical reasons) has decreased considerably (Note 2). In FY 2009, the age pattern of healthcare expenditure showed a convex shape. This is an important sign, because the relative weight of healthcare expenditure for the elderly has decreased. However, per capita healthcare expenditure for age group 85+ has increased again in recent years. We intend to clarify the age pattern of per capita healthcare expenditure beyond 85 years old later in this paper.

## End-of-life Healthcare Expenditure for the Elderly

### Data

We used the National Database of CI for fiscal 2011 and 2012. From the Database, we obtained health insurance claim information during the one year prior to death for those who died in fiscal 2011 and 2012. Therefore,



**Figure 1:** Per capita National Healthcare Expenditure according to age group (age group 15-19 = 1.0) Source: Ministry of Health, Labor and Welfare. National Healthcare Expenditure.

we focused on healthcare expenditure for the deceased elderly. Table 1 shows the number of data we used. The National Database of CI covers the total population in principle, but the number of deceased elderly was less than half of the actual number of deaths obtained from the Vital Statistics (Note 3). This discrepancy arises because the key record to identify if a person is dead or alive is not quite accurate. The number of deceased elderly is shown by place of death (medical facilities or outside medical facilities), and the average representative rate for deceased elderly in the National Database of CI was 46 percent for medical facilities but less than 30 percent for outside medical facilities.

## Results

### According to monthly inpatient pattern prior to death

Healthcare expenditure for the deceased elderly in Japan varied greatly

depending on the use of inpatient services, which turned out to be the main factor behind the increase in the healthcare expenditure for the deceased elderly as the month of death approached.

Table 2 shows the number of deceased elderly according to monthly inpatient pattern prior to death as follows:

-“Consecutive inpatient” Px means those who started using inpatient care at x months prior to death month (no inpatient care beforehand within one year), and continued using inpatient care without interruption until death.

-“Non-consecutive” inpatient means those who used inpatient care with interruption, and means those who used inpatient care in the last two months out of the final three months and (111) means those who used inpatient care in the last three months.

-“No inpatient” means those who did not use inpatient care during the one year prior to death.

The total number of deceased elderly aged 65 or over in FY 2011 and 2012 together was 921 thousand, and their average healthcare expenditure during the one year prior to death was 3.3 million yen. Average healthcare expenditure was most expensive for P12 (7.1 million yen) comprising 6.5 percent of deceased elderly, and least expensive for No inpatient (0.7 million yen) comprising 6.4 percent of deceased elderly. The proportion of No inpatient was only 2.9 percent for age group 65-69, but it increased to 15.8 percent for age group 95+.

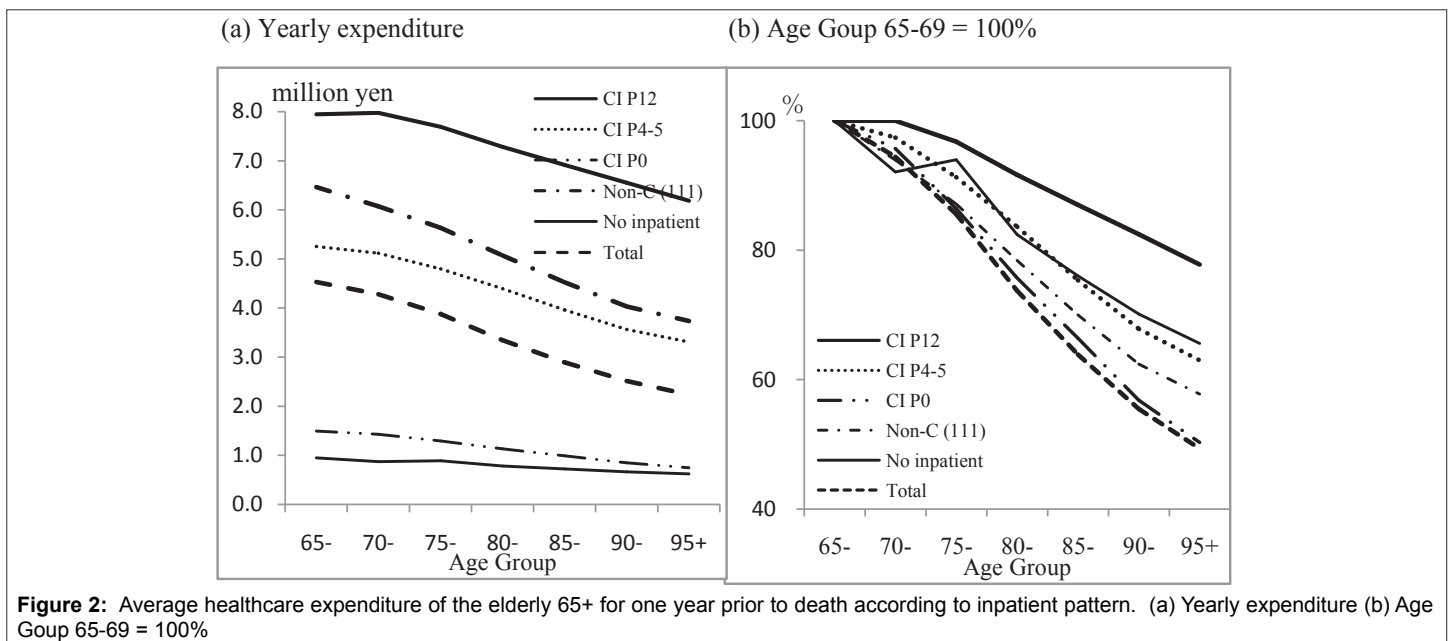
Figure 2 shows how the average healthcare expenditure of each inpatient pattern during the one year prior to death changed by age. It was highest for Consecutive inpatient P12 and lowest for No inpatient as mentioned before (Figure 2a), and it decreased rapidly with age increase for every inpatient pattern (Figure 2b). Looking at the deceased elderly as a whole, the expenditure for age group 95+ was about half of the expenditure for age group 65-69.

Age group	FY 2011						FY 2012					
	Total		In Facilities		Outside Facilities		Total		In Facilities		Outside Facilities	
Number of Data	%		%		%		%		%		%	
65-69	27,915	34	26,071	39.2	1,844	11.8	25,287	31.5	23,464	35.7	1,823	12.7
70-74	46,784	41.4	43,521	46.2	3,263	17.3	42,257	37.9	39,134	41.8	3,123	17.5
75-79	70,029	41.8	64,575	45.6	5,454	20.9	70,657	43	64,801	46.6	5,856	23.2
80-84	105,385	47.9	95,559	51.5	9,826	28.4	109,946	49.6	99,131	53.1	10,815	31
85-89	100,773	45.2	89,042	48.2	11,731	30.7	109,489	46.6	96,040	49.6	13,449	32.5
90-94	66,882	41.3	56,271	43.7	10,611	31.9	71,758	42	59,367	44.4	12,391	33.4
95+	35,476	35.7	27,453	38	8,023	29.6	38,270	36.6	28,837	38.6	9,433	31.4
65+	453,244	42.5	402,492	46.1	50,752	26.2	467,664	43	410,774	46.3	56,890	28.3
Actual Number of Death												
65-69	82,062		66,436		15,626		80,161		65,763		14,398	
70-74	113,113		94,208		18,905		111,507		93,657		17,850	
75-79	167,707		141,569		26,138		164,344		139,078		25,266	
80-84	220,110		185,489		34,621		221,545		186,642		34,903	
85-89	222,793		184,597		38,196		234,928		193,593		41,335	
90-94	162,024		128,730		33,294		170,900		133,757		37,143	
95+	99,334		72,207		27,127		104,664		74,643		30,021	
65+	1,067,143		873,236		193,907		1,088,049		887,133		200,916	

**Table 1:** Number of Data

Age Group	Total	Consecutive inpatient				P0	Non-consecutive			No inpatient	Total
		P12	P4-5	P1	Total		(011)	(111)			
65-69	22,744	2,836	1,454	4,432	6,721	28,901	7,311	11,536	1,557	53,202	
70-74	39,859	4,872	2,603	7,822	11,504	46,396	11,924	18,152	2,786	89,041	
75-79	67,200	8,259	4,237	13,436	19,167	68,397	17,361	25,553	5,089	140,686	
80-84	110,309	12,744	6,773	22,959	32,371	94,902	23,456	33,733	10,120	215,331	
85-89	112,992	13,745	6,312	24,392	33,757	83,582	19,917	27,576	13,688	210,262	
90-94	74,211	10,333	3,885	16,065	21,976	50,641	11,359	15,352	13,788	138,640	
95+	37,719	6,645	1,744	8,152	10,705	24,383	5,099	6,888	11,644	73,746	
65+	465,034	59,434	27,008	97,258	136,201	397,202	96,427	138,790	58,672	920,908	
a	3.1	7.1	4.3	1.8	1.1	3.8	3.6	5.1	0.7	3.3	

**Table 2:** Number of deceased elderly according to inpatient pattern  
a: Average healthcare expenditure for one year before death for the elderly 65+ in million yen.



**Figure 2:** Average healthcare expenditure of the elderly 65+ for one year prior to death according to inpatient pattern. (a) Yearly expenditure (b) Age Goup 65-69 = 100%

### Monthly expenditure prior to death

We divided the deceased elderly into five groups according to the level of healthcare expenditure during the one year prior to death: quintile 1 representing the lowest 20 percent and quintile 5 the highest 20 percent. Fig.3 shows the average monthly healthcare expenditure prior to death by 10-year age groups for quintiles 3 to 5 as well as the quintile Total. Horizontal axis means the number of months before death month. From quintile Total, average monthly healthcare expenditure decreased as age increased, and there was a persistent tendency that monthly healthcare expenditure increased slowly and started rising rather rapidly as the death month approached. The decrease in monthly healthcare expenditure as age increases was quite common for each quintile, but the increase in monthly healthcare expenditure as the death month approaches was different by quintile. For quintile 5, monthly healthcare expenditure increased persistently, and average monthly expenditure during the one month before the death month was more than 1 million yen for age groups 65-74.

There is a long-standing question about the proportion of deceased elderly whose healthcare expenditure increased steeply prior to death. Instead of this question, we counted those deceased elderly whose healthcare expenditure during the one year prior to death was more than double of the age group average. The result is shown in table 3. About 9% of deceased elderly in age group 65-69 and 70-74 belonged to this

high profile group, but the rate increased to 14 percent for age group 95+ (11.7 percent for the deceased elderly as a whole). Average healthcare expenditure during the one year prior to death for this high profile group was 12.1 million yen for age group 65-69, and 6.3 million yen for age group 95+ (8.8 million yen for the deceased elderly as a whole). Median healthcare expenditure during the one year prior to death was 8.3 million yen for the highest 10 percent of the deceased elderly and 12.1 million yen for the highest 1% (Table 3).

### Comparison to National Healthcare Expenditure in FY 2012

Table 4 shows per capita National Healthcare Expenditure by age group (Total), as well as per capita healthcare expenditure for the deceased during the one year prior to death (Deceased) and per capita annual healthcare expenditure for survivors (Survivor). Table 4 reveals two interesting points. On average, healthcare expenditure for the deceased elderly during the one year prior to death was 5.0 times than that of annual healthcare expenditure per surviving elderly. However, the former drastically dropped with age increase, from 4.5 million yen (10 times than that of survivors) for age group 65-69 to 2.2 million yen (2.5 times that of survivors) for age group 95+. The other point is shown more vividly in Figure 4 below.

Figure 4 shows per capita annual healthcare expenditure for Total,

Age Group	Those whose healthcare expenditure is more than double of age group average				Median healthcare expenditure for one year prior to death for: (million yen)		
	Percentage			Average (million yen)	Top 10%	Top 5%	Top 1%
	Total	Males	Females				
65-69	8.6	8.7	8.2	12.1	10.5	12.5	15.7
70-74	8.8	8.8	8.8	11.4	10.0	11.9	14.6
75-79	9.6	9.8	9.2	10.3	9.4	11.1	13.4
80-84	11.0	11.2	10.7	8.8	8.3	9.8	11.9
85-89	12.2	12.4	12.1	7.7	7.5	8.7	10.5
90-94	13.1	12.9	13.2	6.8	7.0	7.8	9.2
95+	14.0	13.6	14.1	6.3	6.7	7.4	8.2
65+	11.7	13.0	10.4	8.8	8.3	9.9	12.1

**Table 3:** Profile of high healthcare expenditure

Age Group	Per capita annual healthcare expenditure			
	Total	Deceased	Survivor	Deceased/Survivor
	(thousand yen)			
65-69	477	4,532	451	10.0
70-74	625	4,280	591	7.2
75-79	776	3,878	727	5.3
80-84	914	3,342	837	4.0
85-89	1,004	2,895	890	3.3
90-94	1,078	2,516	911	2.8
95+	1,155	2,237	897	2.5
65+	717	3,269	659	5.0

**Table 4:** Per capita healthcare expenditure by age group: Deceased vs. Survivor in FY 2012

Deceased, and Survivor based on Table 4. Per capita healthcare expenditure for Total continued to increase beyond 85 years old. However, deducting healthcare expenditure for the deceased, per capita annual healthcare expenditure for survivors had a peak at age group 90-94, and decreased afterwards. This age pattern of per capita annual healthcare expenditure shown in Figure 4 clearly indicates that healthcare expenditure for the deceased elderly had already had a certain non-negligible impact on healthcare expenditure for the very old age group.

Using the healthcare expenditure for deceased elderly during FY 2011 and 2012, as well as the representative rate of deceased elderly in the National Database of CI shown in Table 1, we calculated the proportion of expenditure devoted to the deceased elderly within the National Healthcare Expenditure by age group. Table 5 shows the result. For the elderly as a whole, about 10 percent of annual healthcare expenditure was used for the deceased during the year concerned. Reflecting death rate, the proportion was less than 6 percent for age group 65-69, but more than 30 percent for age group 95+.

## Discussion

A challenge facing all developed countries is to provide adequate health, nursing and long-term care services to the older population at an affordable cost, and to improve the quality of the services rendered with a view to the ageing of the general population, changes in family structures and financial constraints [3]. Changing demographics, an increasing incidence of chronic disease and progressive disability, rapid technological advances, and systemic market failures in the health care sector combine to drive cost [4].

## Main findings

We analyzed healthcare expenditure for the deceased elderly during the

one year prior to death, using the National Database of CI for fiscal 2011 and 2012. The following is a summary of what we found.

- Average healthcare expenditure for the deceased elderly during the one year prior to death was 3.3 million yen, and it was higher for those who used more inpatient care and lowest for those who did not use inpatient care during the period (6.4 percent of deceased elderly).
- The average healthcare expenditure during the one year prior to death decreased rapidly with age increase: from 4.5 million yen for age group 65-69 to 2.2 million yen for age group 95+ (the latter was about half of the former).
- Monthly healthcare expenditure increased slowly and started rising rather rapidly for just 2-3 months prior to the death month, and it persistently decreased as age increased.
- Of deceased elderly as a whole, the proportion of those whose healthcare expenditure during the one year prior to death was more than 6.6 million yen was 11.7 percent, and the average amount among them was 8.8 million yen.
- Per capita annual healthcare expenditure for survivors (namely, deducting healthcare expenditure for the deceased during the period concerned) had a peak at age group 90-94, and decreased afterwards.
- Of the elderly as a whole, about 10 percent of annual healthcare expenditure was used for the deceased from the year concerned. The proportion was less than 6 percent for age group 65-69, but more than 30 percent for age group 95+.

## What is already known on this topic and what this study adds?

Fukawa (1998) used medical claim data for the elderly in the 1990s and concluded that an increase in monthly healthcare expenditure for deceased elderly as the death month approached was due to increasing use of inpatient care [5]. According to him, healthcare expenditure for deceased elderly during the one year prior to death was, on average, 4.3 times than the annual healthcare expenditure for surviving elderly [5]. However, the former drastically dropped with age increase, thus the rise in healthcare expenditure at the terminal stage did not greatly affect the overall healthcare expenditure for the elderly. This time, we obtained a similar result with higher magnification of 5.0 instead of 4.3.

The fact that average healthcare expenditure for deceased elderly during the one year prior to death decreases with age increase has also been reported from overseas. Setting the healthcare expenditure per deceased elderly aged 65-69 during the one year prior to death as 100%, then in the case of deceased elderly aged 85 or over, the per capita healthcare expenditure was 50% in Japan [5] and the Netherlands [6], 63%

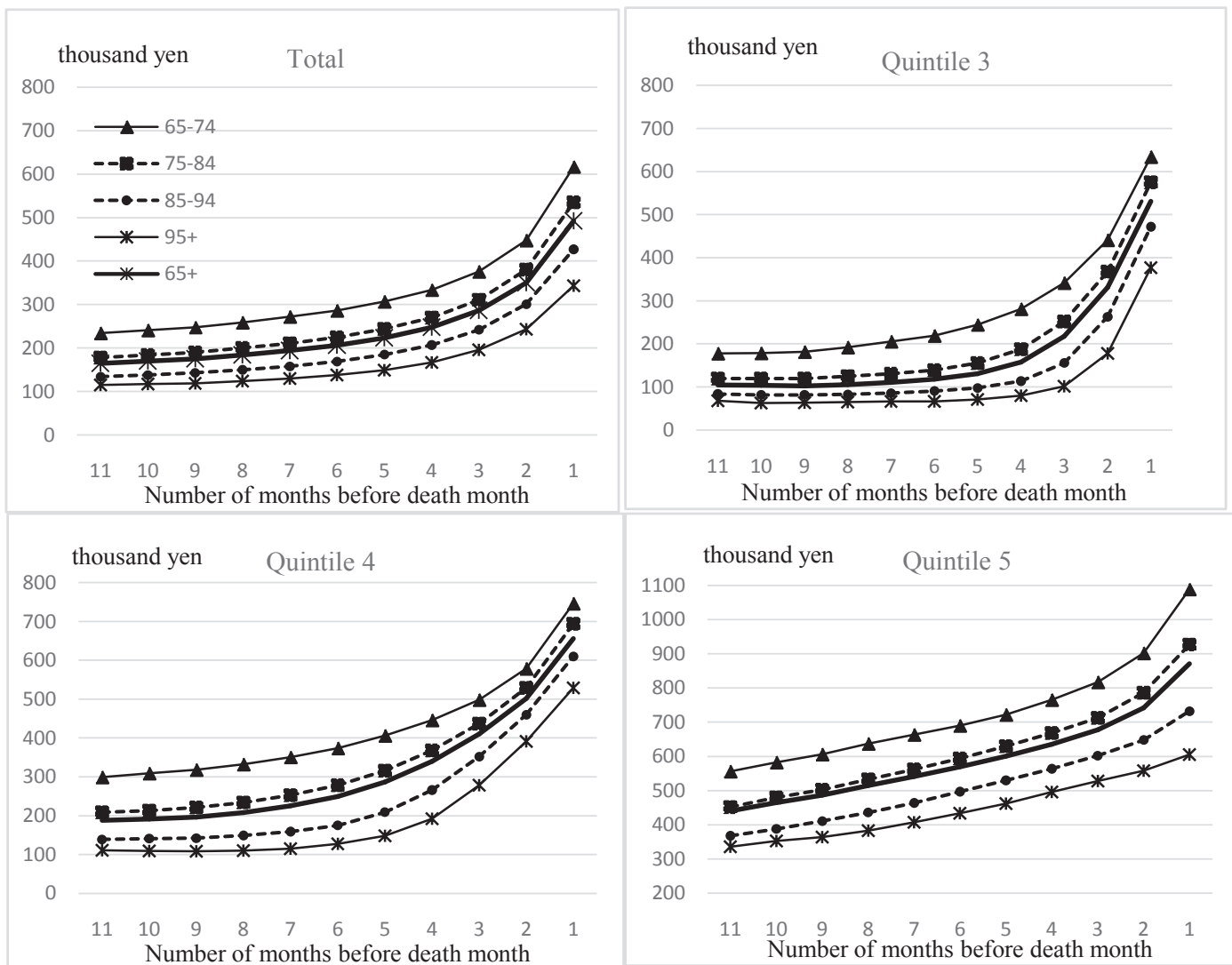


Figure 3: Average monthly healthcare expenditure before death by age group according to quintile group of healthcare expenditure

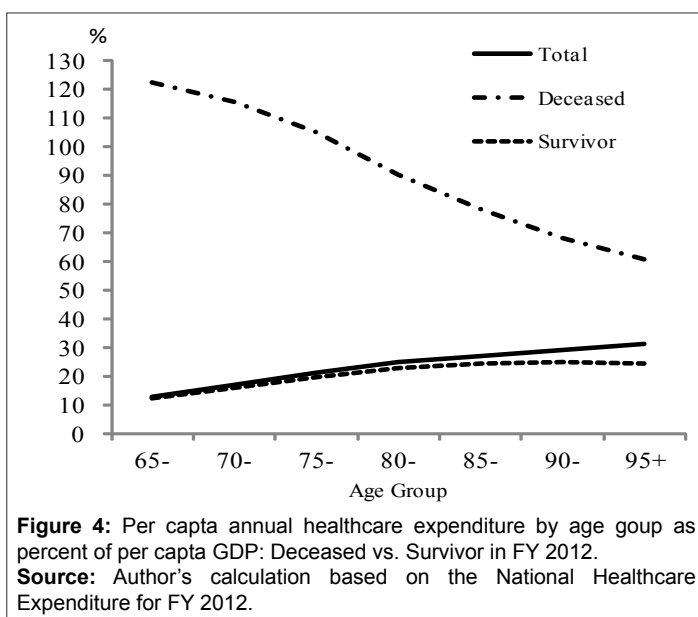


Figure 4: Per capita annual healthcare expenditure by age group as percent of per capita GDP: Deceased vs. Survivor in FY 2012. Source: Author's calculation based on the National Healthcare Expenditure for FY 2012.

in Germany [7], 66% in the US [8], and 71% in Switzerland [9]. Medicare expenditures during the last 12 months of life decline with age at death [8], and reasons suggested for this include shorter intervals between illness and death and decreased use of acute care, hospitals, and other services with older age at death, as well as less desire among the oldest individuals or their health care providers to use advanced (and expensive) technological methods to prolong their lives [10]. We therefore take the view that the healthcare expenditure of the elderly in the year (or six months) prior to death decreases universally with age increase regardless of the given system of healthcare for the elderly [3].

Patients with chronic illness in their last two years of life account for about 32% of total Medicare spending, much of it going toward physician and hospital fees associated with repeated hospitalizations [11]. Healthcare expenditure for the deceased elderly during the one year prior to death was certainly quite high compared to their surviving counterparts.

On the other hand, however, healthcare expenditure for the deceased elderly has not had a commanding share in the total healthcare expenditure for the elderly. Of annual healthcare expenditure for the elderly as a whole, about 10 percent of them was used for the deceased from the year concerned in Japan.

Age Group	FY 2011	FY 2012
65-69	5.4	5.4
70-74	6.0	6.1
75-79	7.9	7.8
80-84	10.8	10.7
85-89	14.9	15.1
90-94	21.3	21.4
95+	31.4	32.1
65+	9.6	9.7

**Table 5:** Proportion of healthcare expenditure used for the deceased by age group (in percent)

If we deduct healthcare expenditure for the deceased during the period concerned, the age pattern of per capita healthcare expenditure has changed, which is of great significance to the rapid ageing of the population in Japan. Per capita healthcare expenditure does not simply increase with age increase. Therefore, it could be more expedient to deal with the issue of terminal care expenditure from the point of view of an equitable and efficient distribution of health resources among age groups, and between surviving patients and those in terminal care [3].

Most Japanese patients with serious illness said they would prefer to die at home, yet most patients died in the hospitals. Patients often prefer a more conservative pattern of end-of-life care than they actually receive, and patient's wishes can be less influential than the practice patterns at the hospital where care is delivered. Per capita healthcare expenditure for the very old age group has increased again in recent years. This suggests that elderly Japanese patients tend to receive more intensive inpatient care including tube feeding. Therefore it is quite important to ensure that patients and their families engage in discussions of their preferences before they become seriously ill and that providers respect these preferences.

### Limitations of this study

Some limitations of this analysis should be noted. While we did in fact used a large scale micro data to analyze healthcare expenditure for the deceased elderly, but the key record for identifying the deceased is not fully accurate. Therefore, we could not deal with the total deceased elderly accurately. Moreover, we could not obtain the data of surviving elderly in the National Database of CI, and the comparison between the deceased and surviving elderly is an estimation, which cannot be guaranteed to not be an overestimation. Nevertheless, our results are still based on a large scale micro data, and we believe they are useful for policy discussion.

**Note 1:** The National Database of Health Insurance Claim Information and Specified Medical Checkups has recently made available for public use, although access is still limited. A patient's Health Insurance claim information file is issued monthly per medical facility, and we used longitudinal data for each patient.

**Note 2:** This happened partly due to a shift in healthcare expenditure to long-term care expenditure. For the elderly (65+) as a whole, long-term care expenditure was about one-third of healthcare expenditure. However, for the elderly aged 90 or over, long-term care expenditure was greater than healthcare expenditure.

**Note 3:** Actual number of deaths is based on the calendar year.

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