

# Future Management of Japanese Hospitals

## 1. Trend of Japanese hospital management

- These topics were chosen with the intent of showing future management of Japanese hospitals. Last time, 'Hospital management based on collaborative systems' (Japanese only) showed current trends in regional distribution of medical resources. This time, I consider the subject of future Japanese hospital management, based on medical demand forecasts and financial data of regional hospitals.
- First, I summarize the circumstances of hospital management in Japan. National healthcare expenditure is growing gradually, and addressing this growth is one of the big issues in national finance.
- The so-called 2025 model and community-based integrated care system model are designed to address the growth in healthcare expenditure and provide a soft landing.
- In 2025, baby boomers will be over 75 years old. The Japanese government thinks that the 2025 model will be the best component of hospital function at that time. In FY2016, each prefecture set its Community Health Care Vision, which should lead to practical medical policy, emphasizing greater sharing of roles. The intent is to limit the number of hospitals for advanced acute phase treatment, and increase the number of rehabilitation facilities, which are currently in short supply.
- At the same time, it is important to introduce the concept of the community-based integrated care system shown in Fig 1-2 and increase the implementation of home-medical and home-nursing care.
- Each hospital needs to act corresponding to changes in the above-mentioned circumstances. National healthcare expenditure is increasing even though the numbers of outpatients and inpatients are not increasing (Fig 1-3). Hospitals are lessening the average length of stay (Fig 1-4), while keeping appropriate numbers of inpatients.

Figure 1-1 Trend of National Medical Care Expenditure

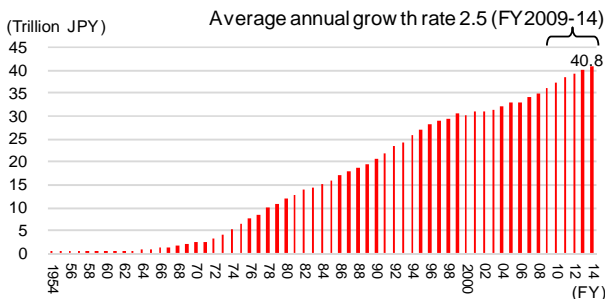


Figure 1-3 Numbers of Inpatients and Outpatients

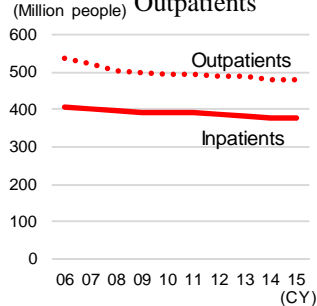


Figure 1-4 Average Length of Stay

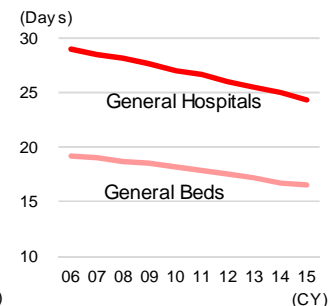
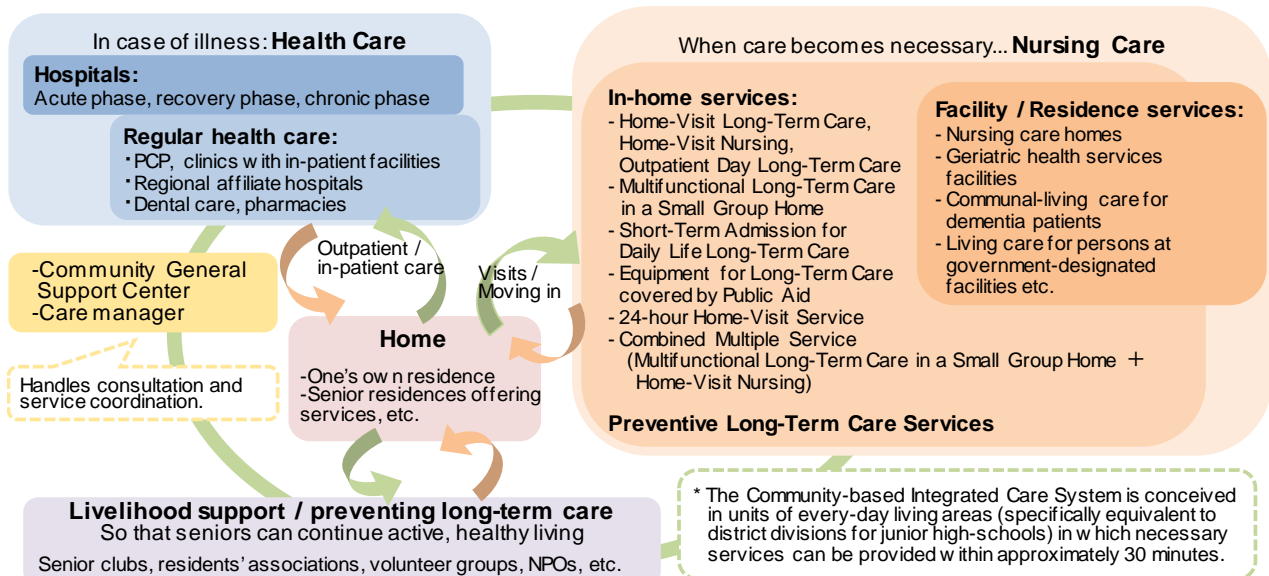


Figure 1-2 Community-based integrated care system model



Source for Fig 1-1: Ministry of Health, Labour and Welfare (MHLW), "Estimates of National Medical Care Expenditure."

Source for Fig 1-2: MHLW, "Long-Term Care Insurance System of Japan."

Source for Figs 1-3, 1-4: MHLW, "Hospital Report."

## 2. Data on Japanese hospital management

- Covered next is data on Japanese hospital management. This page shows the 10-year trend of data for private and semi-public hospitals, other than public hospitals that have basically low profits. Fig 2-1 is data from the Federation of Public and Private hospitals representing the entire country and Japan Hospital Association. Fig 2-2 is from MHLW data. These two figures are from different samples.
- Fig 2-1 shows operating profit basically in the red in 2006-08, recovering in 2010-11, and persistently lackluster in 2014-15. The fact that both sales and costs moved upward in those periods means that the balance of the increasing sales and costs determined profitability. As for costs, the level of cost of supplies tended to be high throughout these 10 years. On the other hand, cost of salary was high in 2012-14 but went lower in 2015.
- Fig 2-2 shows only percentages, and its trend of operating profit was similar to that of Fig 2-1. A common point between Fig 2-1 and Fig 2-2 is that even though private hospitals were profitable through this century's first decade, the operating profits (medical profits) they earned were of only 0-1%.
- In Japan, hospital earnings are determined by public pricing called medical service fees. Therefore, it is important that hospitals attain sales in line with their staff organization. Taking into account both Fig 1-3 and Fig 1-4 of the previous page, the number of hospital inpatients is tending to decrease slightly. And continuing improvements in medicine come at additional cost. That is, increased costs for human capital and medical materials improvements result in increased costs per patient, and thus even private hospitals' profits remain at very severe levels.
- From a bit of a different angle, Fig 2-3 and Fig 2-4 show data of hospitals with fewer than 200 beds. In Japan, this category covers 5,836 hospitals, 68.8% of the total 8,480 hospitals (as of October 1, 2015). Quantitatively this category's portion of all hospitals is high. And its accumulative profitability is not so low, even if the profitability of these hospitals individually is small. However, the various constituents' respective portions of the total cost vary greatly: salary (56.3%) and supplies (19.2%). Fig 2-4 shows a bit of growth in the number of inpatients, suggesting that the number of inpatients could be a more significant variable for small hospitals than for all hospitals as a whole (Fig 1-3 and Fig 1-4). Why it still matters is an important point about roles that I will mention later.

Figure 2-1 Trend of sales and profits in Japanese hospitals (per bed)

	2006.6		2007.6		2008.6		2009.6		2010.6	
Medical revenues	1,458	100.0%	1,479	100.0%	1,466	100.0%	1,588	100.0%	1,690	100.0%
Medical expenses	1,465	100.5%	1,469	99.3%	1,495	102.0%	1,565	98.6%	1,628	96.3%
Salaries and benefits	737	50.5%	754	51.0%	771	52.6%	810	51.0%	838	49.6%
Supplies	407	27.9%	388	26.3%	389	26.5%	413	26.0%	434	25.7%
Depreciation and amortization	80	5.5%	78	5.3%	81	5.5%	84	5.3%	89	5.3%
Others	241	16.5%	249	16.8%	255	17.4%	258	16.3%	268	15.8%
Medical profit	-7	-0.5%	10	0.7%	-30	-2.0%	22	1.4%	62	3.7%
Non-medical revenues	20		21		22		24		23	
Non-medical expenses	24		25		25		25		27	
Ordinary profit	-11	-0.8%	7	0.4%	-33	-2.2%	21	1.3%	58	3.4%

	2011.6		2012.6		2013.6		2014.6		2015.6	
Medical revenues	1,778	100.0%	1,747	100.0%	1,813	100.0%	1,863	100.0%	1,996	100.0%
Medical expenses	1,720	118.0%	1,731	117.0%	1,798	122.6%	1,907	120.1%	1,997	118.2%
Salaries and benefits	883	60.6%	908	61.4%	946	64.5%	979	61.6%	1,018	60.3%
Supplies	462	31.7%	447	30.2%	465	31.7%	503	31.7%	541	32.0%
Depreciation and amortization	97	6.6%	104	7.0%	102	6.9%	113	7.1%	115	6.8%
Others	278	19.1%	272	18.4%	285	19.5%	312	19.7%	323	19.1%
Medical profit	58	4.0%	16	1.1%	15	1.0%	-44	-2.8%	-1	0.0%
Non-medical revenues	25		26		25		25		30	
Non-medical expenses	26		23		23		27		24	
Ordinary profit	56	3.9%	19	1.3%	17	1.1%	-45	-2.9%	5	0.3%

Sources. Federation of Public and Private hospitals of the entire country; Japan hospital association, "Survey on the Actual Condition of Hospital Management"

- Note 1) General hospitals + mental hospitals + tuberculosis hospitals  
2) Excluding hospitals founded by local government.

Figure 2-2 Percentage of cost to medical revenues

FY	2007	2008	2009	2010	2011	2013	2014
Salaries and benefits	52.7%	52.5%	53.0%	52.5%	52.5%	52.6%	53.1%
Supplies	25.3%	24.2%	23.9%	22.6%	23.6%	23.2%	22.7%
Depreciation and amortization	5.1%	5.3%	5.3%	5.1%	5.3%	5.1%	5.5%
Operating profit	-0.7%	-0.6%	0.0%	2.4%	1.3%	0.8%	-0.6%
Ordinary profit	-0.3%	-0.4%	0.7%	3.0%	3.1%	1.5%	0.8%

Source. MHLW, "Hospital Management Index."

- Note 1) General hospitals  
2) Excluding hospitals founded by local government.  
3) There is no data for FY2012.

Figure 2-3 Ordinary profit per bed (fewer than 200 beds)

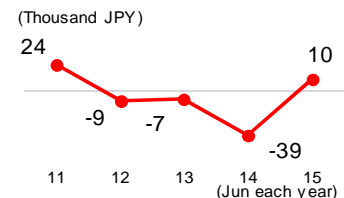
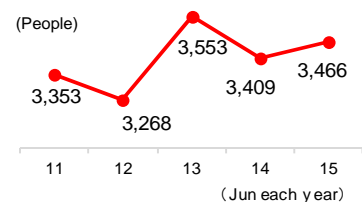


Figure 2-4 Number of inpatients per hospital (fewer than 200 beds)



Sources. Federation of Public and Private hospitals of the entire country; Japan Hospital Association, "Survey on the Actual Condition of Hospital Management."

- Note 1) General hospitals  
2) Excluding hospitals founded by local government.

### 3. Medical market comparisons: Japan, US and Singapore

- Next, I use US and Singapore data as references for comparing Japanese hospital management. Of course, direct comparisons are difficult because of differences in the countries' respective medical systems. However, I have chosen to compare Japan's data with that of these two countries for a simple reason: both the US and Singapore have had cases in which companies operating hospitals have gone public, and thus we can find the financial data in financial statement reports.
- Differences among the three countries' respective medical systems include Japan having nationwide medical insurance; the US consisting of Medicare, Medicaid and private insurance; and Singapore operating a system of medical savings accounts. The proportioning between governmental and private hospital expenditure is different. Fig 3-1 shows how the three countries differ.
- Rising healthcare expenditure is common and quite a big issue. Fig 3-2, based on WHO data, shows the trend of total healthcare expenditure as a percentage of the respective countries' GDP: Japan 10.2%, US 17.1%, and Singapore 4.9% (2014). The per capita medical expenditure shown in Fig 3-3 is all-inclusive and thus cannot be used to directly explain the sub-category of hospital management. Nevertheless, the important point is that the broad medical-care sector's per capita price varies greatly among the three countries. But comparison is not easy; each country has a different Gross National Income. In terms of GNI per capita, Singapore is superior to the US and Japan. And, along with that growth, Singapore's total healthcare expenditure per capita has gradually grown, overcoming Japan's in 2014.
- Fig 3-4 and Fig 3-5 show the numbers of hospitals and doctors, respectively. Compared to the US and Singapore, Japan has a large number of hospitals, even though its THE is relatively low. The reason is that the categorization of hospitals is a bit different among the countries. The field of chronic-phase hospitals in Japan is covered by nursing homes in the US. And as for Singapore, it has only 26 acute hospitals, but those hospitals average over 450 beds. Japan's large number of hospitals is also reflective of the fact that 68.8% of them have fewer than 200 beds. However, as Fig 3-5 shows, the number of doctors per 10,000 people has been trending upward in all three countries, even if the number of facilities stays the same or increases. The reason must be related to medical advances.

■ Japan ■ USA ■ Singapore  
 THE: Total Healthcare Expenditure  
 GGHE: General Government Healthcare Expenditure  
 PvtHE: Private Healthcare Expenditure  
 GNI: Gross National Income  
 PPP: Purchasing Power Parity

Figure 3-1 Distribution ratio of THE by GGHE and PvtHE

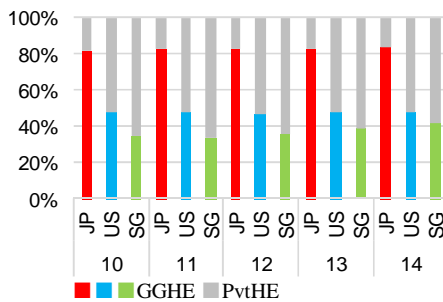


Figure 3-4 Number of hospitals

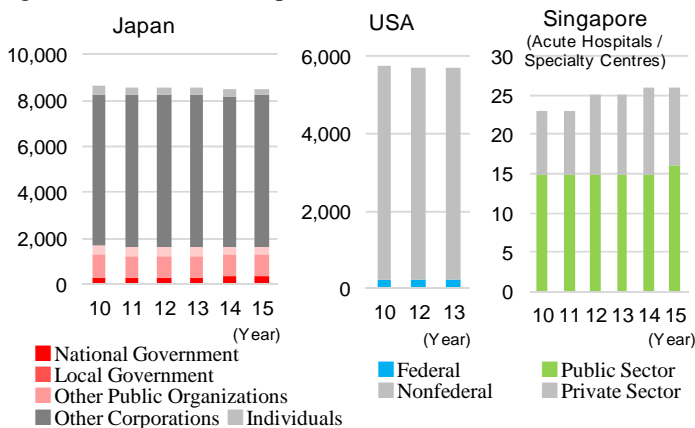
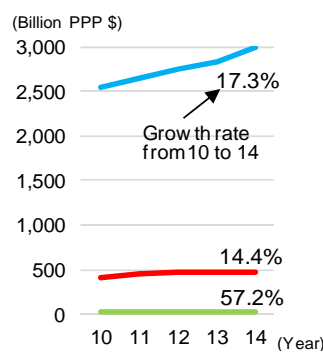


Figure 3-2 Total Healthcare Expenditure



Source for Figs 3-1 and 3-2: WHO, "Global Healthcare Expenditure Database."  
 Sources for Fig 3-3: WHO, "Global Healthcare Expenditure Database"; World Bank, "World DataBank."

Figure 3-3 GNI per capita and THE per capita

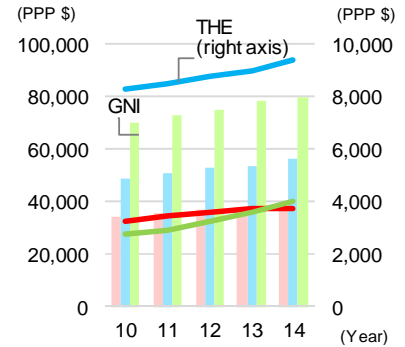
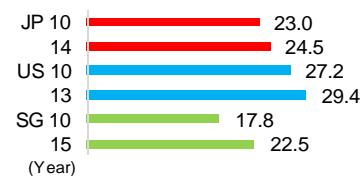


Figure 3-5 Physicians per 10,000 people



Sources for Fig 3-4: MHLW, "Survey of Medical Institutions"; Centers for Disease Control and Prevention, "Health, United States, 2015"(a); Ministry of Health, Singapore, "Singapore Health Facts"(b).

Sources for Fig 3-5: MHLW, "Survey of Physicians, Dentists and Pharmacists"; Statistics Bureau of Japan, "Population Estimates"; (a); (b); Department of Statistics Singapore, "Population Trends 2016."

#### 4. Hospital management comparisons: Japan, US and Singapore

- On this page, I present financial data of US-listed and Singapore-listed companies that operate hospitals. As I mentioned earlier, what is important is not comparison in terms of number but rather recognition of differences in structure.
- First, Fig 4-1 aggregates five US-listed companies' sales and profits for 2010 and 2015. These five companies include 760 hospitals, based on their IR material, and the average length of stay in these hospitals is four or five days, totally different from Japanese hospital statistics. Bed occupancy rate in these US hospitals is between 40% and 60%, another statistic that is different than Japan's. On the other hand, as is obvious from the THE per capita data in Fig 3-3, the sales per bed in the US (this sample) is two to three times higher than that in Japan. I should continue to emphasize that the US sample hospitals' sales are from very short lengths of stay and the Japan sample hospitals' sales are from long lengths of stay.
- Second, as for costs in the US, salary to sales is 46.5%, and supplies to sales is 15.7%. Sales per bed in the US is two to three times that in Japan, but the portioning of each cost is not much different. Thus the US's high salary and supplies number is responsible for the difference in sales. In addition, those listed companies are stock companies and, thus, have to consider returns to investors. Those companies' debt also bears interest and the ratio of their long-term debt to total assets is 68.2%. The profit levels that the companies need to gain might be high.
- For Singapore, I make two lists. Fig 4-2 shows major Asian medical groups that are listed on Singapore's stock market. However, they operate their hospitals in many areas of Asia. On the other hand, Fig 4-3 shows the data of Singapore companies involved in primary care operations. An important consideration is that in the trend of advanced medical care, those two categories' levels of profitability differ.
- Gaining high profits is not the main aim of the medical field. I think that the main aim is to provide good-quality medical services at appropriate costs. Also, the institutions that provide this medical care need to be sustainable. Japan has 120 million people and as of 2015 the average lifespan is 83.7 years old, compared to 79.3 years old in the US and 83.1 years old in Singapore. The average lifespan in Japan is long, but the THE per capita is not so high. (15th among 35 OECD countries, 2015). Although the system of common medical payment pricing makes it difficult for Japanese hospitals to make high gains, they still are able to maintain good quality and appropriate management. Considering that the size of Japan's population is not so small, I believe that keeping the balance between quality and management is a sufficient goal.

Figure 4-1 Profit change of US-listed companies (sum of five major companies)

	Million USD			
	2010		2015	
Revenues	61,705	100.0%	92,007	100.0%
Salaries and benefits	25,315	41.0%	42,826	46.5%
Supplies	9,485	15.4%	14,438	15.7%
Depreciation and amortization	2,797	4.5%	4,551	4.9%
Operating profit	6,771	11.0%	9,997	10.9%
Profit before income tax	3,567	5.8%	5,960	6.5%
Admissions	3,380,533		4,528,780	
Number of hospitals	618		760	
Number of licensed beds	92,658		128,783	

Sources. IR materials of the following companies for which we can do a consistent comparison. HCA Holdings, Inc.; COMMUNITY HEALTH SYSTEMS, INC.; TENET HEALTHCARE CORP.; UNIVERSAL HEALTH SERVICES, INC.; LifePoint Health, Inc.

Figure 4-2 Profit change of the SGP-listed companies (sum of two major companies)

	Thousand SGD			
	2010		2015	
Revenues	297,702	100.0%	541,469	100.0%
Salaries and benefits	131,529	44.2%	230,273	42.5%
Supplies	38,080	12.8%	68,801	12.7%
Depreciation and amortization	9,976	3.4%	18,966	3.5%
Profit before income tax	54,655	18.4%	102,374	18.9%

Sources. IR materials of the following companies. Raffles Medical Group Ltd; Health Management International Ltd (Converting Ringgit to Singapore Dollar).

Figure 4-3 Profit change of the SGP-listed companies (sum of three primary care - based companies)

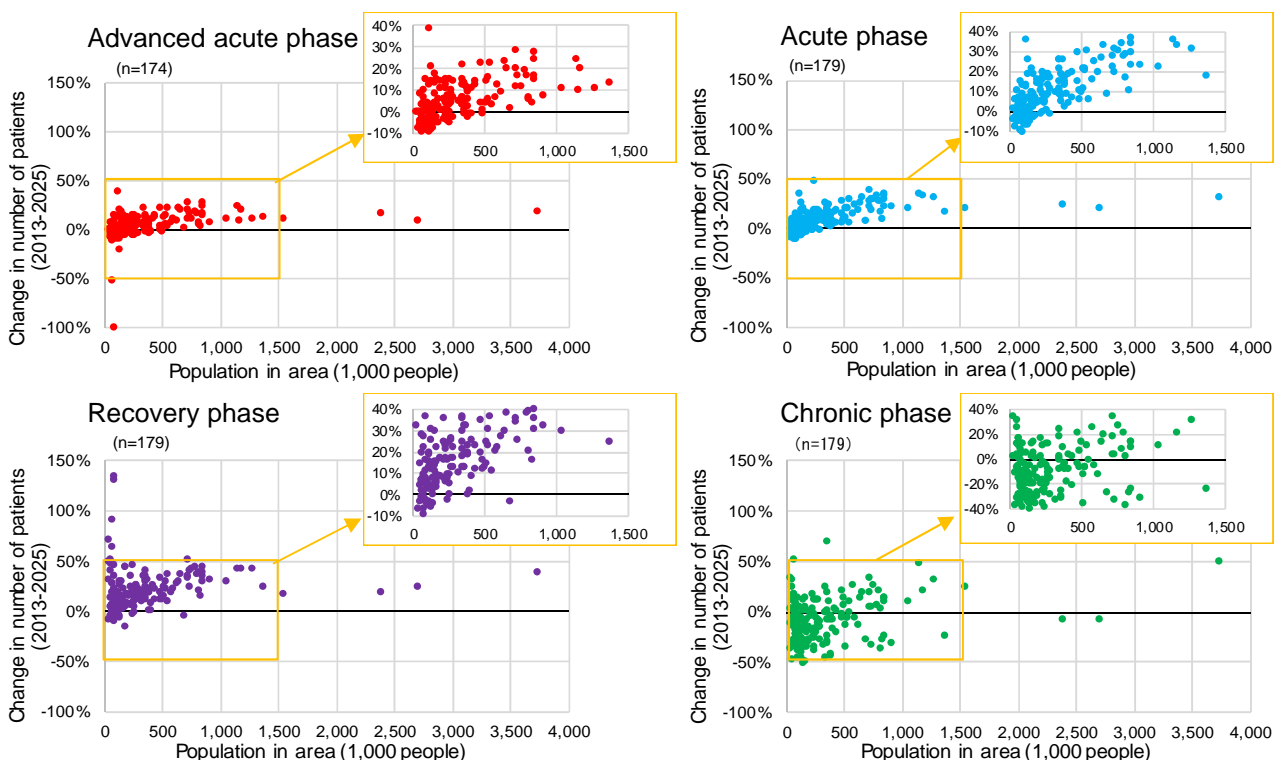
	Thousand SGD			
	2010		2015	
Revenues	132,021	100.0%	145,439	100.0%
Salaries and benefits	66,124	50.1%	79,764	54.8%
Supplies	23,137	17.5%	24,955	17.2%
Depreciation and amortization	4,490	3.4%	4,252	2.9%
Profit before income tax	6,457	4.9%	866	0.6%

Sources. IR materials of the following companies. Healthway Medical Corporation Limited; Singapore Medical Group Limited; AsiaMedic Limited.

## 5. Analysis of Community Health Care Vision reports (part 1)

- The first four pages show hospital management based on financial data. Starting with this page, I look at hospital management from a regional perspective in Japan. In my previous report, 'Hospital management based on collaborative systems,' I analyzed the balance of medical resources, but this time I try to analyze the 'Community Health Care Vision' reports that were released by each prefecture in FY2016.
- First, I explain the various bed categories. Hospital beds in Japan are divided into the following four categories: advanced acute phase (currently 169,472 beds), acute phase (599,272), recovery phase (130,633) and chronic phase (357,526).  
Advanced acute phase beds are those for especially high intensive medical care for patients in the acute phase.  
Acute phase beds are those for patients requiring acute phase medical care.  
Recovery phase beds are for patients' short-term medical care and/or rehabilitation before returning home.  
Chronic phase beds are for patients requiring long-term medical care.
- Next, given the scale of a medical administration area called "the second medical area," I see the number of patients increasing in each of the four phases until 2025. I analyze each phase independently but, as is known, all four phases coexist in each of their second medical areas. Just for convenience in analysis, I made independent graphs.
- In the advanced acute phase, the number of inpatients increases regardless of city size. It grows about 4.4% in this period (2013 to 2025). At the same time, however, in 30.5% of the areas, overall demand decreases regardless of the numbers from the advanced acute phase--and the smaller the population size, the more frequent this phenomenon.  
The acute phase trend is similar to that of the advanced acute phase. Demand decreases in 19.0% of the areas despite the overall growth, with smaller population areas more frequently experiencing demand decreases or, conversely, larger population areas exhibiting a higher propensity for inpatient increases.  
On the other hand, in the recovery phase, the situation is different. The number of the inpatients grows on average by 20.8%, which is higher than in the other categories. Also, sudden increases are forecasted for some small-size areas. As for the chronic phase, the number of inpatients will decrease overall. The average rate of decrease is forecasted at minus 8.3%--and the smaller a particular area's population is, the higher the rate of decrease is. Thus, reconstruction is important in order to repurpose facilities currently dedicated to chronic phase services.
- In most phases of hospital service, the areas experiencing growth in the number of inpatients for 2013-2025 is relatively large, with the recovery phase being the exception. Actually, the Community Health Care Vision reports identify many areas where recovery phase beds remain an important necessity.

Figure 5 Change in number of patients (demand) in relation to population in the area

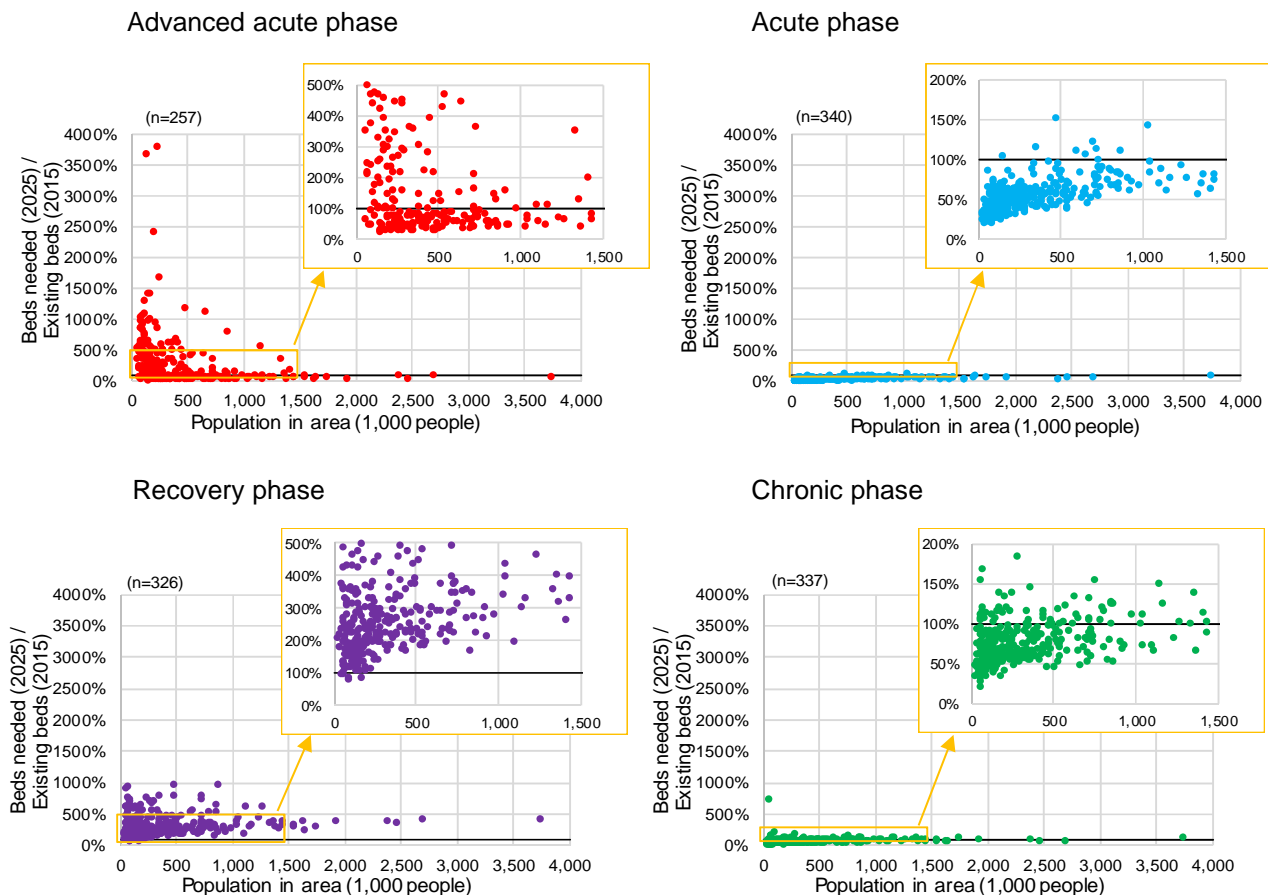




## 6. Analysis of Community Health Care Vision reports (part 2)

- On the other hand, how about examining hospital bed numbers in terms of deficits and surpluses? Fig 6 below, depicts the number of beds needed in 2025 relative to current numbers of beds, based on the Community Health Care Vision reports and the Hospital Bed Function Report . (The number of the samples is different from the previous page.)
- In terms of advanced acute phase beds, 49.0% of the areas will require fewer beds than now. This figure is independent of area size; however, the areas needing fewer beds in this phase are concentrated, relatively, in areas with fewer than 500 thousand people.
- As for acute phase beds, it is assumed that the needed number will decrease in most areas. It is interesting that, in contrast with Fig 5, the overall demand increases but the number of beds in this phase decreases. The Community Health Care Vision reports indicate that most prefectures recognize the necessity of changing the function of their hospital beds.
- The recovery phase's situation contrasts with that of the acute phase. In every area, the needed number of recovery phase beds is huge. The shape of the recovery phase scatter plot for Fig 6, showing beds needed in 2025, is similar to that for the corresponding scatter plot in Fig 5, depicting the forecasted number of patients. It means that the current number of facilities does not match future demand, making obvious the necessity of constructing facilities or adjusting functions. That is partly because this category was adopted relatively recently. The new category makes appropriately balances future demand and supply.
- Finally, in the chronic phase, the shape of the scatter plot is similar to that in the acute phase. It shows that the number of beds in 80.1% of the areas will decrease. It is directly related to current overall deficiencies and excesses in beds. Also, it relates to continuous discussion about eliminating sanatorium long-term care beds. Unlike in the acute phase, it is also similar to the plot representing the need to decrease beds. However, the decrease in future demand in the chronic phase is bigger than that in the acute phase, as shown in Fig 5.
- Thus, increases and decreases in inpatients and estimated numbers of beds needed in 2025 are a little different in each category.

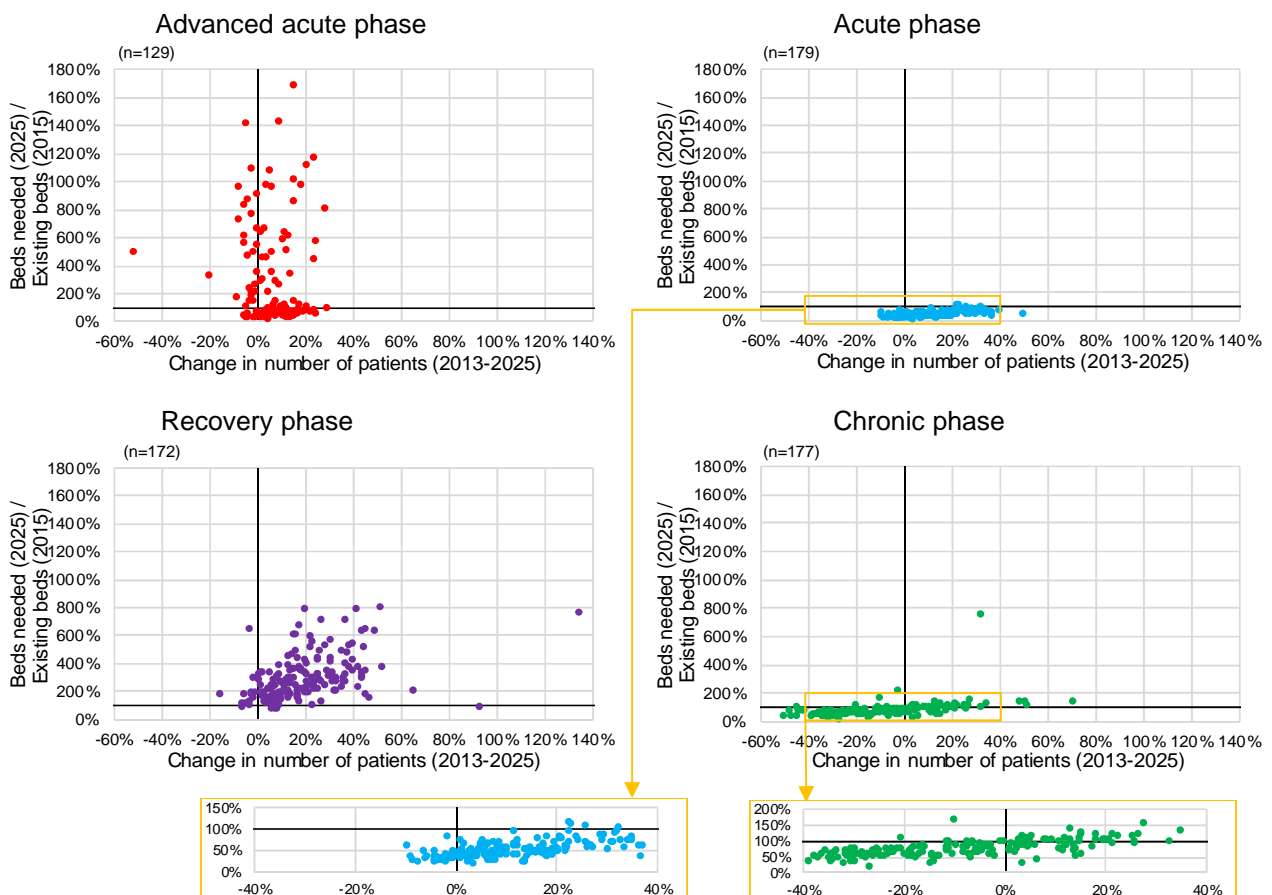
Figure 6 Population in area vs beds needed / existing beds (supply)



## 7. Analysis of Community Health Care Vision reports (part 3)

- Fig 7 shows the relation between the rate of inpatient increase/decrease and the number of beds needed in 2025 relative to the current number. In the advanced acute phase, there is no clear trend. However, the scatter plots for the other phases show a rising to the right--with the proviso that this rising to the right happens in separate dimensions.
- In the recovery phase, the situation is very simple, as explained on the previous page: the increase in inpatients and the increase in needed beds overlap. On the other hand, in the acute phase, the areas are concentrated in the dimension of inpatients increasing and beds needed decreasing. However, in areas where the number of inpatients increases largely, there is no need for additional beds and the balance evolves naturally. And as for the chronic phase, there are many areas where the number of inpatients decreases. In these areas, the number of beds needed decreases in parallel with forecasted decreases in the number of inpatients.
- The acute phase and chronic phase trends are the most important because the number of beds in these two categories is huge. To some extent, we can say that overall the larger the increases in patients in the future, the larger the number of beds needed, even though these two rates do not always move in the same direction.
- Japan's medical field has uneven distributions of doctors, nurses and nursing-care personnel. Also, medical institutions have existing capital investment and debt, and their profitability is limited. These situations hinder hospitals from moving quickly to change the functions of beds in line with changes in patient needs. The evidence, based on field research, is convincing.
- At the same time, in the acute and chronic phases the long-term roles have changed according to past changes in patient needs. But nowadays, with more-precise categorization, involving the recovery and advanced acute phases, we can do more-convincing analysis. As for the recent addition of the home medical category, the structure is basically the same. This analysis of Community Health Care Vision reports shows that hospitals need to choose and execute a flexible action plan in line with changes in demand. Because the current situation is growing more severe (in some regions even the numbers of the aged have begun to decrease), I try to think about future ways of hospital management.

Figure 7 "Beds needed / Existing beds" (supply) vs Change in number of patients (demand)

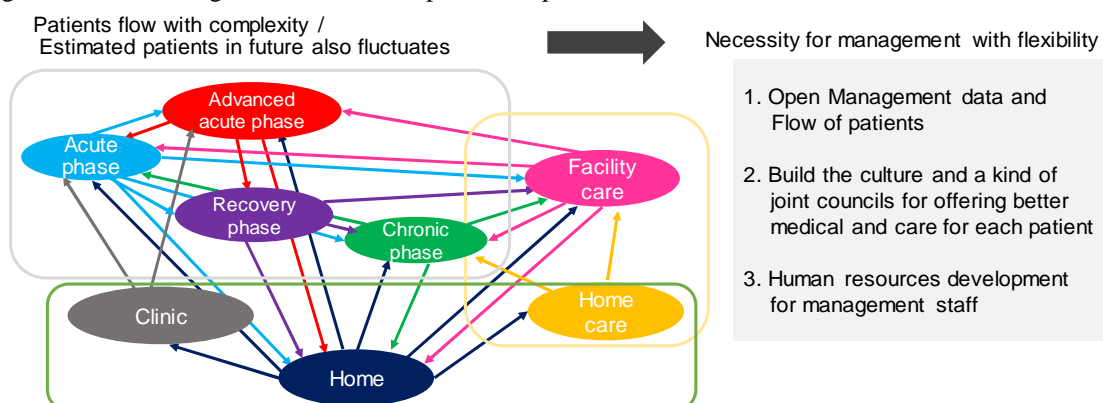


Sources. Each prefecture's "Community Health Care Visions" and "Hospital Bed Function Report"

## 8. Future management issues for Japanese hospitals

- As a conclusion, this page shows future management issues for Japanese hospitals. Pages 1 and 2 show that profitability of Japanese hospitals tends to be adjusted by the portion of salary to sales. It is contrary to the situation in 2008, when the contribution of salary to sales roared, highly corresponding to the payment of high medical service fees for recruiting qualified nurses. In the circumstances of low profitability, it is difficult to reduce the costs of supplies and IT; therefore, many hospitals tend to use salary as an adjuster, which I warn could result in lower-quality medical services. It is possible that this trend might grow strong; thus, I pick it up as one of the issues.
- Because of space limitations in this paper, I omit the graph regarding hospital balance sheets. However, one turning point in particular merits mentioning. Since the latter part of 2014, the construction fee for building new medical/care facilities has risen and the floor space for new construction starts has decreased. In this situation, the amount of lending from financial institutions to medical/care fields began decreasing in 2016. The amount of lending in these fields had been growing rapidly for at least the five previous years, but it turned downward. Of course, it might have been natural, given that profitability remained low and new construction began decreasing, but this inversion broke a long precedent. Thus, I pick this change as another issue.
- On the other hand, based on total healthcare expenditure per capita and average lifespan (pages 3 and 4), Japanese medical prices remain relatively reasonable, and management in each hospital keeps well-balanced in the long run. I think that this provides basically good sustainability. Of course, under fiscal restrictions, hospital management may remain in a severe situation, but I do not recommend an overly strict examination of the situation. Instead it is better to evaluate how past management was able to maintain a kind of balance between quality and cost.
- At the same time, as seen on pages 5 to 7, the biggest issue that hospitals face is to correspond to the change of demand (increases/decreases in the number of inpatients) and the balance of regional medical resources. It is important to note that patients do not flow directly from the advanced acute phase to the home care phase. Each facility discharges and admits patients by various ways, as seen in Fig 8. The overall flow is very complex.
- Ideally under these situations, each medical/care institution's operations exhibit characteristics of flexibility and collaboration. Healthcare, nursing care and home care operations should be integrated as shown in Fig 1-2.
- I suggest acting on the following three management points in order to achieve such integration.
  1. Optimize systems by accessing actual management data and flow of patient data instead of using sample data
  2. Provide all patients better medical/care services by creating both an appropriate culture and effective collaborative councils--especially involving regional central hospitals, with family doctors playing key roles
  3. Develop appropriate human resources: management staff in each hospital that are able to consider the issues comprehensively
- Based on these actions, hospitals should build their own work plans that fit their respective regions and patients, which collectively will lead to a sustainable Japanese medical system.
- Relevant literature (no English translations):
  - Future management and strategy for hospitals (March 2017, Kinzai)
  - Hospital management data-book 2016 (October 2016, Nihon Iryou Kikaku)
  - Hospital management based on collaborative systems (January 2016, DBJ website)
  - Healthcare mini-book issued in February 2017 (DBJ website)

Figure 8 Future management issues for Japanese hospitals



Sources. Various data

[Economic & Industrial Research Department Tatsufumi Aoyama]



Copyright © Development Bank of Japan Inc. 2017

This material has been prepared by Development Bank of Japan Inc. (DBJ) solely for the purpose of providing information. It is not intended as a solicitation or an offer to buy or sell any financial instrument, product, service or investment or for any other transaction.

This material is based on current, generally held views on the economy, society and other relevant matters, as well as on certain reasonable assumptions by DBJ. DBJ does not guarantee the thoroughness or accuracy of the information contained, which is subject to change without notice due to changes in the business environment or other reasons.

Please note that DBJ is not responsible for any action taken based on this material.

It is strictly prohibited to copy, extract or disclose all or any part of this material (including any attachments hereof) without prior written consent from DBJ. Any use of this material must be accompanied by attribution to DBJ.

Inquiries:  
Economic & Industrial Research Department  
Development Bank of Japan Inc.  
Phone: +81-3-3244-1840  
E-mail: [report@dbj.jp](mailto:report@dbj.jp)