

A Study on the Location Characteristic and Disparity of Day Care Facilities for the Elderly in Yamaguchi Prefecture

Sachiko Mishima^{*1}, Nagusa Ishibashi², Shoken Koh³, Mahito Nakazono⁴, and Sachiko Yamamoto⁵

¹Doctor Student., Graduate Student of Science and Engineering, Yamaguchi University, Japan

²Master Student., Graduate School of Science and Engineering, Yamaguchi University, Japan

³Lecturer., Graduate School of science and Engineering, Yamaguchi Univ, Dr.Eng. , Japan

⁴Professor., Graduate School of Science and Engineering, Yamaguchi Univ, Dr.Eng. , Japan

⁵Assistant Professor., Faculty of Engineering., Information and systems, Univ of Tsukuba, Dr.Eng. , Japan

Abstract: The purpose of this study is to clarify the location characteristic of day care facilities for the elderly and to consider the issue of facility supply for the future in Yamaguchi Prefecture. The results are as follows. 1) By analyzing the location pattern of day care facilities, each self-governing body in 2000 was able to classify into six types, called urban type 1, urban type 2, high-density towns-and-villages type, medium-density towns-and-villages type, semi-mountainous type, and mountainous type. 2) In the areas of urban type 1 and urban type 2, facility supply is progressing by a corporation for profit, and the fulfillment rate of facility demand is high. 3) On the other hand, in the areas of semi-mountainous type and mountainous type, although a day care facility with nursing home is supplied by a social welfare corporation and few day care facilities are supplied by private sector corporations, the fulfillment rate of facility demand is low and there is the disparity between urban type and mountainous type. Since supply of a small-scale and independent day care facility is forbidden by the nursing care insurance revision in 2015, it is expected that the disparity will be expanded in the future.

Keywords: Nursing-care insurance system, Day care facility, Sufficiency degree, Regional disparities, Regional Classification

1. Introduction

The population of Japan was decreased about 269,000 people and the aging rate was 26%, according to 2014 vital statistics of population. The advancement of aging society with child birthrate falling rapidly continues to progress. The change of the population by age group after 2000 is shown in figure 1. The population below 65 years old continues to decrease from 2000, but the population over 65 years old continues to increase until 2020. The population over 65 years old rapidly increases in 2015 because the first baby boom generation has become aged 65 and over, decreases after 2020, and starts to increase again after 2030 when the second baby boom generation will become aged 65 and over. Change in the number of care-need certificated persons by a care-need level is shown in figure 2. A care-need level means necessary degree of the assistance in everyday life. Care level 1 is the condition needing assistance, when they walk or do housework. And care level 5 is the condition needing care in all situations. The number of people with care level 1 and 2 is specially increasing to 2014, but the number of people with care level 5 is decreasing after 2013. It is thought that the standards of certification of needed long-term care have become strict, because increase of care-need certificated persons with high degree of care is an issue.

It is a serious issue that 524,000 people are waiting for a

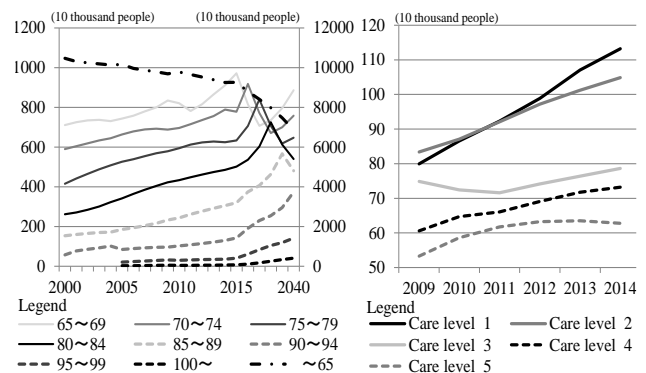


Fig.1. Change of population **Fig.2. Change of care-need certificated persons**

special nursing home of 2014. However, it is not easy to establish more facilities, because the number of facilities is limited by local government. Many elderly people use a day care facility until being admitted into a special nursing home, so it is thought that a day care facility has a major role to play in these efforts.

In previous studies of the field of building and city planning, there are the accumulations of the study such as a grasp of the location actual, evaluation of the service level, consideration and suggestion of optimal location layout planning 1-3), and classifying the characteristics of the demand for the elderly 4). On the other hand, about the problems considering disparities of welfare services, there are the accumulations of the study such as the research pointing out uneven distribution and regional disparity of the facilities location for particular areas 5-6). But there is few studies analysis of the time-series

*Contact Author: Sachiko Mishima, Doctor Student, Yamaguchi University
2-6-1, Tokiwadai, Ube City, 755-8611, Japan
Tel: 0836-85-9707 Fax: 0836-85-9701
e-mail: t502we@yamaguchi-u.ac.jp

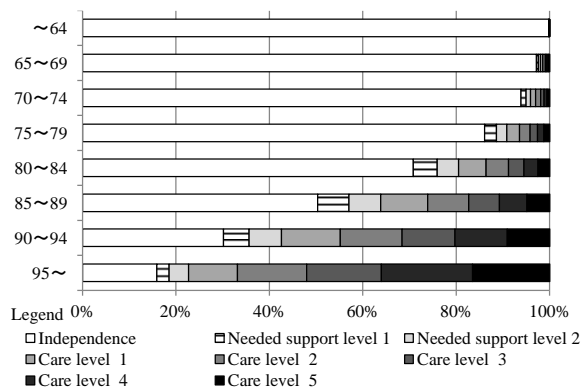


Fig.3. The ratio of care-need certified person (2014)

Table.1. The ratio of a care-need certified person

| | Care level 1 | Care level 2 | Care level 3 | Care level 4 | Care level 5 |
|-------|--------------------|--------------------|--------------------|--------------------|--------------------|
| ~65 | 0.00030 (0.003) | 0.00042 (0.003) | 0.00028 (0.002) | 0.00023 (0.001) | 0.00025 (0.002) |
| 65~69 | 0.00476 (0.035) | 0.00540 (0.035) | 0.00383 (0.030) | 0.00312 (0.009) | 0.00307 (0.018) |
| 70~74 | 0.01055 (0.042) | 0.01086 (0.042) | 0.00781 (0.078) | 0.00648 (0.029) | 0.00609 (0.024) |
| 75~79 | 0.02506 (0.144) | 0.02280 (0.144) | 0.01670 (0.125) | 0.01418 (0.026) | 0.01292 (0.049) |
| 80~84 | 0.05423 (0.361) | 0.04657 (0.361) | 0.03478 (0.180) | 0.02983 (0.047) | 0.02647 (0.095) |
| 85~89 | 0.09280 (0.564) | 0.08532 (0.564) | 0.06782 (0.346) | 0.05965 (0.073) | 0.05187 (0.206) |
| 90~ | 0.11035 (0.860) | 0.13168 (0.860) | 0.12688 (0.351) | 0.13237 (0.231) | 0.11572 (0.488) |

Note: Figures in parentheses indicate standard deviation.

change of facilities supply based on each small area for 15 years since nursing-care insurance system was introduced, as a target for whole area of the local prefecture including the urban region and rural region where the depopulation and aging is remarkable.

As mentioned above, the purpose of this study is to clarify the effect and issue of facilities supply by the survey on the fulfillment rate of facility demand in Yamaguchi prefecture where aging is rapidly advanced and it is estimated to increase the demand of day care facility.

The data used for analysis is compiled from WEB site : insurance information Service Guide of Yamaguchi Prefecture / Database of Service Establishment / Day Care (Elderly Citizens' Welfare Division in Yamaguchi Prefecture), Result of National Census and vital statistics (2000-2014), National Institute of Population and Social Security Research : Future Population Estimates (2015-2040).

2. The percentage of care-need certified persons in the elderly people and estimation method.

2.1 Estimation of the percentage of care-need certified persons in the elderly people

In this paper, the fulfillment rate of facility demand is calculated by the number of care-need certified persons. All-Japan Federation of National Health Insurance Organizations shows the number of them by age group and a care-need level. The example of the ratio of a care-need certified person by age group in 2014 is shown in figure 3. When the age group rises, the ratio of a care-need certified person and a care-need level tend to become higher. The ratio of a care-need certified person in the age group of 85-89 is

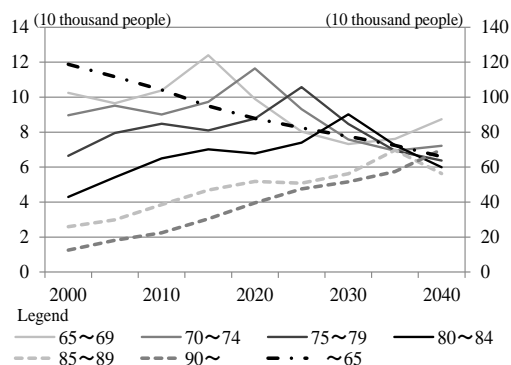


Fig.4. Change of population in Yamaguchi prefecture

about 50%, and the ratio of a care-need certified person in the age group of 90 or more is over 80%. The ratio of the number of care-need certified persons to the population was calculated by age group, using 2009-2014 data that have become the present category of need long-term care. And an average of six years was calculated. In this paper, the average of the ratio is postulated to continue after 2015. And needed support care level 1 and 2 are excluded from estimation, because a day care facility is intended for the people who have obtained a certification of needed long-term care in general. A support care is the condition needing some assistance, when they walk or do housework. The ratio of a care-need certified person by age group and a care-need level is shown in table 1. The ratios of the care-need certified persons with care level 1 and 2 are the highest. When the age group rises, the ratio of a care-need certified person and a care-need level tend to become higher in all age group. The ratio of the care-need certified persons with care level 2, 3 and 4 is high in the age group of 90 or more. About standard deviation, when the age group rises, it tends to become higher, but the average of the ratio is used in this paper.

2.2 The estimation method of the number of care-need certified persons

The number of care-need certified persons is calculated using the average of the ratio. It postulated that the ratio is α_{ij} , population by age group is A_i and the number of care-need certified persons by a care-need level is P_j . The number of care-need certified persons with care level 1-5 can be expressed as the following equation.

$$\begin{pmatrix} P1 \\ P2 \\ P3 \\ P4 \\ P5 \end{pmatrix} = \begin{pmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} & \alpha_{14} & \alpha_{15} & \alpha_{16} & \alpha_{17} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} & \alpha_{24} & \alpha_{25} & \alpha_{26} & \alpha_{27} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & \alpha_{34} & \alpha_{35} & \alpha_{36} & \alpha_{37} \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & \alpha_{45} & \alpha_{46} & \alpha_{47} \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & \alpha_{55} & \alpha_{56} & \alpha_{57} \end{pmatrix} \times \begin{pmatrix} A1 \\ A2 \\ A3 \\ A4 \\ A5 \\ A6 \\ A7 \end{pmatrix} \quad \dots (1)$$

i : age

(i = 1~7, 1 : ~65, 2~6 : 5-year-old interval, 7 : 90~)

j : a care-need level

(j = 1~5)

And it postulated that the number of care-need certified persons is P. The number of care-need certified persons can be expressed as the following equation.

$$P = \sum_{i=1}^5 (P_i) \quad \dots (2)$$

Table.2. The number of care-need certificated persons in Yamaguchi prefecture

| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|--------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| Care level 1 | 9568 | 11501 | 13508 | 15448 | 17011 | 18234 | 19298 | 19786 | 19175 |
| Care level 2 | 9399 | 11295 | 13227 | 15249 | 16955 | 18239 | 19258 | 19934 | 19802 |
| Care level 3 | 7374 | 8963 | 10568 | 12336 | 13891 | 15079 | 15992 | 16728 | 16936 |
| Care level 4 | 6600 | 8099 | 9592 | 11304 | 12859 | 14069 | 14964 | 15757 | 16212 |
| Care level 5 | 5946 | 7263 | 8570 | 10069 | 11426 | 12477 | 13241 | 13911 | 14307 |
| total | 53201 | 64135 | 75214 | 86491 | 95993 | 103405 | 109254 | 112502 | 111167 |

This is calculated at 5-year intervals in 2000-2040, which is published in national institute of population.

3. The estimation of the number of care-need certificated persons in Yamaguchi prefecture

3.1 The number of elderly people

The change of the population by age group after 2000 in Yamaguchi prefecture is shown in figure 4. In Yamaguchi prefecture, it is estimated that decrease of elderly people begins earlier than all Japan. The peak of population in the age group of 65-69 is 2015. However, it is estimated that the population over 85 years old is continuing increase until 2040. The population in age group of 58-89 is increased to 56,000 people from 26,000 people, and the population in age group of 90 or more is increased to 70,000 people from 13,000 people. In addition, it is estimated that the population below 65 years old is decreased to 650,000 from 1190,000.

3.2 The estimation of the number of care-need certificated persons

The number of care-need certificated persons is calculated using the population by age group in figure 4. The result of estimation is shown in table 2. The number of care-need certificated persons is 53,201 in 2000 and 111,167 in 2040, so it increases double. It continues increasing, but the increasing rate is decreased after 2025. According to a care-need level, the number of care level 4 is 6,600 in 2000 and 16,212 in 2040, and the increasing rate is the highest. However, the number of care level 1 and 2 is decreasing after 2035. It is thought that it is cause that the number of people below 85 years old is decreasing after 2035. The whole number of care-need certificated persons is decreasing after 2035, because there is the most number of care level 1 and 2.

4. The regional characteristics by the elderly population and the number of care-need certificated persons

4.1 The regional characteristics by the elderly population

By analyzing the three indices drawn from the elderly population over 75 years old; the aging rate in 2010 (%), elderly population density in 2010 (persons/km²) and the increasing rate of elderly people between 2000 and 2010 (times), each self-governing body in 2000 was able to classify into six types, called urban type 1, urban type 2, high-density towns-and-villages type, medium-density towns-and-villages type, semi-mountainous type, and mountainous type. The result of classifying types is shown in table 3 and figure 5.

Type 1 is called urban type 1, and corresponds to

Table.3. The result of classifying the type

| 2000 Old municipality | The number of self-governing body | 1990 | | | 2010 | | | 1990-2010 increase ratio of elderly people (times) | area (km ²) | Elderly population density (persons/km ²) (2010) |
|-----------------------|-----------------------------------|------------------------------------|--------------------------------------|-----------------------|------------------------------------|--------------------------------------|--------------------|--|-------------------------|--|
| | | Total population (thousand people) | Elderly population (thousand people) | the rate of aging (%) | Total population (thousand people) | Elderly population (thousand people) | the aging rate (%) | | | |
| Type 1 | 5 | 158.5 | 6.8 | 4.3 | 148.7 | 19.3 | 12.8 | 2.8 | 266 | 72.5 |
| Type 2 | 9 | 50.0 | 1.9 | 4.7 | 43.7 | 6.1 | 14.6 | 3.7 | 121 | 50.0 |
| Type 3 | 9 | 10.1 | 0.7 | 6.8 | 9.9 | 1.6 | 17.8 | 2.5 | 24 | 64.6 |
| Type 4 | 10 | 11.8 | 0.8 | 8.1 | 10.7 | 1.9 | 20.7 | 2.4 | 50 | 36.9 |
| Type 5 | 11 | 9.0 | 0.7 | 7.8 | 7.4 | 1.5 | 21.3 | 2.3 | 119 | 13.0 |
| Type 6 | 12 | 4.9 | 0.4 | 8.9 | 3.1 | 0.8 | 28.0 | 2.0 | 137 | 6.2 |

Legend) Type 1 is urban type 1.
 Type 2 is urban type 2.
 Type 3 is high-density towns-and-villages type.
 Type 4 is medium-density towns-and-villages type.
 Type 5 is semi-mountainous type.
 Type 6 is mountainous type.
 note1) self-governing body classification used in the location pattern is a thing of 2000 Previous "Heisei large merger"
 note2) In the elderly population, More than 75-year-old people has many day care users and therefore to target them

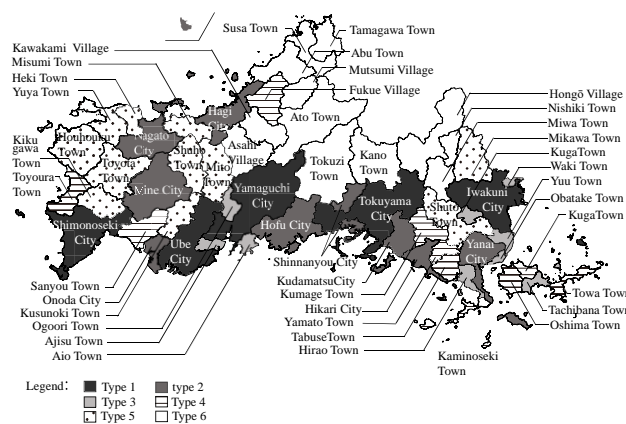


Figure.5. Distribution map by type

Shimonoseki city, Yamaguchi city, Ube city, Tokuyama city and Iwakuni city, where are major cities in Yamaguchi prefecture. The elderly population and elderly population density is the highest. However, the aging rate in 2010 is 12.8%, and it is low, because they have large population. Type 2 is called urban type 2, and corresponds to the old cities except type 1. The elderly population is lower than type 1, but the increasing rate of elderly people between 2000 and 2010 is 3.7 times and it is high. The aging rate in 2010 is 14.6% and elderly population density in 2010 is 50persons /km².

Type 3 is called high-density towns-and-villages type, and corresponds to 9 old towns and villages. Type 4 is called medium-density towns-and-villages type, and corresponds to 10 old towns and villages. Types 3 and 4 have high elderly population density, because the area of self-government body is smaller than the old town and villages classified into other types. In particular, elderly population density of type 3 is 64.6 persons/km², and it is close to type 1 and 2. And, the cities with type 3 are located around cities with type 1 and 2. The aging rate of type 3 is 17.8% and type 4 is 20.7, and about one in five people are the old-old population of over 75.

Type 5 is called semi-mountainous type, and corresponds to 11 old towns and villages. Type 6 is called mountainous type,

Table.4. The number of care-need certificated persons

| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Type 1 | 26721 | 33300 | 40172 | 45866 | 49285 | 53629 | 60169 | 57821 | 55477 |
| Type 2 | 15637 | 18951 | 22535 | 25380 | 27281 | 30122 | 33249 | 31811 | 36550 |
| Type 3 | 4149 | 4947 | 5859 | 6603 | 9241 | 9755 | 9323 | 8868 | 7840 |
| Type 4 | 5242 | 6663 | 7698 | 8382 | 8704 | 9291 | 9984 | 9323 | 8654 |
| Type 5 | 4930 | 6070 | 6944 | 7825 | 8162 | 8559 | 9411 | 9001 | 8995 |
| Type 6 | 3135 | 3636 | 4087 | 4606 | 4816 | 5086 | 5635 | 5444 | 5210 |

and corresponds to 12 old towns and villages. The elderly population density of type 5 and 6 are 13.0 and 6.2 persons/km², and low, because the elderly population is smaller and the area of self-government body is larger than other types. The aging rate of type 5 and 6 are 21% and 28%, and high. They are placed as depopulated regions.

4.2 The number of care-need certificated persons by type

The number of care-need certificated persons is calculated by type. The result of estimation is shown in table 4. The number of them of almost types is decreased after 2030, but the number of them of type 3 is decreased after 2025. The number of them of type 2 is increasing between 2035 and 2040, because the population in age group of 65-80 is increasing. The increasing rate of type 1 is about 1.7 times between 2000 and 2015, and about twice between 2000 and 2040. The increasing rate of type 2 is about 1.6 times between 2000 and 2015 and about 2.3 times between 2000 and 2040. And the increasing rate of type 1 and 2 is the highest. On the other hand, the increasing rate of type 6 is about 1.5 times between 2000 and 2015 and about 1.7 times between 2000 and 2040. So, there is not big disparity between type 1,2 and type 6.

5. The fulfillment rate of facility demand in Yamaguchi prefecture

5.1 The change of a facility capacity

The change of a facility capacity by type is shown in figure 6. In 2000 when nursing-care insurance was introduced, the highest facility capacity is 985 people of type 1. And the lowest facility capacity is 251 of type 3. So, the disparity is relatively small. After that, a facility capacity has increased rapidly in type 1 and 2, so it became 7,166 people in 2015 and increased about 7 times in type 1, and it became 3,970 people and increased about 6 times in type 2. On the other hand, the increasing rate of a facility capacity in old towns and villages is lower than old cities. The highest increasing rate of it is about 4 times of type 4, and it became 1,286 people in 2015 from 320 people in 2000. And the lowest increasing rate of it is only twice of type 6, and it became 564 people from 280 people. So, there is the big disparity between the old cities and old towns

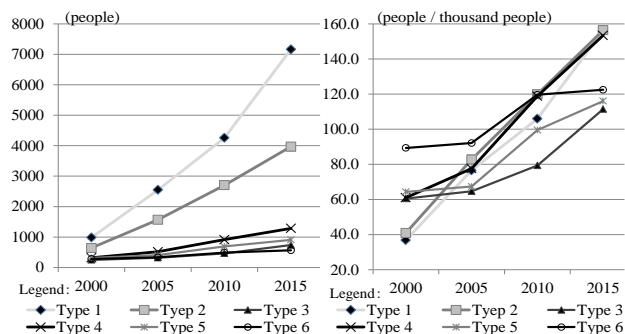


Fig.6. The change of a facility capacity

Fig.7. The change of fulfillment rate

and villages in 2015.

5.2 The fulfillment rate of facility demand

The change of the fulfillment rate of facility demand by type is shown in figure 7. In 2000, the fulfillment rates of facility demand of type 1 and 2 are 36.9 and 40.9 people/thousand people, and they are the lowest. Type 6 is 89.3 people/thousand people, and it is the highest. It is thought that the fulfillment rate of facility demand is low in urban region that the estimation of the number of care-need certificated persons is large, and the fulfillment rate of facility demand is high in rural region that the estimation is small. Because a day care facility with a nursing home is established equally over Yamaguchi prefecture and there is no disparity of total facility capacity. In 2005, the fulfillment rate of facility demand of type 1 and 2 increased twice, so the disparity of it is smaller than in 2000. It is thought that facility development is advanced in the region where the number of care-need certificated persons is large, after nursing care insurance was introduced. In 2010, the fulfillment rate of facility demand has risen in all the types. The increasing rate of type 1, 2 and 4 is high, but type 3 is low. Therefore, the disparity of the fulfillment rate of facility demand is bigger than in 2005. It is thought that a day care facility of urban area tends to promote the demand of around regions, because towns and villages of type 3 are close to urban area. In 2015, the disparity is expanded more between the old cities and old towns and villages, because it tends to rise as 2005.

In addition, it is clarified that the fulfillment rate of facility demand of type 4 is the same level as type 1 and 2. On the other hand, the fulfillment rate of facility demand of type 3 has risen in 2015, and it is the lowest.

5.3 Relationship between the fulfillment rate of facility demand and established organizations

Table.5. Facility capacity of new entry by established organization in three time division

| | 2000~2004 | | | | | | 2005~2009 | | | | | | 2010~2014 | | | | | | total |
|--------|----------------------------|---------------------|------------------------|-----------------------|--------------------------------|----------|----------------------------|---------------------|------------------------|-----------------------|--------------------------------|----------|----------------------------|---------------------|------------------------|-----------------------|--------------------------------|----------|-------|
| | Social Welfare Corporation | Medical Corporation | Corporation for Profit | Nonprofit Corporation | Social Welfare conference, etc | Subtotal | Social Welfare Corporation | Medical Corporation | Corporation for Profit | Nonprofit Corporation | Social Welfare conference, etc | Subtotal | Social Welfare Corporation | Medical Corporation | Corporation for Profit | Nonprofit Corporation | Social Welfare conference, etc | Subtotal | |
| Type 1 | 422 | 272 | 667 | 165 | 38 | 1564 | 268 | 296 | 976 | 90 | 85 | 1715 | 351 | 251 | 2203 | 40 | 34 | 2879 | 6158 |
| Type 2 | 302 | 227 | 309 | | 90 | 928 | 254 | 127 | 739 | 15 | 10 | 1145 | 182 | 99 | 1104 | 25 | 24 | 1434 | 3507 |
| Type 3 | 22 | | 17 | | 30 | 69 | | 12 | 72 | 32 | 29 | 145 | 79 | 20 | 143 | 19 | 10 | 271 | 485 |
| Type 4 | 30 | 65 | 72 | 15 | 20 | 202 | 70 | 77 | 223 | 28 | | 398 | 27 | 30 | 276 | 38 | | 371 | 971 |
| Type 5 | | 22 | 20 | 10 | 40 | 92 | 50 | | 142 | 12 | 78 | 282 | | 10 | 197 | | 10 | 217 | 591 |
| Type 6 | 10 | | 45 | | | 55 | 104 | | 20 | 10 | 10 | 144 | 35 | 10 | 60 | | | 105 | 304 |
| total | 786 | 586 | 1130 | 190 | 218 | 2910 | 746 | 512 | 2172 | 187 | 212 | 3829 | 674 | 420 | 3983 | 122 | 78 | 5277 | 12016 |

The new entries of established organizations are classified by three time division (2000-2004, 2005-2009, 2010-2014). Total facility capacity of the new entry by established organization in three time division is shown in table 5. In 2000-2004, many social welfare corporations and corporations for profit entered in the region of type 1 and 2. Many social welfare conferences, Japan agricultural cooperatives, cooperative societies and so on entered in the region of type 3, and many medical corporations and corporations for profit entered in the region of type 4. Many social welfare conferences and other corporations entered in the regions of type 5, and many corporations for profit entered in the regions of type 6. In 2005-2009, many corporations for profit entered in all the regions, but many social welfare corporations entered in the regions of type 6. In addition, social welfare corporations and medical corporations entered in the regions of type 1 and 2. A feature of the regions of type 3 is that there is no new entry of a social welfare corporation. In 2010-2014, the new entry is same trend with 2005-2009, but many corporations for profit entered in the regions of type 6. And the number of new entries of corporations for profit is increasing rapidly.

Next, type 3 and 4 is focused on, because the change of the fulfillment rate of facility demand is characteristic. About type 4 that the fulfillment rate of facility demand is high, the new entry is similar to type 1 and 2, and many corporations for profit enter in this region. On the other hand, about type 3 that the fulfillment rate of facility demand is low, the number of the new entry of corporations for profit is smaller than regions of other types, and the number of the new entry of social welfare conferences and other corporations. Therefore, it is thought that the new entry of a corporation for profit causes the disparity in the fulfillment rate of facility demand. A corporation for profit tends to enter in the region that gathering users is easy, because a corporation for profit regards profitability as important. It is thought that a corporation for profit located urban region promotes the demand of the regions of type 3, because the region of type 3 is close to urban region and pickup distance is short. And it is thought that there are many entries of corporations for profit, because the regions of type 4 are more far from the regions of type 1 and 2 than type 3.

6. Conclusions

In this paper, care-need certificated persons are estimated, and the fulfillment rate of facility demand is compared with patterns of a self-governing body in Yamaguchi prefecture. The results are as follows;

(1) The average of the ratio of care-need certificated persons for six years is postulated to continue after 2015, and the number of care-need certificated persons is calculated. The number of them increases twice between 2000 and 2040, but the number of them is decreasing after 2035. According to a care-need level, the increasing rate of care level 4 between 2000 and 2040 is 2.5 times, and it is the highest.

(2) According to the fulfillment rate of facility demand by type, type 1 and 2 is low, and other types are high in 2000. However, facility development is advanced rapidly in the region of type 1 and 2 after 2005, so type 1 and 2 is the highest in 2015. And there is the big disparity between the old cities and old towns and villages. A feature of the regions of type 4 is

that the fulfillment rate of facility demand is the same level as type 1 and 2, and a feature of the regions of type 3 is that it is the lowest.

(3) About relationship between the fulfillment rate of facility demand and established organizations, it is clarified that the fulfillment rate of facility demand tends to become high in the types that many corporations for profit enter. In type 3, there is a few entry of corporation for profit, because the regions of type 3 are close to urban region and a day care facility located urban region promotes the demand of the regions of type 3. In type 4, there are many entries of corporations for profit, because the regions of type 4 are more far from the regions of type 1 and 2 than type 3.

As mentioned above, the fulfillment rate of facility demand is rising in all self-governing body, because facility development is progressing by a private sector corporation, such as a corporation for profit. The fulfillment rate of facility demand tends to become high in the region that many corporations for profit enter. Facility development is advanced rapidly by a corporation for profit in urban region. There is the big disparity between urban region and rural region. In the future, it is a problem to consider how to advance facility development in the region where the fulfillment rate of facility demand is low. However, it is expected that the disparity between urban region and rural region will be expanded in the future, because supply of a small-scale and independent day care facility is forbidden by the nursing-care-insurance revision in 2015. It is required to clarify a problem of facilities management and to consider the effective method, in consideration of the influence by the legal revision.

References

- 1) Ogawa, H. (1995) A study on the establishment of local "Day-service" centers for the elderly, Architectural Institute of Japan, 478, 89-98
- 2) Nakazono, M. et al. (2008) Supply and management from of regional welfare homes reused the existent Facilities by private associations, Architectural Institute of Japan, 624, 407-414
- 3) Kondo, M. and Takahashi, K. et al. (2002) Evaluation of convenience and allocation planning of welfare facilities for elderly people, Architectural Institute of Japan, 37, 769-774
- 4) Mishima, S. et al. (2012) The change of day service sufficiency after the introduction of health care insurance system, Architectural Institute of Japan, 18 (40), 1025-1028
- 5) Miyazawa, H. (2003) Uneven nursing care service opportunity and the behavior of service providers under the long-term care insurance system, Architectural Institute of Japan, 76, 59-80
- 6) Hatakeyama, T. (2005) A study on the changes in the level of satisfaction with service provided after the increase in usage of "Commuting service", Architectural Institute of Japan, 46 (1), 1-12