

**Quality of care in long term care facilities in Japan:  
From both clinical outcomes and consumer's perspectives**

日本の介護保険施設におけるケアの質に関する研究

—健康アウトカムと利用者の視点から—

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## **Abstract**

Since the implementation of the long term care insurance system, older adults have been able to choose their facility freely and choose among various types of providers, such as NPOs and private companies, which have emerged in the long term care market in Japan. This has led to disparities in quality among long-term care facilities. The Japanese government, providers and researchers have attempted to evaluate quality of care in long-term care facilities. However, most quality assessment tools have been focused on structure and process, and outcome assessment is not yet well documented.

Overseas reviews reported that there are two kinds of outcome assessments of quality of care. One is objective assessments which focus on medical and clinical outcomes such as ADL (activities of daily living) or mortality and the other is subjective assessments which are based on consumers' perceptions such as customer's feedback or satisfaction. In Japan, there is little research applying clinical outcomes to measure quality of care and none have developed satisfaction survey by examining psychometric measure for long-term care facilities. Therefore, the aim of the study is to measure the quality of care in long-term care facilities from both a clinical outcome and consumer perspective.

Care-need level is determined by municipalities strictly based on assessment of physical and mental status. This thesis uses changes in assessed care-need level as an outcome indicator because previous studies showed strong correlation between ADL and care-need level. By taking advantage of nationally standardized assessment of care-need level, study 1 was conducted to describe the status of quality of care by calculating a risk-adjusted care-need level deterioration rate, sustainment rate and improvement rate among all long-term care welfare facilities. Among the three outcome indicators, care-need level deterioration rate was considered to be more straightforward to identify problematic facility. Study1 aimed to grasp the simple situation of the care-need level deterioration in national level to see the possibility to apply it as outcome assessment. Studies 2 and 3 were conducted to investigate resident and facility characteristics associated with care-need level deterioration in long-term care welfare facilities (study 2) and long-term care health facilities (study 3) respectively.

Quality of care measures based on clinical outcome are often criticized for lack of consumers' view which could help providers to clarify consumers' desired service. Especially in Japan, taking the consumers' perspective when providing care is a common goal and vision for long-term care facilities. Therefore, study 4 was conducted to develop a resident satisfaction survey in long-term care health facilities which includes testing validity and reliability.

The obtained findings showed that there are variety of care-need level change rates among all long-term care welfare facilities. Moreover, facility level factors of metropolitan location were consistently negatively associated with care-need level deterioration in both long-term care welfare and long-term care health facilities. Several facility characteristics had an effect in different settings. Among long-term care welfare facilities, facilities with unit care type, fewer year in business, higher proportion of registered nurses among all nurses and higher proportion of registered dietitians among all dietitians were less likely to have residents with care-need level deterioration. In long-term care health facilities, facilities with higher percentage of private rooms, fewer licensed practice nurses per 100 users and fewer doctors per 100 users were less likely to deteriorate in care-need level. The findings from developing the satisfaction survey indicated good construct validity and reliability for 7 domains: "activities", "employee relations", "communication", "rehabilitation", "meals", "employee responsiveness", "resident environment".

In conclusion, distribution of adjusted care-need level change rate among all facilities were varied in wide range (0 to 58.3%) and this distribution could be useful to find out possibly problematic facility. However, bias due to exclusion of residents for preventing ceiling effect and floor effect should be considered in the future study. Multi-level analyses of both resident and facility effects were found to be significant in this thesis and those associated risk factors could be used as documentation for a quality improvement program. The satisfaction survey was developed using a psychometric test. This survey could be a useful tool to provide information to consumers for them to select a facility of their choice. However, one of the challenges of the present satisfaction survey used in this thesis is that it needs to be modified for eventual

nationwide use. Despite of these limitations, this thesis is the first to analyze quality of care in long-term care facilities at a national level, and the first to develop a resident satisfaction survey in long-term care facilities in Japan.

## Abbreviations

<b>ADL</b>	Activities of daily living
<b>AL</b>	Assisted living facilities
<b>ALRSS</b>	Assisted living resident satisfaction scale
<b>CLSDR</b>	Care-need level specific deterioration rates
<b>CFA</b>	Confirmatory factor analysis
<b>CFI</b>	Comparative fit index
<b>EFA</b>	Exploratory factor analysis
<b>IOM</b>	Institute of medicine
<b>IFI</b>	Incremental fit index
<b>LPN</b>	Licensed Practical Nurse
<b>LTCI</b>	long-term care insurance
<b>LTCICD</b>	Long term care insurance claims data
<b>LTCWF</b>	Long-term care welfare facility
<b>LTCHF</b>	Long-term care health facility
<b>LTCMF</b>	Long-term care medical facility
<b>MDS</b>	Minimum data set
<b>MHLW</b>	Ministry of Health Labour, welfare
<b>NH</b>	Nursing homes
<b>ODA-RSS</b>	Ohio department of aging-resident satisfaction survey
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>ONHRSS</b>	Ohio nursing home resident satisfaction survey
<b>OR</b>	Odds ratio
<b>OT</b>	Occupational therapist;
<b>PT</b>	Physical therapist
<b>QI</b>	Quality indicator
<b>RAC</b>	Residential aged care
<b>RC</b>	Residential care facilities
<b>Ref.</b>	Reference
<b>RN</b>	Register nurses

<b>RSQ</b>	Resident satisfaction questionnaire
<b>RSI</b>	Resident satisfaction index
<b>RAC</b>	Residential aged care
<b>SES</b>	Social economic status
<b>SNHI</b>	Satisfaction with nursing home instrument
<b>SPO</b>	Structure-process-outcome
<b>ST</b>	Speech therapist
<b>USA</b>	United States of America
<b>WAM NET</b>	Welfare and medical service network system



## **Definitions of long-term care facilities**

### **Long-term care facilities (OECD definition)**

Long-term care facilities refer to nursing and residential care facilities which provide accommodation and long-term care as a package. They include specially designed institutions or hospital-like settings where the predominant service component is long-term care and the services are provided for people with moderate to severe functional restrictions.

### **Nursing home**

#### **(Operational definition of long-term care facilities in this study; Sanford et al. 2015)**

A nursing home is a facility with a domestic-styled environment that provides 24-hour functional support and care for persons who require assistance with ADLs and who often have complex health needs and increased vulnerability. Residency within a nursing home may be relatively brief for respite purposes, short term (rehabilitative), or long term, and may also provide palliative/hospice and end-of-life care.

### **Types of long-term care facilities in USA**

#### **(Cited from Department of Health and Human Services)**

##### **Nursing homes**

Nursing homes, also called skilled nursing facilities, provide a wide range of health and personal care services. Their services focus on medical care more than most assisted living facilities. These services typically include nursing care, 24-hour supervision, three meals a day, and assistance with everyday activities. Rehabilitation services, such as physical, occupational, and speech therapy, are also available.

Some people stay at a nursing home for a short time after being in the hospital. After they recover, they go home. However, most nursing home residents live there permanently because they have ongoing physical or mental conditions that require constant care and supervision.

**Assisted living/Residential care facilities**

Assisted living is for people who need help with daily care, but not as much help as a nursing home provides. Assisted living residents usually live in their own apartments or rooms and share common areas. They have access to many services, including up to three meals a day; assistance with personal care; help with medications, housekeeping, and laundry; 24-hour supervision, security, and on-site staff; and social and recreational activities. Exact arrangements vary from state to state.

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# **Chapter 1 Introduction**

## **1.1 Long-term care facility**

### **Definition of long-term care facilities**

There is no international agreed definition of long-term care facility. One of the most commonly used by countries is defined by OECD<sup>1</sup>:

“Long-term care facilities refer to nursing and residential care facilities which provide accommodation and long-term care as a package. They include specially designed institutions or hospital-like settings where the predominant service component is long-term care and the services are provided for people with moderate to severe functional restrictions.”

However, with this definition it is difficult to understand the details of what kind of users reside in and what kind of services are provided in long-term care facilities.

### **Operational definition in this study**

There is often confusion in distinguishing the terms long-term care facilities and nursing homes. An international definition for “Nursing Home” was established by one current study after conducting survey in 17 countries.<sup>2</sup>

“A nursing home is a facility with a domestic-styled environment that provides 24-hour functional support and care for persons who require assistance with ADLs and who often have complex health needs and increased vulnerability. Residency within a nursing home may be relatively brief for respite purposes, short term (rehabilitative), or long term, and may also provide palliative/hospice and end-of-life care”.<sup>2</sup>

Among the 17 countries, 15 countries including Japan had agreements of consideration of nursing home as long-term care facilities. This study applied the international definition of nursing home to long-term care facility for better understanding the function of long-term care facilities.

### **Demand of long-term care facilities**

Longer life expectancy combined with declining fertility rates have produced rapid growth in the elderly population around the world. According to the United States Census Bureau, the proportion of the elderly (65 years old or more) was 7% in 2015,

however, the proportion will increase to 16.9% by 2050. The share of the older population will exceed 21% in 94 countries, including 39 countries with 28% or more of their total population being older.<sup>3</sup>

As humans age, their physical and mental abilities start to decline. One study reported that 24% of the total elderly needs some long-term care assistance.<sup>4</sup> Elderly are more likely to experience functional decline and this is associated with needing subsequent long-term care. Long-term care users generally prefer to receive service at home, however, depending individual circumstance, long-term care facilities can be a better option for the elderly particularly if they are living alone or requiring round the clock care and supervision<sup>5</sup> or people living in remote areas with limited home-care support.<sup>1</sup>

Nowadays, demand for long-term care facilities remains high in OECD countries.<sup>6</sup> Furthermore, the shortage of registered nurses has increased pressure on long-term care services.<sup>6, 7</sup> Countries have long-term care systems bound to their own culture, history and financial circumstance but virtually all developed nations facing the challenges of limitless demand within the context of finite resources and are struggling to bridge the quality gap in long-term care facilities.<sup>8, 9</sup>

## **1.2 Quality of care**

There are numerous definitions of quality of care. In earlier times, Donabedian mentioned that quality of care is the kind of care which is expected to maximize an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts.<sup>10</sup>

Recently, definition of quality of care from the Institute of Medicine (IOM) was well-cited: “Quality of care is the degree to which health services provided to individuals and patient populations improve desired health outcomes and are consistent with current professional knowledge”.<sup>11</sup>

Harries-Kojetin and Stone mentioned that customer satisfaction represents a valuable subjective measure of quality of care that is different from, yet complementary to, that generated from service providers or more objective clinical indicators.<sup>12</sup>

Therefore, quality of care should also focus on non-medical outcomes such as satisfaction and feedback from customer perspective which is essential to understanding what services they desire.

### **1.3 Framework of quality of care measurement**

#### **Donabedian's SPO model and SPO systems model of nursing care quality in nursing homes**

With regard to quality of care assessment, Avedis Donabedian was called as father of quality assurance by developing structure-process-outcome (SPO) quality model.<sup>13</sup> In the SPO model, structure measures are the professional and organizational resources associated with the provision of care. Process measures are the characteristics of things done to and for the residents. Outcome measures are the desired states one would (or would not) like to achieve for the resident.<sup>13</sup> The SPO model is widely supported by researchers,<sup>14-19</sup> however, SPO originally were not developed specially for nursing homes and some have questioned its suitability for this setting.<sup>15, 20</sup> Unruh and Wang (2004)<sup>16</sup> developed a SPO systems model of nursing care quality in nursing home through a review of frameworks of nursing home and empirical studies regarding associated variables with quality of care. Figure 1 presents what kind of factors associated with quality of care. According to Unruh and Wang (2004)<sup>16</sup>, quality of care were associated with both structure, process characteristics and resident characteristics. They also mentioned that contextual factors which presents external environment such as political contexts have indirect effect to quality of care.

According to Donabedian, outcome indicators are considered more stringent quality indicators than structural or process indicators because deviations from appropriate care should influence residents' health outcome.<sup>13</sup> In addition, Spector and Mukamel (1998) mentioned that outcome measures should be used more to improve care. Therefore, this thesis determined to focus on outcome measures.



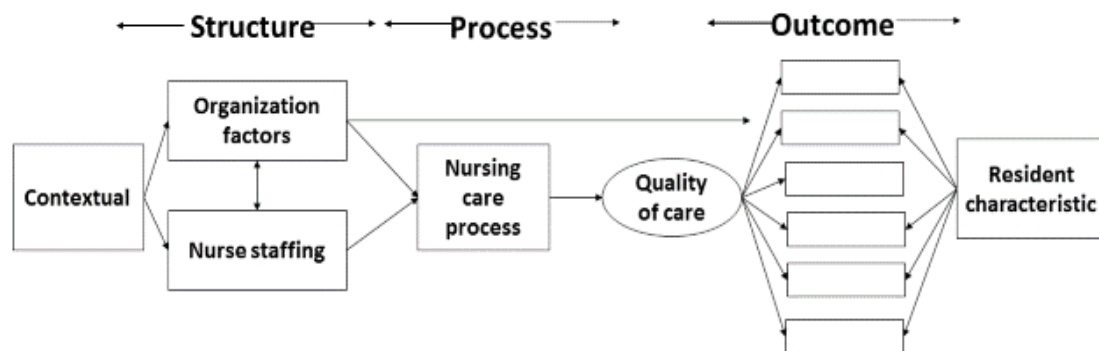


Figure 1. SPO systems model of nursing care quality in nursing homes.<sup>16</sup>

## 1.4 Outcome measurement overseas

Outcome measures reflect the impact of health care services or interventions on the health status of patients.<sup>21</sup> The narrower term of outcome measure refers to the population's change of the health status through the care they have received.<sup>10</sup> Objective assessment using clinical outcome such as physical function, were supported by researchers to measure the change of the health status in previous studies.<sup>22-27</sup> Broad term of outcome measure included subjective assessment of consumer's perspectives<sup>10</sup> such as consumer's satisfaction, complaints, health-related quality of life which shared common feature of subjective assessment.<sup>12, 18, 28-30</sup>

### 1.4.1 Objective quality of care measurement based on clinical outcomes

#### Quality indicators (QIs)

QI are quantitative measures reflecting a professional care standard which can be used as guides to monitor and evaluate the quality of important patient care and support service activities.<sup>31</sup> QIs are used as a surrogate measure for quality of care and could be measured from three domains: structure, process and outcome.<sup>9</sup>

#### Brief history of quality measurement in long-term care facilities

The origin and development of nursing home quality come from government supervision through requirements of licensure to open nursing home facilities. In 1961, United States of America first studied nursing home state licensures after problems were

being reported by the Commission on Chronic Illness and by a number of states.<sup>32</sup> The Public Health Service issued a Nursing Home Standards Guide with 77 health and safety standard recommendations. Only structural QI was recommended at that time.<sup>33</sup> In 1977, the Health Care Financing Administration were created in US and continued to develop standards of certification. By 1987, health and safety standards were increased to 98 structural indicator and 38 process indicator.<sup>15, 32</sup> The significant influence of outcome indicator has come from Omnibus Budget Reconciliation Act (OBRA) in 1987. The IOM report recommended that nursing home regulations should be refocused and to move from assessment of structure and process to an assessment of outcomes.<sup>15</sup> The Resident Assessment Instrument / Minimum Data Set (RAI/MDS) was created and forms a core tool in quality monitoring today. The MDS records information about resident's strengths and needs and thereafter to help staff evaluate goal achievement and revise care plans.<sup>34-36</sup> The MDS includes a clinical assessment of over 400 items including demographics and medical condition and so on. QIs are calculated by aggregating resident level clinical data to the facility level which are then used for monitoring improving quality improvement.<sup>27, 36</sup> Following its implementation in USA, a number of other country such as Canada, Switzerland and Finland have applied MDS to monitor quality of care.<sup>9, 37</sup>

### **Nursing home QIs among 7 countries**

One previous study has provided an overview of nursing home QIs from 7 nations<sup>9</sup> (USA, Australia, Norway, New Zealand, England, Sweden and Denmark) to shown the state of art regarding sensitivity of nursing home quality assessment. They reported that, except for Sweden, all of the study countries undertake nationally standardized assessment of patient before admission to nursing home. (Table 1) Among those countries, only USA had systematically developed QIs on the basis of resident assessments and tested reliability.<sup>9</sup>

Table 1 Quality monitoring and use of QIs in seven countries.

Country	Patient admission assessment	QI for monitoring nursing home care in use (No. of QI)	Quality monitoring systems for nursing homes	Legal rules or regulations
USA	Resident Assessment Instrument-Minimum Data Set (RAI-MDS)	National QI derived from RAI-MDS (24 QI)	Accreditation by Joint Commission on Accreditation of Healthcare Organizations (JCAHO), observations and external audits	Omnibus Budget and Reconciliation Act (OBRA) 1987 and the Federal Nursing Home Reform Act 1987
Australia	Aged Care Assessment Program (ACAP)	Aged Care Standards (4 standards with 44 indicators for expected outcomes)	Accreditation by the Aged Care Standards and Accreditation Agency	Aged Care Act 1997
Norway	[IPLOS] Individual care needs data set	Derived from KOSTRA (national reporting, published on Bedrekommune.no) (5 QI)	Norwegian Board of Health Supervision, Supervision of health and social services	Municipal Health Service Act 1985 and the Social Service Act 1990
New Zealand	National needs assessment	Health and Disability Sector Standards for Ministry of Health Certification (6 outcomes with 42 standards)	Certification by the Ministry of Health. Certification audits by auditing agency (legal requirements met)	Health and Disability Services (Safety) Act 2001. Health and Disability Services (Safety) Hospital Care, Residential Disability Care and Rest Home Care Standards Notice 2002
UK (England)	Single Assessment Process (SAP) Minimum Data Set for Health Care in UK (MDS HC)	Standards for Care Homes for Older People (38 standards)	The Commission for Social Care Inspection (CSCI) inspection reports including rating 0–5 stars (38 standards). Self-assessment Annually reported to CSCI (38 standards)	Care Standard Act 2000, National Minimum Standards Care Homes for Older People
Sweden	[SAMSPRA <sup>o</sup> K] (Shared language) (not used nationally)	-	Health care supervision boards. Internal audits	Social Services Act 1982 and the Health and Medical Services Act 1983
Denmark	[Fællessprog] (shared language)	Local standards (varying number of QI derived)	Inspections by local senior public physician	Social Service Act 1997

Source: Nakrem et al. (2009). Nursing sensitive quality indicators for nursing home care:

International review of literature, policy, and practice. International Journal of Nursing Studies

### **1.4.2 Subjective quality of care measurement based on consumers' perspectives**

Objective QIs using clinical outcome are often criticized for a lack of “human voice”.<sup>15</sup> From the perspective of regarding residents as a consumer who decides what service they need, consumer's assessment of service, such as satisfaction ratings, should be an important outcome measure.<sup>38, 39</sup>

Documents regarding resident satisfaction reported mainly in late 1990s to early 2000s.<sup>29, 39-46</sup> Castle (2007) conducted systemic review on satisfaction surveys in long-term care settings.<sup>29</sup> 50 studies which have used and developed satisfaction instruments in long-term care settings were analyzed. He reported that satisfaction survey instruments varied greatly in numerous ways including contents of items, assessment of psychometric properties and number of total items and domains used.<sup>29</sup> Castle maintains that a good, standardized instrument on a survey should have sample with representative of population, internal consistency reliability, test-retest reliability, internal reliability and construct validity.<sup>29</sup> Although none of the surveys had satisfied all the standardized condition, he mentioned that Ohio satisfaction instruments handled the problem of reliability and validity. In 2007, Straker et al. developed resident satisfaction survey by rigorous psychometric testing (internal consistency reliability, test-retest reliability and construct validity) with a total of 869 of the 956 nursing homes in Ohio.<sup>28</sup>

## **1.5 Quality of care measurement in long-term care facilities in Japan**

### **1.5.1 Long-term care insurance system**

In 2000, Japanese government implemented long-term care insurance (LTCI) system. The aim of the system is to establish a system which responds to society's major concerns about aging, the care provision problem, whereby citizens can be assured that they will receive care and be supported by society as a whole.<sup>47</sup> The difference between previous system and LTCI system is shown in Table 2.

Since the system changed, there has been a considerable increase in the number of long-term care facility service users. The number of facility service users were 520,000 in 2000 and now it was increased to 890,000 in 2013.<sup>48</sup> With the new policies under LTCI System and expansion of the care market, the following reasons have led to increased interest in and necessity of quality of care measure in long-term care.

- ① Since LTCI users have become able to choose the type of services and facilities, the need for information about facility such as quality of care has increased.
- ② Various associations, such as private companies and NPOs, have entered into the care market and this has brought disparities in quality of care.<sup>49</sup>
- ③ With the transition to a ‘super aging society’, the Ministry of Health, Labour and Welfare (MHLW) reported that approximately 18.2% of facility were experiencing staff shortage.<sup>50</sup> How to assure quality of care under limited human resource were currently discussed.<sup>51</sup>
- ④ In 2013, the Long-Term Care Benefit Expenses was increased to 9.4 trillion, reaching the highest outlay ever.<sup>52</sup> Considering the huge amount of public expenditure, a national check on the quality of care is essential.<sup>49</sup>

Table 2. Difference between previous system and present LTCI system

previous system	LTCI system
① Municipal governments decided services, after users' application.	Users themselves can choose services and service providers.
② Separated applications were required for each service of medical and welfare systems.	By making use plans of care service (Care Plan), integrated medical and welfare services can be utilized.
③ Services were provided mainly by municipal governments and other public organizations (e.g. Council of Social Welfare).	Services are provided by various associations such as private companies and NPOs, etc.
④ Co-payment was heavy burden for the middle/upper income group, which kept them from applying to services.	Regardless of income, co-payment is set as 10% (20% for persons with income above certain level, after August 2015)

Source: Ministry of Health, Labour and Welfare 2016<sup>53</sup>

### **1.5.2 Care-need level assessment**

Residents who live in long-term care facilities have fulfilled the requirements of the LTCI. All citizens who are aged 65 and over or those who are between the ages of 40 to 64 with health-related disability are eligible to use LTCI. For citizens who apply to their municipality for care-need level assessments, a trained local government official visits the home to evaluate nursing care needs using a nationally standardized questionnaire on current physical and mental status (73 items) and use of medical procedures (12 items). Depending on the amount of care required, the Japanese LTC insurance system consists of 7 eligibility levels, including 2 support levels and 5 care levels. This certification is determined after a judgment screening based on the opinion of a doctor. Support levels 1 or 2 are intended to provide preventive services. In addition to care-need support level, the other five levels of care range from care-need level 1 (less disabled) to care-need level 5 (most disabled) and are eligible to use facility services by the LTCI.<sup>54</sup> The certificate is available for maximum of two years (one year in principle) for persons who renew the certificates and maximum of one year (6 months in principle) for new LTCI users.<sup>55</sup> However, users are allowed to re-apply for the care-need level certificate whenever they experienced functional changes, even as within a short period such as one month. Only users with care-need levels 1 to 5 are eligible to use facility services under the LTCI system.<sup>55</sup>

### **1.5.3 Long-term care facilities under long-term care insurance system**

Facility services provided under LTCI system could be classified into three types: Long-term care welfare facilities (LTCWFs), Long-term care health facilities (LTCHF) and Long-term care medical facilities (LTCMFs). The fundamental function, human resource allocation criteria and the number of facilities are shown in Table 3.

Briefly, the target of users in the three types of facilities are differentiate by medical needs. LTCWF is a living facility provides majority service regarding live, and LTCHF is an intermediary facility between hospitals, homes. LTCMF focused on residents who have high medical needs, however this designation will be abolished before the end of 2023.<sup>56</sup>

Table 3. Characteristics of long-term care insurance facilities

<b>Facilities</b>	<b>Long-term care Welfare facility</b>	<b>Long-term care Health facility</b>	<b>Long-term care Medical facility</b>
<b>Fundamental function</b>	Life service for older people who require long-term care	Rehabilitation, nursing and/or care to help enable them to return home	Medical and nursing care, and long-term treatment
<b>Eligible users</b>	People requiring long-term care and who are unable to live at home	The elderly whose illness is stable and does not require hospital treatment yet which requires rehabilitation, nursing or care.	For patients requiring nursing care, and whose acute-phase treatment is over yet require long-term recuperation under constant medical management
<b>Human resource allocation criteria</b>	<ul style="list-style-type: none"> <li>•Physician (either visiting or regular employee): 1</li> <li>•Nurses: 3</li> <li>•Care staff: 31</li> <li>•Care manager: 1</li> <li>•Daily life counselors: 1</li> </ul>	<ul style="list-style-type: none"> <li>•Physician (regular employee): 1</li> <li>•Nurses: 9</li> <li>•Care staff: 25</li> <li>•Physical therapist, occupational therapist, speech therapist: 1</li> <li>•Care manager: 1</li> </ul>	<ul style="list-style-type: none"> <li>•Physician (regular employee): 3</li> <li>•Nurses: 17</li> <li>•Care staff: 17</li> <li>•Care manager: 1</li> </ul>
<b>Number of facilities</b>	5953	3533	1711
<b>Mean length of stay</b>	1474.9days (1465.1days)	329.2days (277.6days)	412.0days (427.2days)

Source: Ministry of Health Labour, Welfare, 2002<sup>57</sup>

Japan association of Geriatric Health Facilities<sup>58</sup>

Japan Nursing Association<sup>59</sup>

Mean length of stay: As of Sept. 2010. ( ) indicates 2007 figures



#### **1.5.4 Government efforts on measuring quality of care**

Along with the implementation of LTCI system, the government has made efforts to evaluate the quality of facility care services. In 2001, MHLW reported “Third Party Evaluation of welfare service” (DAISANNSYAHYOKA). The core content of the Third Party Evaluation is evaluating the facility service by a third party to ensure an objective perspective. The aim of this evaluation is to 1) grasp problem to improve quality of care 2) provide the facility information to make consumer’s choice of facilities broadly. The detail content of third party evaluations of welfare service include vision and policy of facility, leadership and management, service assurance and so on.<sup>60</sup> The content only included structure and process factors but no issues related to outcome assessment was mentioned. Today, the Third Party Evaluation of welfare service is still being carried out, however, according to the statistics of Japan National Council of Social Welfare, the participation rate of long-term care welfare facility was merely 6.41% in 2017.<sup>61</sup> The reason for low participation rate were expensive commission and too many items contained in the survey.<sup>49</sup>

In 2006, MHLW developed “Welfare and medical service network system (WAM NET)”. The purpose of this system is to provide comprehensive information on medical and welfare service for all people.<sup>62</sup> Regarding long-term care facilities, structural and process information such as general information, operation status, number of staff, operation vision are publically available on the internet. However, according to the result of survey for users of WAM NET, the information is mainly used for work requirements (93.6% of the total purpose) and most of the users (93.1% of the total users) are from government or institution related to medical and welfare area.<sup>63</sup> This means insufficient utilization or isolated information of WAM NET for potential long-term care facility users. Another difficulty and concern with the efficient use of this is that the information is too detailed and complex.

In 2014, MHLW summarized long-term care services evaluated by structure and process outcome (table 4) and point out that outcome measurement was yet to be systematically implemented. Later in 2015, MHLW made recommendation that conducting regular check of improvement or sustainment of residents’ status using

standardized method is necessary. By now, the efforts to introduce outcome assessment to LTCI based on resident health status are underway.

Table 4. Quality of care measurement in long-term care services

	Structure	Process	Outcome
<b>Specified criteria for long-term care facility/providers</b>	<ul style="list-style-type: none"> <li>• human resource allocation criteria</li> <li>• Standards for equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Standards for operating/management</li> </ul>	None
<b>Guidance and Inspection in long-term care facility/providers</b>	<ul style="list-style-type: none"> <li>• Inspection in human resource allocation criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Guidance of operation (guidance of care management process)</li> </ul>	None
<b>Welfare and medical service network system</b>	<ul style="list-style-type: none"> <li>• Status of equipment</li> <li>• Status of staff</li> </ul>	<ul style="list-style-type: none"> <li>• Status of efforts in quality assurance</li> </ul>	
<b>Evaluation based on care compensation</b>	<ul style="list-style-type: none"> <li>• Additional charge for facility policies</li> </ul>	<ul style="list-style-type: none"> <li>• Rehabilitation management additional charge</li> </ul>	<ul style="list-style-type: none"> <li>• Additional charge for high home return rate</li> </ul>

Source: Ministry of Health Labour, Welfare 2014

### **1.5.5 Outcome assessment using clinical outcome in Japan**

#### **Difficulty in applying outcome assessment in national level in Japan**

Under guidance of nationally standardized MDS outcome QI assessment, Yamada and Ikekami (2004)<sup>24</sup> tried to develop outcome assessment based on MDS and applied Morries et al<sup>64</sup> risk adjustment method to Long-term care facilities. They assessed residents' health status regularly for at least once in 4 months and calculated the proportion of the resident who had experience of categorized clinical outcome including falls, ADL decline, and incontinence and so on. The resident level QIs were aggregated across all residents in a facility to define facility-level QIs such as fall incidence rate and prevalence of ulcers.<sup>64</sup> The values of these facility-level QIs are risk adjusted on the basis of covariates resulting from logistic regression analysis on each of the QIs.<sup>65</sup> About QI of ADL decline, although USA didn't used risk-adjustment, mean ADL of the new admitted residents were used as covariates in the Japanese study.<sup>24</sup> In general, result showed useful of the outcome assessment, however, there are difficulty of enhancing the outcome assessment to national level.<sup>24</sup> Thus, using aforementioned clinical outcome measurement to describe the status of quality of care among all facilities is inapplicable. In other words, if possible, it seems more practical to apply existing nationally assessed clinical outcome to describe the status of quality of care among all facilities.

#### **Exploring facility characteristics associated with outcome indicators**

One study<sup>66</sup> used clinical outcome of falls, pressure ulcers and dehydrations by calculating the proportion of residents of a facility that have one or more for each outcome. Facility with good performance (the first quartile) and not so good performance (the remaining 75%) was determined. Then, facility characteristics associated with good performance was investigated. This was the first study which try to explore facility characteristics associated with outcome indicator, however, facility was the unit of analysis, and it failed to control resident characteristics<sup>66</sup> which influence outcome especially when nursing homes are not captured in case mix.<sup>16</sup> Furthermore, the subjects of previous study represented only a 3% of the total of facility users which remained doubt about generalizability.<sup>66</sup>

### **1.5.6 Outcome assessment from consumer's perspectives in Japan**

Outcome assessments from the consumer's perspectives were conducted in several facilities using resident satisfaction survey. However, the contents of the surveys varied a lot and contained abstract questions such as “Are you satisfied with our service?” or “Please let us know if you have an opinion for improving the quality of care”. The report was limited to show the percentage of each answer and no argument or explanation was about how to improve the care based on their results.<sup>49</sup> Moreover, none of the survey was validated.

Research regarding development of resident satisfaction surveys for care services were focused on home help services<sup>67</sup> and LTCI service.<sup>68</sup> None of the resident satisfaction on facility service was developed by researchers. In this regard, to provide comparable information of resident satisfaction among facilities, a validated survey is necessary.

In summary, outcome assessment of quality of care in Japanese facilities is still in the trial period. The government has not taken practical action to set standardized outcome indicators.<sup>69</sup> Researchers have attempted to develop Japanese version of MDS but this failed to spread to the national level.<sup>24</sup> Exploring facility characteristics associates with quality of care is sparsely documented.<sup>66</sup> On the other hand, existing resident satisfaction survey based on consumer's perspectives have not yet been validated.<sup>70</sup>

### **1.5.7 Care-need level change as a possible outcome indicator**

National standardized QI are used in countries such as USA, Australia, Norway, New Zealand and play an important role in certification and funding.<sup>9</sup> The USA has developed twenty four QIs and those are used for guiding care planning and monitoring for residents in long-term care settings.<sup>9</sup> Among QIs, two indicators are related to status change in physical functioning: incidence of decline in late loss ADLs, incidence of decline in range of motion. Likewise, in Japan, concerning clinical outcome related to physical functioning, care-need level change could be a possible outcome indicator because care-need level is strongly related to ADL.<sup>71</sup> Furthermore, several Japanese studies have used changes in care-need level as an outcome indicator to investigated

long-term care services.<sup>72-76</sup> It is therefore this thesis focuses on care-need level change to measure quality of care in long-term care facilities.

## 1.6 Research aims and conceptual framework of thesis

The aim of this thesis is to measure quality of care in long-term care facilities from both clinical outcomes and consumer's perspectives. This thesis aims to answer the following three questions. "What is the status of quality of care among all long-term care facilities?", "What facility characteristics works on quality of care?", "What domains are comprised in resident satisfaction?"

Thus, the specific aims are:

- ① To describe the status of quality of care among facilities by applying care-need level change as an outcome indicator (**Study 1**)
- ② To determine what resident and facility characteristics associated with care-need level deterioration (**Study 2** focused on LTCWFs, **Study 3** focused on LTCHFs)
- ③ To develop reliable and validated resident satisfaction survey. (**Study 4**)

Figure 2 shows the conceptual framework and research aims of this thesis.

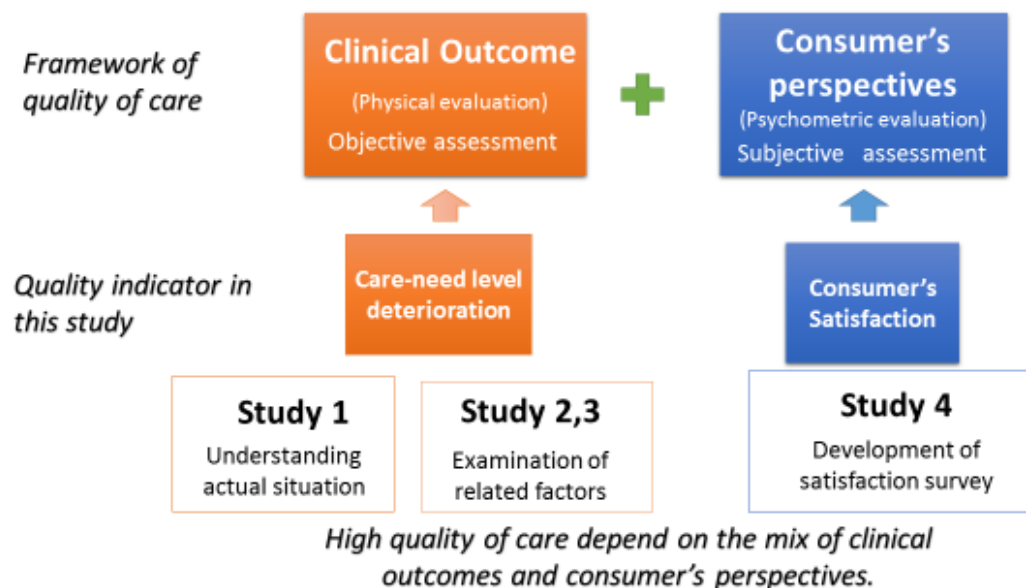


Figure2. Conceptual framework of thesis and research aim

## **Chapter 2: Quality of care measurement using clinical outcomes**

### **2.1 Care-need level change rates among facilities: A descriptive analysis using national level data (Study 1)**

#### **2.1.1 Aim**

To describe the status of quality of care among all facilities by applying an outcome indicator, in terms of care-need level change.

#### **2.1.2 Methods**

##### **Long term care claims data**

One study was performed with using primary data in limited facilities.<sup>66</sup> However, the subjects represented only a 3% of the total of facility users. This casts a shadow of uncertainty regarding the generalizability of that study. Secondary long-term care insurance claims data (LTCICD) could be an effective research tool, because it records some basic functional conditions and the usage of long-term care services. Having an accurate and updated functional record for users could provide the users with functional change records to understand quality of care. So far, LTCICD is the best option because other secondary data, such as care-need level assessment data, specific health examination data and medical claims data, cannot be linked to the information of residents with facilities at a national level.

##### **Study design and participants**

This study used national care monthly claims data of LTCI from October 2012 to October 2013. The care claims data included demographic information on sex, age and the latest certified care-need level status. The sample flow chart is shown in figure 3. Among the 4021 facilities and 389350 residents who have a care-need level record and were admitted to a special nursing home from October 2012 to October 2013, 93466 residents were excluded because they had no information about care-need level by October 2013. This study also excluded 7105 residents who lived in a facility for a period shorter than 1 year because they do not provide enough information for detecting

level-change. In the next step, 35700 residents who stayed in facilities where the operations started less than 1 year since opening by October 2012 were excluded because of concerns regarding the instability of quality of care in recently opened facilities. Finally, 3628 residents from facilities where the number of residents as less than 30 people were excluded. The final study participants were 245858 residents in 2935 facilities.

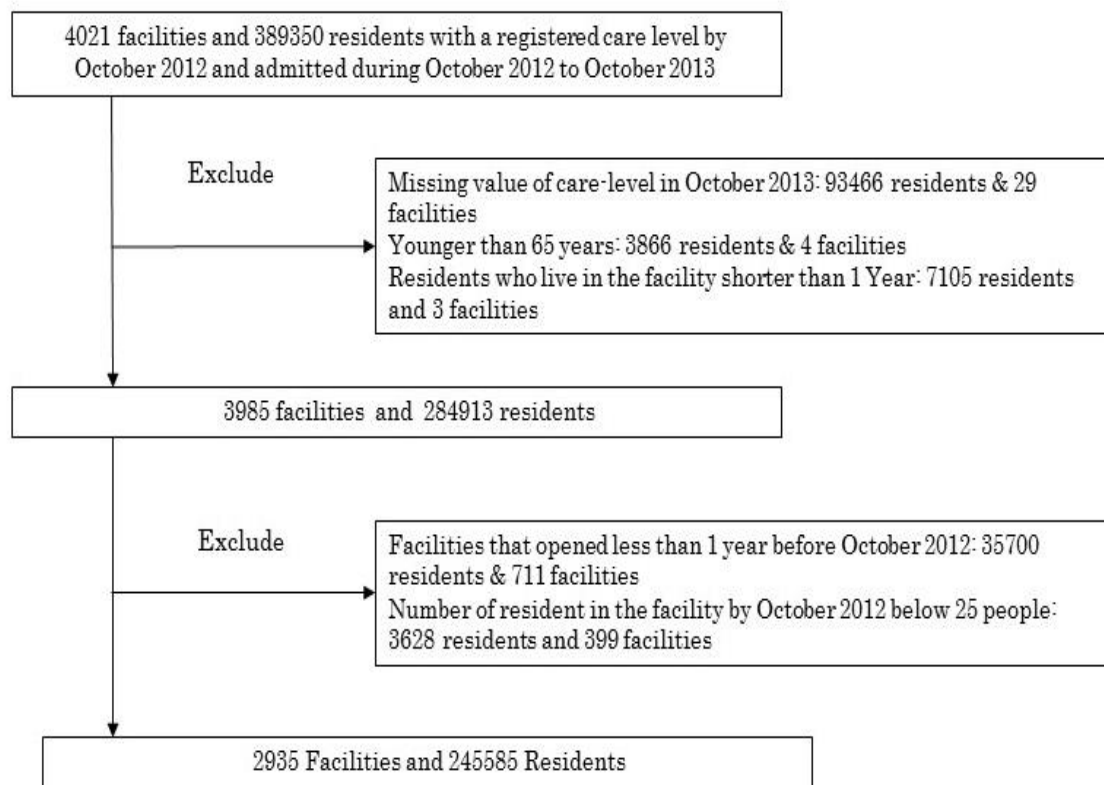


Figure 3. Diagram of flow of the selection participants (Study 1)

### Facility care-need level change rate

In USA, QIs are calculated by aggregating resident clinical outcome to facility level.<sup>24,</sup>

<sup>77</sup> QI, in raw form, are fractions derived from a numerator (number of residents with a particular outcome) and a denominator (number of residents at risk for the outcome).<sup>36</sup>

Following above-mentioned calculation, this study applied resident care-need level change to calculate facility level outcome indicator of care-need level change rate.

Three outcome indicators of care-need level improvement rate, care-need level sustainment rate and care-need level deterioration rate in one year was calculated in the first step. For example, care-need level deterioration rate in this study is, the number of residents who experienced care-need level deterioration divided by the total number of residents in that facility.

### **Risk adjustment**

Adjustment for clinical risk factors of residents could produce fairer comparisons of facilities quality of care, because some resident clinical factors increase the risk of adverse outcomes independently of quality of care.<sup>27, 36</sup> In this study there is only one clinical outcome of care-need level and it was used for risk adjustment.

There are two main approaches of stratification and standardization are mainly used in long-term care facilities.<sup>36</sup> Stratification involves the identification of discrete risk-groups and computing facility level outcome indicators separately within each group (strata).<sup>36</sup> However, when there are many groups being compared, this may not be a viable option and in such case, researchers should prefer standardization.<sup>78</sup> Compared to stratifying residents to five care-need level groups, this study decided to use standardization adjustment<sup>79</sup> to create a single risk-adjusted rate for each facility.

Indirect standardization is used when there is no data about group specific rate (care-need level deterioration rate in each care-need level) in one or two populations being compared (i.e. facilities).<sup>80</sup> Since the aforementioned information is available for calculations, this study determined to apply direct standardization.

### **Floor and ceiling effects**

Residents who were at care-need level 5 at base line could not deteriorate anymore because this is the highest care-need level and may cause a ceiling effect. This study focused on care-need levels 1 to 4 for the analysis of deterioration rates. By contrast, care-need level 1 could improve to care-need level 0 (support level), but in this study, no subjects of care-need level 0 was included because special nursing home care claims data, in which care-need level 1 to care-need level 5 are eligible for LTCI facilities. This causes a floor effect in care-need level 1, and we focused on care-need levels 2 to 5 for the analysis of improvement rates. Therefore, the sustainment rates for care-need level 1



and care-need level 5 were overestimated in this study.

### Statistical analysis

The formula of the calculation is applied from Lester and Klein (1995) which conducted age-specific mortality using direct standardization.<sup>79</sup> Three researchers and I discussed about the stratification strategy, and all the calculation were performed by me.

When care-need level adjusted deterioration rates are calculated in one facility, the care-need levels are aggregated into  $i=1, 2, 3, 4, 5$  care-need level groups. Let

$d_i$

= the number of care-need level deteriorated residents in October 2013 compared to October 2012 in  $i$  care-need level group.

$p_i$  = the number of residents in the  $i$  care-need level group in 2012.

The total number of care-need level deteriorated residents in a facility is

$$d = \sum_i d_i$$

The total resident number of a facility is

$$p = \sum_i p_i$$

Care-need level specific deterioration rates are defined as

Care – need level specific deterioration rates

$$\begin{aligned} &= \frac{\text{Number of care level deteriorated residents for care level } i}{\text{Number of residents in care level } i \text{ in 2012}} \\ &= \frac{d_i}{p_i} = m_i \end{aligned}$$

Algebraically, the adjusted rate is a weighted average of the CLSDRs. To compute the care-need level adjusted deterioration rate, the reference facility's care-need level distribution is used to determine a set of weights. Let

$w_i$

$$= \frac{\text{proportion of residents with } i \text{ care-need level among total residents in October 2012}}{\text{Average number of residents in total facilities}}$$

Then, the care-need level adjusted deterioration rate is given by

$$\text{Care – need level adjusted deterioration rate} = \sum_i w_{si} * m_i$$

The same calculation method was applied for calculating the improvement rate and sustainment rate.

#### **Practical use of care-need level adjusted care-need level change rate**

Firstly, the average care-need level change rate among all facilities was calculated. This average could be used as a cutoff-point for good and bad facilities in terms of care-need level change rate.

Secondly, considering the monitoring and detection of problematic facilities, deterioration rates are expected to be a more straightforward way for understanding flagged episodes, rather than using improvement rates or sustainment rates. Internationally, adverse outcome such as falls, becoming more depressed or anxious and late loss of ADL are used more often as QIs.<sup>9</sup> Thus, this study focused more on deterioration rate and described distribution of care-need level adjusted deterioration rate among all facilities to clarify the status of quality of care.

### 2.1.3 Results

#### Characteristics of study facilities in October 2012

Table 5 shows the basic characteristics among study facilities in October 2012. Data were documented in 2935 LTCWFs. The median number of residents was 61, who were living in facilities for one year from October 2012 to October 2013. The majority of the residents are females, with a median female proportion of 82.2% per facility (range 57.0-97.4). The average age is 86.2 years per facility. The distribution of residents by care-need level group per facility is presented in table 5.

Table 5. Basic characteristics of study facilities in October 2012 (n=2,935).

Characteristics	Median number of residents per facility (Range)	M (SD) or Median per facility	Median of % per facility	Range
Sex				
Male	11(1-157)		17.8%	(2.6%-44.3%)
Female	49 (17-669)		82.2%	(57.0%-97.4%)
Age		86.2 (1.3)		
Care-need level				
Care-need level 1	3 (1-38)		3.5%	(0.3%-30.3%)
Care-need level 2	6(1-81)		9.1%	(0.8%-33.3%)
Care-need level 3	13(1-187)		21.5%	(2.1%-50.0%)
Care-need level 4	20(1-318)		32.5%	(3.3%-65.4%)
Care-need level 5	19(1-307)		32.3%	(3.2%-88.5%)
Number of residents		61		(25-809)

#### Distribution of care-need level change in one year

Table 6 shows the results of care-need level change by care-need level group and sex in one year. Care-need level changes are shown as the care-need level group represented by deterioration rate, sustainment rate, and improvement rate. The deterioration rates by care-need level 1 are fractions derived from a numerator (number of deteriorated residents classified in care-need level 1) and a denominator (number of residents who are classified in care-need level 1 at baseline).

As noted earlier, we used the mean value of the care-need level adjusted deterioration rate, sustainment rate and improvement rate to represent the care-need level adjusted care-need level change in the total facilities.

There was a difference in deterioration between care-need level groups. The higher the care-need level, the less deterioration. Female residents showed more deterioration than males in every care-need level group. By contrast, the higher the care-need level, the higher the improvement rate and sustainment rate. After adjustment by care-need level, the deterioration rate for the total facilities was 15.9% on average. Additionally, 75.4% of residents experienced a sustained status, and 7.1% of the residents improved.

Table 6. Care-need level-change at individual level and adjusted care need level change at facility level

	Total residents								Male residents								Female residents							
	deterioration		sustainment		improvement				deterioration		sustainment		improvement				deterioration		sustainment		improvement			
Care-need level in October 2012	N	N	%	N	%	N	%	Total number of male residents	N	%	N	%	N	%	Total number of female residents	N	%	N	%	N	%	N	%	
<b>Individual Level</b>																								
care-need level 1	8278	2899	35.0	5379	65.0			1718	567	33.0	1151	67.0			6560	2332	35.6	4228	64.5					
care-need level 2	23156	7099	30.7	14616	63.1	1441	6.2	4866	1377	28.3	3176	65.3	313	6.4	18290	5722	31.3	11440	62.6	1128	6.2			
care-need level 3	53079	14456	27.2	35171	66.3	3452	6.5	11108	2623	23.6	7695	69.3	790	7.1	41971	11833	28.2	27476	65.5	2662	6.3			
care-need level 4	80573	14844	18.4	59845	74.3	5884	7.3	14518	2383	16.4	10842	74.7	1293	8.9	66055	12461	18.9	49003	74.2	4591	7.0			
care-need level 5	80499			74113	92.1	6386	7.9	11849			10656	89.9	1193	10.1	68650			63457	92.4	5193	7.6			
<b>Facility Level</b>																								
Care-need level adjusted rate per facility	245585		15.9		75.4		7.1	44059		12.3		71.3		7.7	201526		16.1		75.0				6.8	

### Sub-analysis of care-need level adjusted deterioration rate by sex

Figure 4 shows the distribution of care-need level adjusted deterioration rates by sex. To avoid a small sample size to compensate for a possible bias, we selected facilities with 10 or more male and female residents. Finally, 1723 facilities remained and a significantly higher deterioration in female residents was observed compared to male residents ( $p < 0.001$ ).

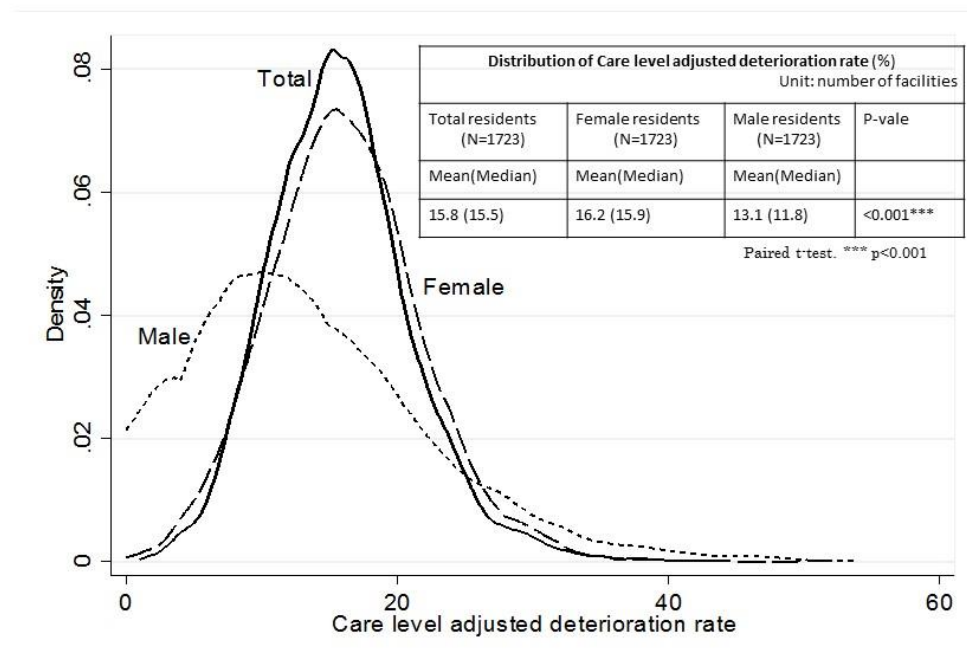


Figure 4. Care-need level deterioration rate by sex (N=1732)

### 2.1.4 Discussion

This study was conducted to describe the status regarding quality of care, by applying an outcome indicator of care-need level. There are three outcome indicators to consider regarding change in care-need level: (i) care-need level adjusted deterioration rate, (ii) care-need level adjusted sustainment rate, and (iii) care-need level adjusted improvement rate.

Most of the residents in LTCWFs are female (82.2% per facility), and nearly 85% of the residents are care-need levels 3 to 5. This study found that the lower the care-need level, the more deterioration occurred. More than one third of patients in care-need level 1 deteriorated. By contrast, the higher the care-need level, the higher the improvement rate. This result differs with a previous study, which reported that the most severe deterioration occurred within the care-need level 2 group.<sup>73</sup> The previous study was focused on the elderly who use home care services; however, the current study analyzed facility residents. These differences, such as subjects or services (home service & facility service) they receive, may be related to different changes in care-need levels. Further studies should explore this.

After adjusted by care-need level, the deterioration rate for the total of facilities was 15.9% on average, with 75.4% of residents experiencing sustainment and 7.1% of residents improving. The deterioration rate of facility varied from 0% to 58.3%. This broad distribution range of care-need level adjusted deterioration rates among all facilities could have practical uses for evaluating quality of care. The highest value of 58.3% indicates the highest level of deterioration that took place and might be indicative of a problematic facility. The average rate of 15.9% could be cutoff point of possibly less problematic facilities (15.9% or lower) and possibly more problematic facilities (higher than 15.9%). In Japan, there are several outcome assessments that take place in the long-term care reimbursement system. For example, additional reimbursement to facilities that have a high success of discharge of residents to their homes.<sup>69</sup> However, it is available only for long-term care health facilities which already aim to help users to return home and the case mix of facility residents was not considered. Thus, a care-need adjusted deterioration rate is conceptually superior to the

aforementioned outcome assessments, because it could be applied to all types of long-term care facilities and adjusted by the residents' status. In the USA, facility level QIs were used to determine high or low quality of care<sup>9</sup> and QIs such as incidence of ADL decline were already disclosed to the public and could be accessed through government websites.<sup>81</sup> Thus, there is the possibility to apply care-need level adjusted deterioration rates as a QI. Thus, further research on developing QIs is needed, considering validity and reliability. Furthermore, investigating resident and facility characteristics associated with care-need level deterioration might elucidate the reasons for the variation in deterioration rates among facilities.

This study found a significantly higher deterioration rate in female residents compared to males. For sex difference, a previous study reported the same trend that female residents are more likely to deteriorate when comparing the care-need level change between two sex groups, but no significant difference was reported after controlling for demographic factors and service types.<sup>73, 75</sup> Therefore, further studies should examine the sex difference using multivariable analysis.

This study has several limitations. First, a few municipalities (6.5%) in Japan are not included in the national long-term care insurance claim data, and because there is no information about the location of these municipalities, the prefecture level comparison may be biased. Second, residents who left facilities during one year was excluded in this study, however, more than 90 percentage of the residents left facility because of death or hospitalized.<sup>82</sup> This may affect the quality of care when calculating deterioration rate and should be taken into consideration in the future study.

This study has several strengths. First, the newly developed indicators avoid the impact of mixed effects across facilities by selecting residents who lived for an entire year in a same special nursing home. Moreover, the change of care-need level may serve as a powerful tool for assessing quality of care. Second, using the risk-adjusted care-need level change rates, this study can compare each facility's quality of care. Finally, this is the first study to use a population-based national representative data from LTCI claims to compare all LTCWFs in Japan and compare the outcomes in all prefectures. Knowing the status of facilities using outcome indicators may encourage



LTCWFs to improve their quality of care.

**Ethical consideration**

This study was approved by the ethical committee of the University of Tsukuba (NO. 1431-2).

## **2.2 Overview of literature on associated factors with functional decline in long-term care facilities**

### **2.2.1 Factors associated with care-need level deterioration in long-term care**

To date, studies have attempted to investigate the factors that are related to deterioration in the care-need level focusing long-term care services users.<sup>72, 74-76, 83, 84</sup> However, the existing research were all only focused on individual level factors such as general information, clinical outcome and long-term care services they used. In general, only factor of with dementia users<sup>76, 83</sup> were consistently more likely to experience care-need level deterioration. Other factors such as sex, age, and care-need level at baseline were showed mix results.<sup>73-76, 83, 84</sup> Among those previous studies, two were focused on LTCI users<sup>76, 83</sup> and the others were focused on home care services<sup>72, 73, 75, 84</sup> or community care services.<sup>74</sup> One study have shown that facility service users were more likely to experience a deterioration in the care-need level than community-based service and home care service users.<sup>76</sup> Nevertheless, less documentation were focused on facility services and facility characteristics associated with care-need level deterioration.

### **2.2.2 Factors associated with functional decline in long-term care facilities**

Since care-need level assessment was based on functional status,<sup>54</sup> in this thesis, overseas review were guided by associated factors with functional decline in long-term care facilities. Recently, one systematic review summarized 27 studies that investigated associated factors with residents' functional decline in long-term care facilities.<sup>85</sup> They reported that half of the studies (13/27) considered facility level factors. This thesis summarized aforementioned 13 studies to clarify what resident and facility level characteristics were have effect on functional decline.(table 7) According to the previous review, this study found that both resident and facility level characteristics affect functional decline<sup>85-94</sup>, however, some studies failed to find facility-level related variables.<sup>95</sup> This result implies that there may be other facility characteristics that affect functional status. At resident level, there are consistently associated variables of age and

cognitive impairment. However this study failed to find consistently associated facility level characteristics with functional decline. It may be because the difference in assessment of ADL and follow-up period and fundamental function of facilities<sup>85-94, 96, 97</sup> that have difficulty to compare the results.

To sum up, the empirical studies provide evidence of relationship between facility characteristics with functional decline. Furthermore, multi-level framework of quality of care posit that both resident and facility level should be examined and the relation of residents nested within facilities should be considered.<sup>17, 95, 98</sup> Less documentation regarding research on the effect of the facility regarding functional decline were found in Japan. Future studies should take into consideration both resident and facility characteristics when examine associated factors with functional decline.

Table 7. Positively associated resident and facility characteristics with functional decline

Authors	Year of the data	Resident-level characteristics	Facility-level characteristics (main or significant variables)
Li et al <sup>86</sup>	2004		Low-volume NH (30-50 residents/facility)
Phillips et al <sup>99</sup>	2002	More cognitively impaired More mortality risk Women Black, not Hispanic Living alone before admission Admitted from hospital Admitted from other NH	Nursing home as fixed effect
Phillips et al <sup>97</sup>	1993-1994		Traditional units & Special care units (No difference)
Sloane et al <sup>96</sup>	1997-1998		No difference between RC & AL
Wang et al <sup>95</sup>	2004	Bowel and bladder incontinence, along with balance dysfunction	8 facility variable (profit status, location, facility size, hospital affiliation, licensed staffing levels, unlicensed staffing levels, nursing home community discharge rate and percentage of Medicare days) were not significant. • Significant nursing home effect were found.
Wang et al <sup>87</sup>	2004	Bladder incontinence Female	Facility profit status, location, facility size, hospital affiliation, licensed staffing levels, unlicensed staffing levels. NH community discharge rate and percentage of Medicare days • NH random effects were much stronger for residents with a higher level of cognitive function
Frytak et al <sup>88</sup>	1995-1996		No differences in outcome trajectories for ADLs between AL & NH
Stark et al <sup>89</sup>	1988-1989	Older Age, low baseline ADL, Informal help, Not admitted from hospital	Different associated variables in different settings (Adult Foster care & Nursing home care)
Porell et al <sup>90</sup>	1991-1994	Older Age, female, African American. Alzheimer's disease, Parkinson's disease	Lower operating revenue, Lower net revenue (But weakness attributes to outcome were found)
Slaughter et al <sup>91</sup>	2006-2007	Dementia, comorbidities,	less supportive environments
Slaughter et al <sup>92</sup>	2006-2007	Dementia	less supportive environments
Rudman et al <sup>93</sup>	1992		smaller size, slower resident turnover rate, smaller proportion of residents with nonorganic psychoses, lower ratio of short-stay to long-stay residents, lower ratio of independent to dependent long-stay residents.
Walk et al <sup>94</sup>	1986-1995	Women, short stay,	Lower quality of care

RC=residential care facilities; AL=assisted living facilities; NH=nursing homes

## **2.3 Resident and facility characteristics associated with care-need level deterioration in long-term care welfare facilities in Japan (Study 2)**

### **2.3.1 Aim**

To determine the resident and facility characteristics associated with residents' care-need level deterioration in LTCWFs in Japan.

### **2.3.2 Methods**

#### **Data source**

This study combined resident-level national LTCI claims data from October 2012 to October 2013 and facility-level data from a survey of institutions and establishments of long-term care in 2012. The LTCI claims data contain information regarding user sex, age, care-need level, and types of service received. The long-term care facility characteristics were obtained from the facility survey, which is conducted by MHLW every year.

#### **Participants**

Inclusion criteria require that residents are aged 65 years or older and have been discharged multiple times from a facility during the follow-up period. Approximately 24.4% of all residents were loss to follow-up because they left the facilities. According to MHLW, the main reasons for leaving a facility were death, which accounted for 63.7%, and hospitalization, which accounted for 28.9%.<sup>82</sup> For residents who hospitalized for several weeks including those who have died in hospitals, LTCWFs register them as residents. Therefore, this study first analyzed all residents and defined loss to follow-up residents as the “deterioration group” because of the consideration that 92.6% of the residents might be hospitalized or dead. Then, an analysis was conducted after excluding the loss to follow-up group. The residents who were care-need level 5 at baseline could not deteriorate further; thus, these residents were excluded to prevent a ceiling effect (Figure 5).

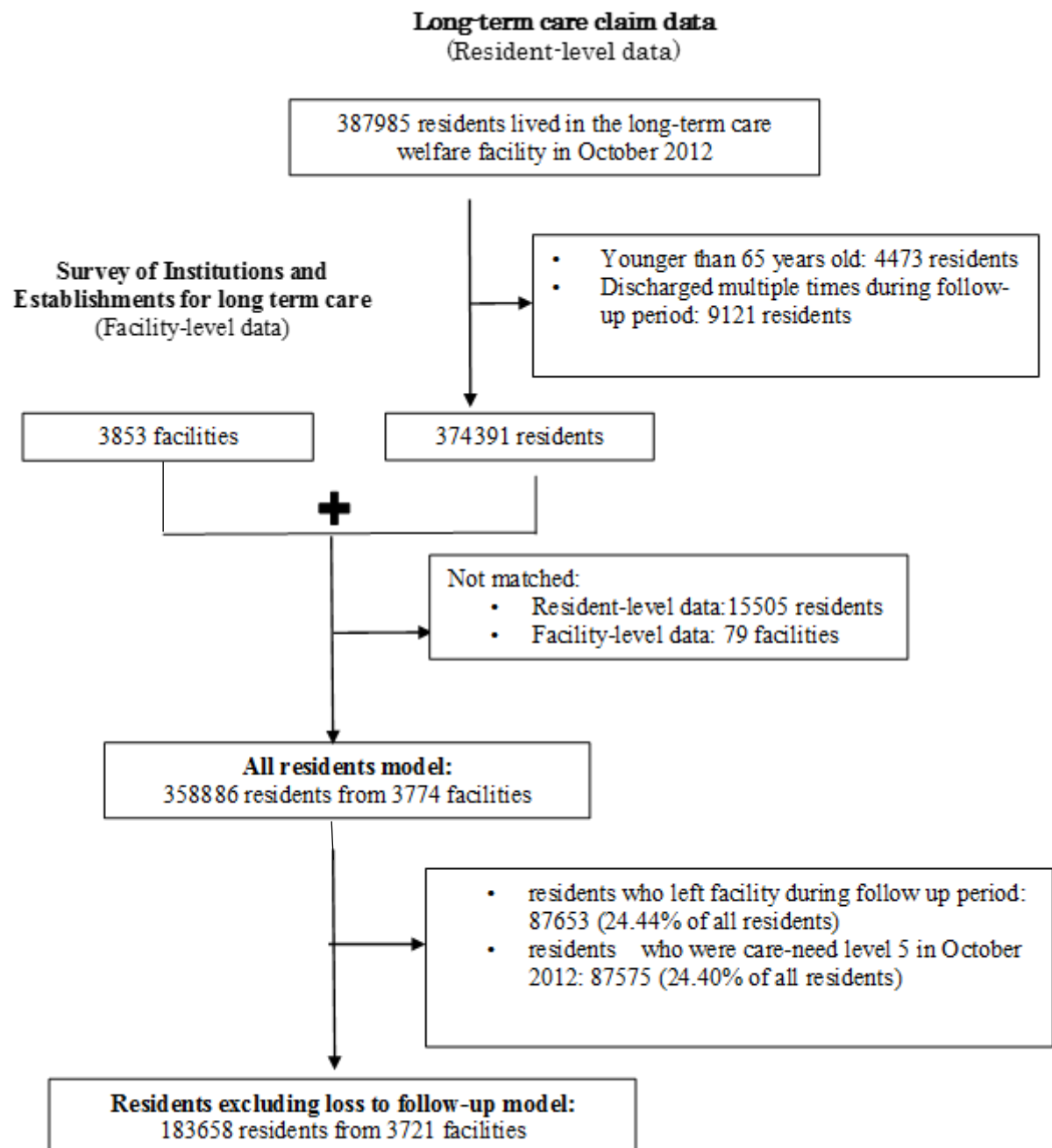


Figure 5. Participant flow chart diagram (Study 2)

## **Dependent variable**

The care-need level deterioration is the dependent variable in this study. First, this study calculated the change in the care-need level by subtracting the care-need level in October 2012 from the care-need level in October 2013. If the residents' care-need level changes were equal to or less than 0, they were defined as "not deteriorated". If the residents' care-need level changes were greater than 0, they were defined as "deteriorated".

## **Independent variables**

### ***Resident-level characteristics***

The age (65-74, 75-84, 85-94, greater than 95 years) at baseline and sex were collected.<sup>99, 100</sup> This study used the care-need level at baseline to adjust the residents' health status.<sup>72, 74-76</sup>

### ***Facility-level characteristics***

The selection of independent variable is guided from SPO systems model of nursing care quality in nursing homes<sup>16</sup> and theoretically used when investigating facility effect on quality of care. To explore facility characteristics, the information of structural factors that the data set have were all investigated. This study included years in business,<sup>101, 102</sup> facility size<sup>91, 101, 103</sup> (less than 100 beds, 100 beds or more than 100 beds), location (metropolitan, nonmetropolitan)<sup>17</sup>, the availability of 24-hour nursing staff<sup>66</sup> and the number of staff in different specialties allocated per 100 users<sup>66, 102</sup>, the proportion of register nurses (RN) among nurses<sup>91</sup> and the proportion of registered dietitians among all dietitians. This study also included an independent variable that indicated the types of care facility provide in terms of traditional, unit, or mixed. Traditional care are mainly provided in the facility with shared room setting. In contrast, unit care refers to person-centered care and care for a small number of residents (less than 10) as one living unit, and provided care mainly in all private room setting facilities. Mixed care are those with both the unit care and the traditional care exist.<sup>104</sup>

## **Statistical analysis**

The descriptive analysis was conducted first to review the distribution of the dependent variable and the independent variables. Then, a univariate logistic regression was carried out to identify the variables that are significantly associated with the outcome

for inclusion in the multivariate model. A Pearson correlation coefficient analysis was conducted between all independent variables, and variables that were highly correlated ( $>0.7$ ) were excluded to avoid multicollinearity.

Multilevel logistic regression was used because of the nested nature of data set (residents nested within facilities). Additionally, the multilevel model accounts for the hierarchical structure to produce better inferences.<sup>105</sup> The STATA procedure “melogit” was used to fit this multi-level model.<sup>106</sup> A sub-analysis was performed only in traditional type facility to clarify the effect from resident level variable of private room use.

### **2.3.3 Results**

#### **Descriptive analysis and unadjusted logistic regression**

Table 8 presents the descriptive analysis of the final study participants. The deterioration rate is the proportion of cases that experienced a deterioration in the care-need level among all cases within a specific subgroup in one year. Based on the descriptive analysis, univariate logistic regression was conducted to identify the variables that were significantly associated with the care-need level deterioration. (Table 9)

#### **Adjusted multilevel logistic regression**

Table 10 presents the results of the multivariate models predicting care-need level deteriorations. At the resident level, residents who were in the higher age group, male and at a lower care-need level at baseline were significantly more deteriorated in the care-need level in the all residents model. However, after excluding the loss to follow-up group, females were more likely to experience care-need level deterioration.

Several facility variables were consistently associated with care-need level deterioration regardless of whether the loss to follow-up group was excluded. Compared to facility with traditional care, facility that provides unit care and mixed care were less likely to experience care-need level deterioration. In addition, facilities that were located in metropolitan areas were less likely to experience a deterioration in the care-need level.



The results showed that a lower proportion of registered nurses among all nurses were associated with care-need level deterioration only in the all resident model. After excluding those who were loss to follow-up, a re-analysis of the data showed that a lower proportion of registered dietitians among all dietitians and facilities with longer years in business were associated with care-need level deterioration.

**Sub-analysis of association between private room use and care-need level deterioration in traditional type facility**

Table 11 presents the results of facility and resident characteristics associated with the care-need level deterioration only in traditional type facilities. Consequently, a significantly negative relationship between a private room service and care-need level deterioration was found in both models: an “all-residents-model” and “residents (excluding those lost to follow-up) model” (table 11).

Table 8. Descriptive analysis of the resident and facility characteristics at baseline and the care-need level deterioration in the one year follow-up.

		All residents		Residents excluding loss to follow-up	
		% or M $\pm$ SD	Deterioration rate (%)	% or M $\pm$ SD	Deterioration rate (%)
<b>Dependent variables</b>					
		n=358886		n=183658	
Care-need level deterioration		36.58	36.58	23.75	23.75
<b>Independent variables</b>					
<b>Resident level</b>		n=358886		n=183658	
Age		86.66 $\pm$ 7.44		86.22 $\pm$ 7.36	
Age group					
	65-74	6.43	26.63	7	19.29
	75-84	29.65	31.55	31.06	22.6
	85-94	49.52	37.95	49.44	24.44
	$\geq$ 95	14.4	46.71	12.49	26.32
Sex					
	Male	19.71	42.33	19.42	21.69
	Female	80.29	35.16	80.58	24.24
Care-need level					
	Care-need level 1	2.95	43.13	5.08	35.39
	Care-need level 2	8.41	40.43	14.08	30.53
	Care-need level 3	20.17	40.13	32.4	27.15
	Care-need level 4	32.82	38.28	48.44	18.27
	Care-need level 5	35.65	31.55	-	-
<b>Facility level</b>		n=3774		n=3721	
Care type					
	Traditional	65.13	36.84	65.14	24.07
	Mixed (traditional + unit)	5.67	35.7	5.72	23.07
	Unit	29.2	36.09	29.13	23.02
Facility size					
	Less than 100 beds	58.16	36.62	57.86	23.91
	More than 100 beds	41.84	36.55	42.14	23.66
Years in business		18.42 $\pm$ 12.55		18.46 $\pm$ 12.56	
Location					

	Nonmetropolitan	82.25	36.77	82.75	24.01
	Metropolitan	17.75	35.67	17.25	22.57
Staffing level					
	Doctors per 100 users	0.32±0.37		0.32±0.36	
	Dentists per 100 users	0.02±0.15		0.02±0.15	
	RNs per 100 users	3.15±5.01		3.16±4.97	
	LPNs per 100 users	2.94±2.39		2.95±2.43	
	RN/Nurse	0.51±0.25		0.52±0.26	
	Care workers per 100 users	47.80±54.51		47.71±53.97	
	Registered dietitians per 100 users	1.33±1.48		1.33±1.47	
	Non- registered dietitians per 100 users	0.45±0.84		0.45±0.84	
	Registered dietitians/dietitians	0.79±0.33		0.79±0.33	
	PTs per 100 users	0.14±0.66		0.14±0.65	
	OTs per 100 users	0.09±0.31		0.10±0.32	
	STs per 100 users	0.01±0.10		0.01±0.11	
	Care managers per 100 users	1.85±1.72		1.85±1.72	
24 hours nursing care					
	Yes	2.41	36.81	2.5	24.5
	No	97.59	36.58	97.5	23.73

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OR=odds ratio; RN=Register Nurse; LPN=Licensed Practical Nurse; PT=Physical therapist; OT=Occupational therapist; ST=Speech therapist; ref.=reference; Residents excluding the loss to follow-up group=Residents who stayed at the facility, excluding the cases loss to follow-up due to death or hospitalization in the majority;

Table 9. Unadjusted logistic regression of the care-need level deterioration for the resident and facility characteristics

Independent variables	All residents (n=358886)			Residents excluding loss to follow-up (n=183658)		
	OR	95% CI	p value	OR	95% CI	p value
<b>Resident Level</b>						
Age group (reference: younger than 75)						
75-84	1.27	1.23-1.31	<0.001	1.22	1.16-1.28	<0.001
85-94	1.68	1.63-1.74	<0.001	1.35	1.29-1.42	<0.001
>=95	2.41	2.33-2.50	<0.001	1.49	1.42-1.58	<0.001
Female	0.74	0.73-0.75	<0.001	1.16	1.12-1.19	<0.001
Care-need level (ref.: care-need level 1)						
care-need level 2	0.89	0.86-0.94	<0.001	0.80	0.76-0.84	<0.001
care-need level 3	0.88	0.85-0.92	<0.001	0.68	0.65-0.71	<0.001
care-need level 4	0.82	0.79-0.85	<0.001	0.41	0.39-0.43	<0.001
care-need level 5	0.61	0.58-0.63	<0.001			
<b>Facility Level</b>						
Care type (ref.: Traditional)						
Mixed (Traditional+ Unit)	0.95	0.93-0.97	<0.001	0.95	0.91-0.98	<0.001
Unit	0.97	0.95-0.99	<0.001	0.94	0.92-0.97	<0.001
Years in business	1.00 <sup>a</sup>	1.00-1.00 <sup>b</sup>	<0.001	1.00 <sup>c</sup>	1.00-1.00 <sup>d</sup>	<0.001
Bed size (ref.: more than 100 beds)	1.00	0.98-1.01	0.715	0.99	0.96-1.01	0.24
Metropolitan (ref.: nonmetropolitan)	0.95	0.94-0.97	<0.001	0.92	0.90-0.95	<0.001
Staffing level						
Doctors per 100 users	1.01	0.99-1.04	0.237	1.03	0.99-1.06	0.12
Dentists per 100 users	1.00	0.95-1.06	0.866	0.97	0.89-1.08	0.67
RNs per 100 users	1.00	1.00-1.00	0.119	1.00	1.00-1.00	0.82
LPNs per 100 users	1.01	1.00-1.01	<0.001	1.01	1.00-1.01	0.03
RNs/(RNs+LPNs)	0.90	0.87-0.93	<0.001	0.92	0.87-0.96	<0.001
Care workers per 100 users	1.00	1.00-1.00	0.658	1.00	1.00-1.00	0.98
Registered dietitians per 100 users	1.00	0.99-1.00	0.436	1.00	0.99-1.01	0.77
Non-registered dietitians per 100 users	1.01	1.00-1.02	0.05	1.02	1.01-1.04	<0.001
Registered dietitians/ dietitians	0.96	0.93-0.98	<0.001	0.92	0.88-0.95	<0.001
PTs per 100 users	0.99	0.98-1.01	0.376	0.98	0.96-1.00	0.13
OTs per 100 users	0.97	0.95-1.00	0.034	0.99	0.95-1.02	0.45
STs per 100 users	1.06	0.98-1.14	0.146	1.03	0.92-1.16	0.63
Care managers per 100 users	1.00	1.00-1.01	0.715	1.00	1.00-1.01	0.34
24 hours nursing care	0.99	0.94-1.04	0.671	0.96	0.89-1.03	0.26

OR=odds ratio; RN=Register Nurse; LPN=Licensed Practical Nurse; PT=Physical therapist; OT=Occupational therapist; ST=Speech therapist; ref.=reference; Residents excluding the loss to-follow-up group=Residents who stayed at the facility, excluding the cases loss to follow-up due to death or hospitalization in the majority; <sup>a</sup> 1.001; <sup>b</sup> 1.001-1.002; <sup>c</sup> 1.002; <sup>d</sup> 1.002-1.003

Table 10. Facility and resident characteristics associated with the care-need level deterioration: results of the multilevel logistic regression analysis

		All residents (n=358886)			Residents excluding loss to follow-up (n=183658)		
		OR	95% CI	p value	OR	95% CI	p value
<b>Resident Level</b>							
Age group (ref.<75)							
	75-84	1.39	1.35-1.44	<0.001	1.21	1.15-1.27	<0.001
	85-94	1.99	1.93-2.06	<0.001	1.33	1.27-1.40	<0.001
	>=95	2.99	2.88-3.95	<0.001	1.50	1.42-1.58	<0.001
Sex (Male)		0.64	0.63-0.65	<0.001	1.12	1.09-1.16	<0.001
Care-need level (ref.: care-need level 1)							
	care-need level 2	0.88	0.84-0.92	<0.001	0.79	0.75-0.83	<0.001
	care-need level 3	0.85	0.82-0.89	<0.001	0.66	0.63-0.69	<0.001
	care-need level 4	0.78	0.75-0.81	<0.001	0.39	0.37-0.41	<0.001
	care-need level 5	0.59	0.58-0.62	<0.001	-	-	-
<b>Facility Level</b>							
Care type (ref.: Traditional)							
	Mixed (Traditional+ Unit)	0.94	0.90-0.97	0.001	0.93	0.88-0.98	0.01
	Unit	0.97	0.94-0.99	0.042	0.95	0.91-0.99	0.024
Metropolitan (ref.: nonmetropolitan)		0.97	0.94-0.99	0.011	0.92	0.89-0.96	<0.001
Years in business		1.00 <sup>a</sup>	1.00-1.00 <sup>b</sup>	0.051	1.00 <sup>c</sup>	1.00-1.00 <sup>d</sup>	0.016
RNs/(RNs+LPNs)		0.93	0.89-0.97	0.001	0.98	0.92-1.05	0.581
Registered dietitians/ dietitians		0.99	0.95-1.02	0.376	0.94	0.90-0.99	0.02

OR=odds ratio; RN=Register Nurse; LPN=Licensed Practical Nurse; ref.=reference; Residents excluding loss to follow-up group=Residents who stayed at facility, excluding the cases loss to follow-up due to death or hospitalization in the majority; <sup>a</sup> 1.001; <sup>b</sup> 0.999-1.002; <sup>c</sup> 1.002; <sup>d</sup> 1.000-1.003.

Table 11. Facility and resident characteristics associated with the care-need level deterioration in traditional type facilities: results of the multilevel logistic regression analysis

		All residents (n=232448)			Residents excluding loss to follow-up (n=115138)		
		OR	95% CI	p value	OR	95% CI	p value
<b>Resident Level</b>							
Age group (ref.<75)							
	75-84	1.38	1.33-1.44	<0.001	1.20	1.13-1.27	<0.001
	85-94	2.01	1.92-2.09	<0.001	1.34	1.26-1.42	<0.001
	>=95	3.02	2.89-3.15	<0.001	1.52	1.42-1.63	<0.001
Sex (Male)		0.63	0.61-0.64	<0.001	1.12	1.08-1.16	<0.001
Care-need level (ref.: care-need level 1)							
	care-need level 2	0.93	0.88-0.99	0.015	0.85	0.780-0.91	<0.001
	care-need level 3	0.89	0.84-0.94	<0.001	0.70	0.66-0.75	<0.001
	care-need level 4	0.81	0.77-0.85	<0.001	0.40	0.38-0.43	<0.001
	care-need level 5	0.61	0.58-0.65	<0.001	-	-	-
	Private room users	0.95	0.92-0.98	0.001	0.87	0.83-0.91	<0.001
<b>Facility Level</b>							
Metropolitan (ref.: nonmetropolitan)		0.99	0.95-1.03	0.555	0.96	0.91-1.01	0.104
Years in business		1.00	1.00-1.00	0.119	1.00	1.00-1000	0.762
RNs/(RNs+LPNs)		0.94	0.89-0.99	0.020	0.95	0.87-1.03	0.192
Registered dietitians/ dietitians		0.97	0.93-1.01	0.109	0.92	0.87-0.97	0.008

OR=odds ratio; RN=Register Nurse; LPN=Licensed Practical Nurse; ref.=reference; Residents excluding loss to follow-up group=Residents who stayed at facility, excluding the cases loss to follow-up due to death or hospitalization in the majority

### 2.3.4 Discussion

This study is the first to analyze nationally representative data to identify the characteristics that are associated with care-need level deterioration in LTCWF in Japan. The results demonstrated that at the resident level, age, the care-need level at baseline, and sex were significant predictors of deterioration. At the facility level, the types of care, location, years in business, the proportion of RNs, and the proportion of registered dietitians among all dietitians were significant predictors of care-need level deterioration.

At the resident level, older age and a lower care-need level at baseline were significantly associated with care-need level deterioration as documented in earlier studies.<sup>66, 76, 99</sup>

However, this study found contradictory associations with sex in terms of care-need level deterioration when including and excluding those residents who were loss to follow-up. The results show that male residents contribute more to hospitalization or death than female residents. In contrast, women have a higher risk of care-need level deterioration only when excluding the loss to follow-up group. Previous studies have shown that women have a higher risk of surviving with deteriorating trajectories in health limitations.<sup>107</sup>

The most important objective of this work was to investigate the facility characteristics that are related to care-need level deterioration. First, this study found two variables that are consistently associated with outcomes.

Facilities that provide unit care and mixed care were less likely to be deteriorated in care-need level than traditional care providing facilities. To date, although many facilities that provide unit care have been established, doubts regarding their quality of care remain. This study was the first to investigate whether there are different effects on the care-need level deterioration based on the types of care facility provides. One reason for this difference could be the personal background of the users in private rooms because unit care are provided only in private room that require additional payments. Because there was lack of socioeconomic status information, private room was used as surrogate of higher socioeconomic status. Results of sub-analysis showed a significant negative association of private room use and care-need level deterioration. This result

may be caused by the residents' income level, which may be a possible confounder because a higher socioeconomic status is well known to be correlated with better health outcomes.<sup>108</sup> Future studies need to be conducted to clarify the reason for this difference.

Second, facilities located in metropolitan areas performed better. A previous study argued that rural facilities were less likely to provide mental health services and lacked accreditations or special care programmes.<sup>17</sup>

Fewer years in business contributed to a reduced care-need deterioration only in the model of residents excluding loss to follow-up. However, a non-significant relationship between ADL change and facility age was shown in a previous study.<sup>77, 102</sup> In Japan, the proportion of unit facilities increased from 1.5% to 31.7% between 2003 and 2014.<sup>109</sup> The increase in new facilities with the unit care may have influenced the effect of the business year variable on the outcome.

In addition to the three facility variables, two staffing level variables were associated with present study outcomes. A lower proportion of RNs on the nursing staff was significantly associated with care-need level deterioration only in the all residents model. Earlier studies have demonstrated that RNs serve as leaders and role models in the supervision of LPNs<sup>110</sup> and may improve resident outcomes.<sup>111</sup>

This research study also provided new information in the analysis by excluding the loss to follow-up group. A higher proportion of registered dietitians among all dietitians were negatively associated with care-need level deterioration. In Japan, registered dietitians are required to have a high level of professional knowledge and technique to address the residents' physical and nutritional conditions and food service management. In contrast, non-registered dietitians are nutrition experts that mainly engage in nutrition education.<sup>58</sup> A higher proportion of registered dietitians among all dietitians may affect the physical status of residents because registered dietitians play an important role in providing appropriate instructions according to the health condition.

This study had some limitations. First, even though this study included a wide range of variables related to the facility, possible confounding variables were still could not control, such as staffing turnover and the policies of the facilities<sup>102</sup> that may affect the care-need level deterioration. In addition, at the resident level, the clinical diagnosis and cognitive functioning<sup>16, 95</sup> were not considered due to the limited information in



dataset. Second, findings of this study was based on 5 functional status levels, and the very limited information may be different from previous studies, such as that performed by Phillips and colleagues (2007), who based their study on ADL measures.<sup>99</sup> Additionally, some research<sup>75, 76, 84, 112</sup> including the present study used care-need level as an outcome because the evaluation process of care-need level is strictly done by government and strong correlation between care-need level and ADL was found in previous study. However the validation of the care-need level measurement was yet investigated. Third, this study defined the loss to follow-up residents as the deterioration group because most of these residents may be hospitalized or dead. However, among those loss to follow-up, 7.4% may have been lost due to other reasons, such as returning home or discharge to other types of facilities. Fourth, the cross-sectional approach for the independent variables indicates correlations but not causation.

Despite these limitations, this study has several strengths. First, Japan is a unique country with national-level claims data due to its national health insurance system and well established payment computer system. This advantage will likely result in good generalizability of the results. Second, this study used multilevel models to account for resident and facility predictors and overcome the weaknesses of previous studies. Additionally, this study controlled for several facility variables that may affect the resident outcomes.

### **Ethical consideration**

This study was approved by the ethical committee of the University of Tsukuba (NO. 1431-2).

## **2.4 Resident and facility characteristics associated with care-need level deterioration in long-term care health facilities for the elderly in Japan (Study 3)**

### **2.4.1 Aim**

To clarify the resident and facility characteristics associated with care-need level deterioration in LTCHFs in Japan

### **2.4.2 Methods**

#### **Data source and ethical considerations**

Nationally representative LTCICD were linked to the survey of institutions and establishments for long-term care in 2012. Longitudinal LTCICD resident information records were obtained for data on sex, age, and care-need level of every month for the period of October 2012 to March 2014. Facility characteristics were obtained from the survey of institutions and establishments for long-term care

#### **Participants**

In this study, an admission cohort<sup>100</sup> was used because the residents were free of any facility providers at admission time. All admissions to the LTCHFs during October 2012 to October 2013 were included. The inclusion criteria also required that the residents were 65 years or older at admission, had lived in the same facility for more than 6 months after admission, and had a care-need level of 1 to 4 at baseline. Figure 6 shows the participant selection process. A total of 61,575 residents were lost to follow-up because they had lived in the facility for less than 6 months. Compared to final study residents, more male residents (35.60% vs 28.27%,  $p<0.001$ ) and those more likely to have a lower care-need level of 1 and 2 (39.84% vs 38.58%,  $p<0.001$ ) were lost to follow-up. Finally, 86,273 residents from 1493 facilities were analyzed.

#### **Dependent variable**

The outcome of this study was a binary variable of care-need level deterioration (deteriorated vs not deteriorated). After 6 months of follow-up, if the residents' care-need level was higher than at baseline, they were defined as “deteriorated”; if their level was the same or lower, they were defined as “not deteriorated”.

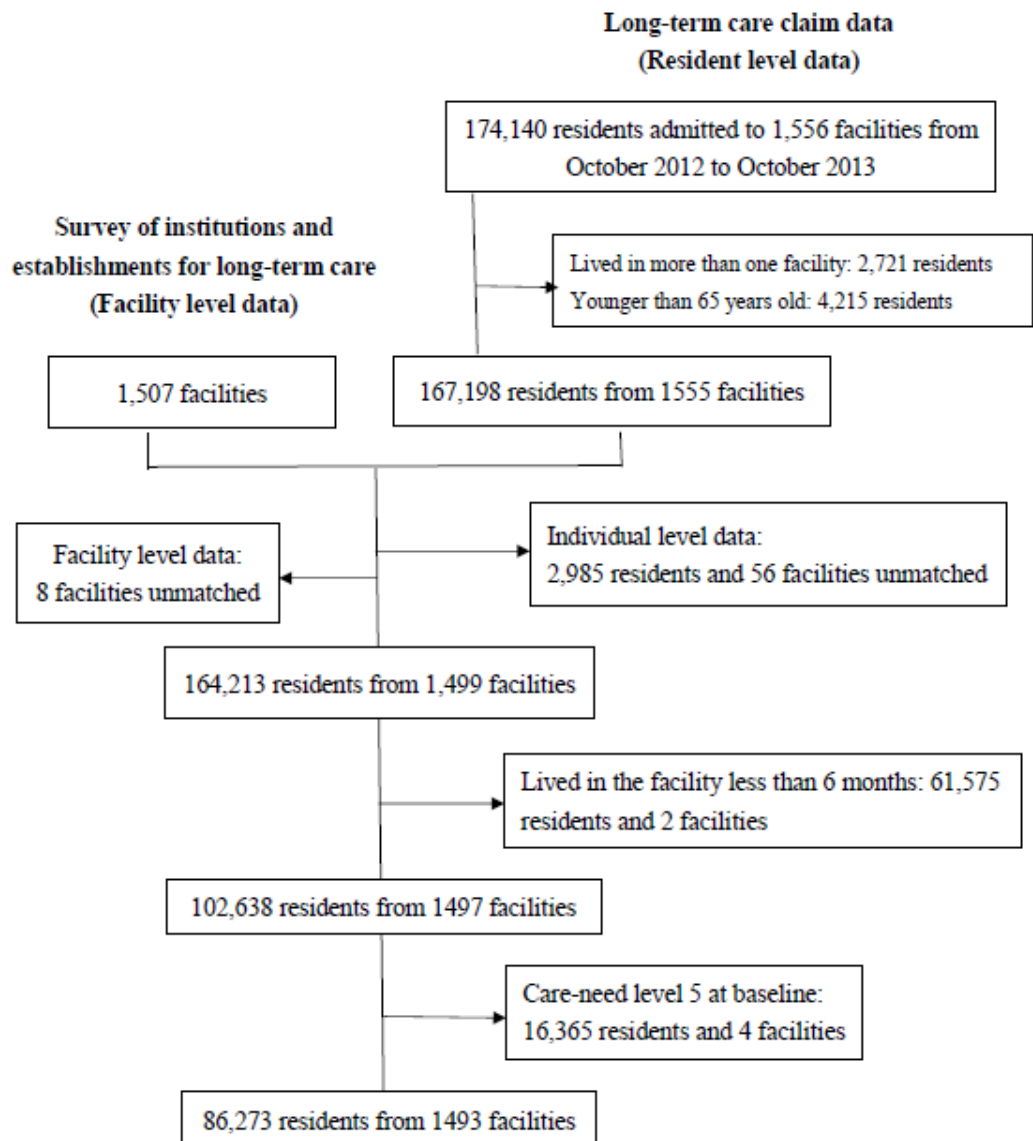


Figure 6. Participant selection flow diagram (Study 3)

### **Independent variables**

At the resident level, age (65-74, 75-84, and older than 85 years) at baseline, sex and care-need level at baseline were selected, which have been identified as possible predictors in previous studies regarding functional decline<sup>73-76, 98, 99, 113</sup>.

According to SPO systems model of nursing care quality in nursing homes,<sup>16</sup> structural factors are related to outcome. This study is guided by SPO model and theoretically used when investigating quality of care, expectancies of the dataset not allowed. Facility structural characteristics of years of business existence<sup>66, 102</sup>; facility size measured by the number of beds<sup>102</sup> (small: 150 beds or less; large: more than 150 beds); location (metropolitan, non-metropolitan); availability of 24-hour nurse staffing<sup>66</sup> and number of staff in different specialties allocated per 100 users<sup>66, 102</sup>; and proportion of registered nurses (RNs) amongst total nurses<sup>91</sup> were analyzed.

### **Statistical analysis**

A descriptive analysis was used to describe the distribution of independent variables and the characteristics of residents and facilities. A univariate analysis was performed with the possible resident and facility characteristics associated with functional decline. Any variable with a P-value less than 0.1 from the univariate analysis and theoretically significant variables were included in the multi-level logistic regression. We used a multi-level logistic regression with a nested dataset (residents in one facility could be more homogeneous than those across facilities) because the assumption of independence is violated in a single logistic regression. A multi-level logistic regression accounts for this nested correlation to produce better inferences.<sup>106</sup> A sub-analysis was performed after stratifying all residents by private room users and shared room users. All statistical analyses were performed using STATA software version 14.0, and  $P < 0.05$  was considered significant.

### **2.4.3 Results**

#### **Baseline characteristics of the residents and facilities**

Table 12 shows the distribution of dependent and independent variables at baseline. In total, 12.81% of the residents experienced care-need level deterioration after 6 months of follow-up. The residents tended to be females who were in their 80s and had a higher care-need level at admission. Regarding the facility characteristics, on average, 37.5% of the rooms were private, and more than 86% of the facilities were located in nonmetropolitan areas. The deterioration rate is the proportion of cases that experienced a deterioration in the care-need level amongst all cases within a specific subgroup in 6 months.

#### **Univariate analysis**

Table 13 displays the results from the univariate analysis between independent variables and care-need level deterioration. At the resident level, the male gender, older age and a lower care-need level at baseline were significantly associated with care-need level deterioration. At the facility level, a large facility, a higher percentage of private rooms, and being located in a metropolitan area were less associated with deterioration in care-need level. Having more doctors, licensed practical nurses (LPNs) and dietitians per 100 users was associated with less care-need level deterioration. By contrast, facilities with more physical therapists and occupational therapists were less likely show deterioration in care-need level.

#### **Resident and facility characteristics predicting care-need level deterioration**

Table 14 provides the results from the multi-level logistic regression. At the resident level, older age, male gender, and a lower care-need level at baseline had a higher risk of subsequent care-need level deterioration. At the facility level, facilities with a higher percentage of private rooms and a metropolitan location were less likely to experience deterioration in care-need level. Facilities with more doctors and LPNs per 100 users were more likely to experience care-need level deterioration.

#### **Sub-analysis of resident and facility characteristics predicting care-need level deterioration by private room users and shared room users**

When the data were analyzed separately by private room users and shared room users, the variables that were significant in overall residents remained significant only in

shared room users. However, in private room users, none of the facility characteristics significantly predicted care-need level deterioration. (Table 15)

Table 12. Descriptive analysis of the dependent and independent variables from Oct. 2012

	% or M	SD	Deterioration rate (%)
<b>Dependent variables</b>		n=86,273	
Care-need level deterioration	12.81		12.81
<b>Independent variables</b>			
<b>Resident level</b>		n=86,273	
Age	84.81	7.14	
Age group			
65-74	8.8		9.28
75-84	35.92		12.44
≥85	55.28		13.6
Sex			
Male	28.27		12.5
Female	71.73		12.92
Care-need level			
Care-need level 1	14.41		26.28
Care-need level 2	24.17		17.97
Care-need level 3	29.51		11.24
Care-need level 4	31.92		4.25
Using private room service	81.08		12.96
	18.92		12.13
<b>Facility level</b>		n=1493	
Facility size			
Small (<150 beds)	45.28		13.62
Large (≥150 beds)	54.72		12.59
% of private rooms	37.51	23.84	
% of dementia rooms	13.30	15.56	
Years of business existence	16.22	6.08	
Location			
Nonmetropolitan	86.74		13.22
Metropolitan	13.26		11.13
Staffing level			
Doctors per 100 users	1.35	0.50	
Dentists per 100 users	0.01	0.06	
RNs per 100 users	5.83	3.47	
LPNs per 100 users	6.99	3.26	
RN/Nurse	0.45	0.20	
Care workers per 100 users	36.59	7.90	
Registered dietitians per 100 users	1.27	0.63	

Non-registered dietitians per 100 users	0.37	0.74		
PTs per 100 users	1.92	1.29		
OTs per 100 users	1.60	1.21		
STs per 100 users	0.25	0.40		
Care managers per 100 users	2.01	1.34		
24-hour nursing care				
	Yes	77.83	1.34	12.75
	No	22.17		12.93
RN=Register Nurse; LPN=Licensed Practical Nurse; PT=Physical therapist; OT=Occupational therapist; ST=Speech therapist.				

Table 13. Unadjusted logistic regression of care-need level deterioration for resident and facility characteristics.

Independent variables	OR	95% CI	p-value
<b>Resident Level</b>			
n=86,273			
Age group (ref.: younger than 75)			
75-84	1.39	1.28-1.51	<0.001
>=85	1.54	1.42-1.67	<0.001
Female	1.04	0.99-1.09	0.091
Care-need level (ref.: care-need level 1)			
care-need level 2	0.61	0.58-0.65	<0.001
care-need level 3	0.36	0.34-0.38	<0.001
care-need level 4	0.12	0.12-0.13	<0.001
care-need level 5			
Private room users (ref.: shared room users)	0.93	0.88-0.98	0.004
<b>Facility Level</b>			
n=1493			
Years of business existence	1.00	1.00-1.01	0.063
Facility size (ref.: small)	0.91	0.87-0.96	<0.001
Private room (%)	0.79	0.72-0.87	<0.001
Metropolitan (ref.: nonmetropolitan)	0.82	0.78-0.87	<0.001
Staffing level			
Doctors per 100 users	1.14	1.08-1.20	<0.001
Dentists per 100 users	1.16	0.80-1.68	0.440
RNs per 100 users	0.99	0.99-1.00	0.114
LPNs per 100 users	1.03	1.02-1.04	<0.001
RN/(RN+LPN)	0.72	0.65-0.81	<0.001
Care workers per 100 users	1.00	1.00-1.00	0.323
Non- registered dietitians per 100 users	1.08	1.04-1.12	<0.001
Dietitians per 100 users	1.02	0.99-1.06	0.179
PTs per 100 users	0.98	0.96-1.00	0.032
OTs per 100 users	1.02	1.00-1.04	0.061
STs per 100 users	0.92	0.86-0.97	0.005
Care managers per 100 users	1.00	0.98-1.02	0.979
24-hour nursing care	1.02	0.97-1.06	0.452

OR=odds ratio; CI=Confidence interval; ref.=reference; RN=Register Nurse; LPN=Licensed Practical Nurse; PT=Physical therapist; OT=Occupational therapist; ST=Speech therapist.



Table 14. Facility and resident characteristics associated with care-need level deterioration

Independent variables	OR	95% CI	P-value
<b>Individual level</b>		n=86,273	
Age group (ref.: younger than 75)			
75-84	1.35	1.23-1.47	<0.001
≥85	1.45	1.33-1.58	<0.001
Female	0.92	0.88-0.96	<0.001
Care-need level (ref.: care-need level 1)			
care-need level 2	0.61	0.58-0.64	<0.001
care-need level 3	0.35	0.33-0.37	<0.001
care-need level 4	0.12	0.11-0.13	<0.001
Private room user (ref.: shared room user)	0.89	0.84-0.94	0.027
<b>Facility level</b>		n=1493	
Private room (%)	0.85	0.74-0.97	0.014
Facility size (ref.: small)	1.00	0.94-1.06	0.985
Metropolitan (ref.: nonmetropolitan)	0.83	0.77-0.90	<0.001
<b>Staffing Level</b>			
Doctors per 100 users	1.11	1.03-1.20	0.004
LPNs per 100 users	1.01	1.00-1.02	0.017
STs per 100 users	0.98	0.91-1.06	0.586
PTs per 100 users	1.00	0.97-1.02	0.848
Dietitians per 100 users	1.04	0.99-1.10	0.159

OR=odds ratio; CI=Confidence interval; ref.=reference; RN=Register Nurse; LPN=Licensed Practical Nurse; PT=Physical therapist; ST=Speech therapist.

Table 15. Facility and resident characteristics associated with care-need level deterioration by private room users and shared room users

Independent variables	Private room users			Shared room users		
	OR	95% CI	P-value	OR	95% CI	P-value
<b>Individual level</b>	n=16,327			n=69,646		
Age group (ref.: younger than 75)						
75-84	1.29	1.02-1.62	0.034	1.35	1.23-1.48	<0.001
≥85	1.30	1.04-1.63	0.023	1.47	1.34-1.61	<0.001
Female	0.86	0.78-0.96	0.006	0.93	0.88-0.98	0.010
Care-need level (ref.: care-need level 1)						
care-need level 2	0.60	0.53-0.68	<0.001	0.61	0.57-0.65	<0.001
care-need level 3	0.33	0.29-0.38	<0.001	0.35	0.33-0.37	<0.001
care-need level 4	0.11	0.09-0.13	<0.001	0.12	0.11-0.13	<0.001
<b>Facility level</b>	n=1200			n=1433		
Private room (%)	0.81	0.64-1.03	0.093	0.84	0.72-0.99	0.032
Facility size (ref.: small)	0.89	0.79-1.02	0.093	1.02	0.96-1.09	0.539
Metropolitan (ref.: nonmetropolitan)	0.88	0.76-1.02	0.092	0.83	0.76-0.90	<0.001
Doctors per 100 users	1.13	0.99-1.29	0.063	1.11	1.02-1.20	0.016
LPNs per 100 users	1.00	0.98-1.02	0.820	1.02	1.00-1.03	0.008
STs per 100 users	0.95	0.81-1.10	0.472	0.98	0.90-1.06	0.641
PTs per 100 users	0.96	0.92-1.00	0.056	1.01	0.99-1.04	0.318
Dietitians per 100 users	1.02	0.92-1.14	0.678	1.04	0.98-1.11	0.168

OR=odds ratio; CI=Confidence interval; ref.=reference; RN=Register Nurse; LPN=Licensed Practical Nurse; PT=Physical therapist; ST=Speech therapist.

#### **2.4.4 Discussion**

This study investigated resident and facility characteristics associated with care-need level deterioration based on an admission cohort design using nationally representative data. The findings showed that at the resident level, age, sex, and the care-need level at baseline were significant predictors of care-need level deterioration. At the facility level, location, percentage of private rooms, the number of doctors per 100 users and the number of LPNs per 100 users were significantly associated with care-need level deterioration.

Overall, at the resident level, residents who were older and males were more likely to experience deterioration in their care-need level in nursing homes. This positive association was consistent with previous studies regarding care-need level deterioration when using LTCI services.<sup>73, 75, 76</sup> The result that a lower care-need level at baseline contributed to care-need level deterioration was also supported by a previous study.<sup>76</sup>

Private room users were less likely to experience deterioration in care-need level. Personal background characteristics of social economic status (SES) may affect this correlation because private room service is much more expensive than shared room service. In addition, high SES is correlated with better health outcomes.<sup>108</sup>

At the facility level, a higher percentage of private rooms was negatively associated with care-need level deterioration. One explanation could be that more private rooms may lower the risks of infections such as influenza or pneumonia. Another explanation may be the organization factor, such as the difficulty of managing. Shared rooms are more difficult to manage compared to private rooms, particularly when creating compatible situations for all roommates.<sup>114</sup> Only Zimmerman et al has considered the percentage of private rooms variable in a model and found a non-significant association with ADL decline.<sup>102</sup>

However, another possibility is that a higher percentage of private rooms may indicate more high SES residents who have better health outcomes. To control for the SES status of residents, a sub-analysis was performed after stratifying the residents by private room users and shared room users. In this sub-analysis, private room users was the substitute variable for higher SES, and shared room users was the substitute variable

for lower SES. The results showed that a higher percentage of private rooms was significantly associated with care-need level only in the shared room users. This indicates that a facility setting with a higher percentage of private rooms reduces the odds of care-need level deterioration for shared room users. Conversely, for private room users, the possibility of a higher SES itself rather than the facility characteristics affect the reduction of care-need level deterioration.

Facilities in metropolitan areas had a smaller odds of deterioration in care-need level. This result is generally consistent with the findings of earlier studies. Previous research suggests that rural facilities are less likely to provide mental health services such as Alzheimer's units; moreover, rural facilities have a lower nursing staff ratio compared to urban facilities, which is associated with a lower quality of care.<sup>115</sup> One study suggested that rural residents are more likely to reside in facilities without special care programs that target residents' special needs, which might increase the odds of receiving a poorer quality of care.<sup>17</sup>

More doctors per 100 users was significantly negatively associated with deterioration in care-need level. By contrast, no previous studies have reported an association between the number of doctors and functional decline. We considered this variable because LTCHF is an intermediate facility between medical facilities and welfare facilities, and more than one full-time doctor per 100 users is a requirement for operating LTCHFs. It is possible that more doctors per 100 users indicates higher care needs or medicalized facilities. It is also possible that a lack of clinical or severity control caused the negative association between the number of doctors per 100 users and care-need level deterioration.

A higher number of LPNs per 100 users was positively associated with care-need level deterioration. One study indicated that LPNs should be employed as complements of RN staff. However, some nursing homes fill most licensed nurse positions with LPNs to save on labour costs and hire only the minimum number of RNs required by regulations. If this phenomenon persists, LPN staffing may contribute to decreased quality of care.<sup>14</sup> Another study indicated that LPN hours were negatively associated with resident's mood and quality of life. They argued that more LPN hours possibly indicate a higher need or more medicalized facilities.<sup>116</sup> Several studies found a non-significant association between LPN and QIs.<sup>23</sup>

Several limitations should be considered in this study. First, approximately 37.5% of the residents were lost to follow-up from having left the facility. However, there are several reasons for leaving LTCHFs, such as returning home, being hospitalized, dying, and being transferred to other facilities. Because there was no information provided regarding the reason for leaving a facility, it is difficult to assume the direction of bias caused by the loss to follow-up. Second, this study's follow-up period was 6 months; however, in general, the care-need level was available for one year. Only residents who have more care-needs or functional changes will renew their certificate of care-need regardless of the term of validity. This may underestimate the prevalence of care-need level deterioration. Third, 14.8% of the residents in admission cohort had stayed in nursing homes during the 3 years previous to admission in the follow-up period; thus, their functional states were also affected by quality of care in their previous nursing home institutionalization. This study developed model after excluding the readmitted residents and found that the main results were the same with all residents, but the number of LPNs per 100 users became nonsignificant (P-value was 0.06). Fourth, due to limited resident information, this study failed to consider the clinical diagnosis, which may affect the outcome.<sup>76, 113</sup> Additionally, rehabilitation was omitted; however, the amount of rehabilitation services that a resident received may affect care-need level deterioration.

Despite these limitations, this study has several strengths. This study focused on LTCHF population, which may lead to good generalizability. In addition, this study investigated both resident and facility characteristics that address the correlates of residents in the same facility.

### **Policy Implications**

Results indicate the following potential implications for the LTCI system. First, the results showed that approximately 12.8% of residents experienced care-need level deterioration in 6 months. Further, residents with a lower care-need level at baseline experienced a greater care-need deterioration. Additionally, previous studies have shown that a greater care-need deterioration occurs in facility service users than in home care service users. Therefore, this study suggests that care-need level deterioration should be prevented in the early stage of lower care-need level. Second, in Japan, all

service prices are determined according to the care-need level, and a higher care-need level warrants a greater amount of benefits regardless of efforts to prevent deterioration. Currently, this payment system provides disincentives to protect the residents from care-need level deterioration. An incentive system that considered care-need level deterioration would prevent this phenomenon. Third, this study also suggest making reimbursement dependent on deterioration of care-need level. In addition, this reimbursement information could be disclosed to allow prospective users to use this information as a reference when choosing a facility. Additionally, enhancing the competitiveness in the market amongst providers may improve the quality of care by the intensive system.

### **Ethical consideration**

This study was approved by the ethical committee of the University of Tsukuba (NO.1165).

## **2.5 Discussion of facility effect on residents care-need level deterioration**

Facility characteristics are important to study because they are the most controllable, are likely to vary from facility to facility,<sup>117</sup> and may differ as a result of influence from operation environment even in the same setting. Study 2 and 3 provided evidence that there were inconsistent effect of facility characteristics in different settings. Table 15 summarized the negatively associated factors with care-need level deterioration in different long-term care settings. Incontinent predictors in different setting were highlighted with *Italic front* in table 16.

### ***Unit type facility***

Unit type was investigated only in LTCWF because the proportion of the unite type facility in LTCHF is merely 5%, which was 29.2% in LTCWFs. The percentage of private room might do same effect in both facility settings, because individual level of private room user were less tend to experience care-need level deterioration. However except all private room setting, unit type facility provides person-centered care which may contributes to quality of care. A previous study reported that person-centered care were significantly associated with high quality of life for dementia residents.<sup>118</sup>

### ***Registered dietitian***

A higher proportion of registered dietitian among all dietitians was only had effect in LTCWFs. One Japanese study present that more than 60% of elderly with care needs were at risk or already suffer from malnutrition.<sup>119</sup> They also reported that subjects with higher care needs were associated with poorer nutritional status.<sup>119</sup> Thus, most of residents in LTCWF are higher care-need level residents (88.64% were care-need level 3 to 5) compare to LTCHF (67.6% of residents were care-need level 3 to 5) could be a reason of different effect of registered dietitian. Further, one current report that 87.2% of total administrators and registered dietitian thought their nutrition management have effect on residents' improvement in care-need level after conducting survey in 1082 LTCWFs.<sup>120</sup> However, none of the previous empirical study was found which have discussion of different effects from dietitian in different long-term care facility setting.

### ***Less number of doctors per 100 users***

Unlike LTCWF, full time doctor is required in LTCHF because it functions as intermediate of medical and care. A higher number of doctors per 100 users might indicate higher care needs or medicalized facilities in LTCHF.

There are many difference in resident and facility characteristics in different facility setting. Resident characteristics such as clinical outcome, service they use are usually different because the function of facility is different. With the difference of service they use, different staffing should be followed. However, this study were failed to obtain the detail data of those characteristics.

Table 16. Resident and facility characteristics associated with care-need level deterioration: results from study 2 and 3.

	LTCWFs	LTCHFs
<b>Resident characteristics</b>	Younger age Female (excluding loss to follow-up model) Higher care-need level at baseline Private room user	Younger age Female Higher care-need level at baseline Private room user
<b>Facility characteristics</b>	<b>Organization factors</b> Located at metropolitan area <i>Fewer years in business</i> <i>Unit care type facility</i>  <b>Staffing factors</b> A higher proportion of registered nurse among nurse <i>A higher proportion of registered dietitian among all dietitians</i>	Located at metropolitan area <i>Higher % of private room</i>  Less number of LPNs per 100 users <i>Less number of doctors per 100 users</i>



## **Chapter 3: Quality of care measurement from consumer's perspectives**

### **3.1 Literature review of resident satisfaction instruments**

#### **Aim**

The aims of the review were to: 1) describe the content of instruments measuring resident satisfaction in long-term care facilities; 2) describe Psychometric properties; 3) evaluate their applicability and feasibility for use in practice.

#### **Search method**

To identify resident satisfaction studies, the following electronic databases were searched: PubMed, Google Scholar and CINAHL. Searches were restricted to English language papers published since 1990. PubMed was used to screen the combination of the keywords: “satisfaction, customer satisfaction, resident satisfaction” limiting the search to “long-term care facilities, nursing home, assisted living facilities and aged care” within the title and abstract. Google Scholar and CINAHL were used with the same keywords but limited only being within the article title. As a result, 93 publications were selected from PubMed and 47 were extracted from Google Scholar and 99 from CINAHL. Because this study focused on developing the instrument of resident satisfaction survey, only articles including discussion or use of satisfaction instrument were include through examine abstracts. Ultimately, 14 articles met the inclusion criteria.

#### **Analysis**

Instrument content was described by domains which classified similar questions together.<sup>29</sup> To assess psychometric properties, articles were examined to see if validity and reliability test were conducted.<sup>121, 122</sup> Applicability was determined by the number of participants, facility settings and if the instrument applied by other researchers or by government.<sup>122</sup>

#### **Content characteristics of resident satisfaction survey**

From among the 14 articles, the same two instruments were appeared twice with difference articles by same author.<sup>44, 123-125</sup> Twelve instruments were found and summarized in table 17. The results demonstrate that there are large variation regarding

content, assessment in psychological property and number of domains and items. The instruments were from USA (n=7), Canada (n=2), Italy (n=1), Australia (n=1) and Netherland (n=1) demonstrating a global interest in measuring resident satisfaction in nursing homes. The number of domain covered ranges from four to eleven. Psychometric test were conducted in seven of twelve studies. Only one study (Straker et al. 2007) performed cognitive screening before conducting the survey. Most of instruments have not often been used outside of their period of development or applied by other researchers. Only one study, Straker et al. 2007, conducted the survey repeatedly which was ever two years at the statewide level, and regularly checking and modify the resident satisfaction survey. In 2013, the instrument of ODA-RSS which was modified by Stracker et al. in 2009 was applied in Canada. They found that several domains are also applicable in Canada.

In summary, the instrument developed by Ohio department rigorously examined psychometric properties and is one of the most comprehensive instrument regarding settings and applicability.

Table 17. General information of instruments included in the literature review

<b>Instrument and reference (Name of the instrument)</b>	<b>Country</b>	<b>Setting</b>	<b>No. of items</b>	<b>No. of Subjects</b>	<b>No. of domains</b>	<b>Domains</b>	<b>Validity</b>	<b>Reliability</b>	<b>Cognitive screening</b>
Ryden et al. 2000 Satisfaction with nursing home instrument(SNHI) <sup>42</sup>	USA	NH	44	110	7	Respect for resident's values and preference, information, physical care, Psychological care, Involvement of family, care providers, environment	Relation with other scale	No	No
Mostyn et al. 2000 <sup>126</sup>	-	NH	-	9053	4	Comfort and cleanliness, nursing, food, facility care and services	Yes	Yes	No
Gesell 2001 <sup>40</sup>	USA	AL	45	475	6	Activities, personnel, dining, apartment, facility, management	EFA	Yes	No
Chou et al. 2001 Resident satisfaction questionnaire (RSQ) <sup>44</sup>	Australia	RAC	24	1146	6	Room, Home, Involvement Meals Service, Staff Care, Social Interaction,	EFA+CFA	Yes	No
Joanne et al. 2004 <sup>127</sup>	USA	NH	-	-	6	activities, care and services, caregivers, environment, meals, well-being	No	No	No
Sikorska-Simmons 2006 Resident satisfaction index (RSI) <sup>124</sup>	USA	AL	27	156	5	Resident perceptions of health care, housekeeping service, physical environment, relationships with staff, social life/activities	EFA	Yes	No
Edelman et al.2006 Assisted living resident satisfaction scale (ALRSS) <sup>128</sup>	USA	AL	18	204	9	Safety/Peace of mind, Personal attention, staff, knowledge, autonomy, Aides, socialization with family, privacy, activities	CFA	Yes	No

Straker et al. 2007 Ohio nursing home resident satisfaction survey (ONHRSS) <sup>28</sup>	USA	NH	48	18560	8	Quality of care and nurse aides, Direct care, choice, Negative Laundry and safety, activities, Administration, Meals and dining	EFA+CFA	Yes	Yes
Van Nie et al.2010 Internet report card <sup>30</sup>	Netherland	NH	9	278	9	Care treatment/plan, communication and information, physical well-being, domestic and living conditions, participation, safety of care , mental well-being, safe living/residence, sufficient and competent staff	No	No	No
Satisfaction with Massachusetts nursing home care Li et al. <sup>129</sup>	USA	NH	-	16488	6	Rated administrative and direct care staff, physical environment, activities available, personal care, food and meals, residents' personal rights	No	No	No
Cook et al. 2013 Ohio department of aging-resident satisfaction survey(ODA-RSS) <sup>45</sup>	Canada	AL	42	9739	11	Activities, choice , care and services, employee relations, communication, employee responsiveness, meals and dining, Laundry, facility environment, residence environment	CFA	Yes	No
Barsanti et al. 2017 <sup>130</sup>	Canada& Italy	NH	14	1797	4	Security, comfort, autonomy, services and facilities	No	No	No

Poey et al. 2017 <sup>131</sup>	USA	NH	10	6214	None	Meeting my needs and concerns, appeal of NH as a home, safety, security, cleanliness, taste of food,, food variety, food quality, enjoyable dining, Laundry services.	No	No	No
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Note: NH=nursing home; AL= assisted nursing home; RAC=residential aged care; EFA= exploratory factor analysis; CFA=confirmatory factor analysis.

## **3.2 Development of a satisfaction survey in Long term care health facilities in Japan: Based on the Ohio Department of Aging-Resident Satisfaction Survey (Study 4)**

### **3.2.1 Aims**

The aim of this study is to develop resident satisfaction survey in LTCHFs in Japan based on the Ohio Department of Aging-Resident Satisfaction Survey.

### **3.2.2 Method**

#### **Survey design procedure**

In initial stage, ODA-RSS was translated into Japanese by me, LTCHFs administrators and experts in gerontology after obtaining the permission of the ODA-RSS via email. An initial literature review using PubMed and JAMAS returned no results regarding resident satisfaction survey being used at LTCHFs. Subsequently, a search using the Electronic database of “Yahoo! JAPAN” was used to identify possible satisfaction surveys being used at LTCHFs. The query was built using the keywords “satisfaction in LTCHFs”. As a result, 23 resident satisfaction survey were found and the contents were investigated in figure 7. One of the results of this letter query, based on satisfaction survey in LTCHFs, was used to investigate the consistency topic of ODA-RSS in Japan. None of the 23 surveys had conducted psychometrical test. Nevertheless, most of the items belonging to ODA-RSS domains appeared except the laundry domain. In addition, items regarding rehabilitation appeared in 18 LTCHFs among total of 23 LTCHFs. Approximately, 70% of the facilities had items regarding bathing. Based on an overview of Japanese survey, we added 2 items concerning rehabilitation, 3 items related to bathing, 1 item related to the ‘choice’ domain. Also, 2 items related to laundry were excluded. Response categories and score were the same with ODA-RSS: ‘Yes, definitely’=1, ‘Yes, Maybe’=2, ‘No, I don’t think so’=3, ‘No, definitely’=4, ‘I don’t know’ was not scored.

Cognitive interviews were conducted with 12 LTCHFs’ residents using 47 items. This was done to determine the item wording and the appropriate number of items. Cognitive interviews lasted from 20-40 minutes per resident and almost all of the residents claimed heavy burden in completing the survey. Additionally, some items seemed to be

not applicable and less important. On the basis of the cognitive interviews and review of surveys in LTCHFs, I and experts in gerontology re-considered the items which are less relevant in Japan and reduced the number of items to 33. (Appendix 1)

Facility name	NO. of items	No. of domains	Activities	Choice	Rehabilitation	Employee relations	Employee responsiveness	Communication	Meals	Bathing	Facility environment	Resident environment	Overall satisfaction
1.介護保健施設 青寿会	31	6											
2.介護老人保健施設 まいえ	48	9											
3.医療法人 光慈会 介護老人保健施設 かりや	23	5											
4.介護老人保健施設 ふれあいの渚	18	8											
5.仙台南病院附属介護老人 保健施設	34	6											
6.介護老人保健施設ソルヴィラージュ	29	4											
7.介護老人保健施設 富士中央ケアセンター	32	10											
8.医療法人 幸信会 介護保健施設	19	3											
9.介護老人保健施設 リハビリポート青葉	28	8											
10.社会福祉法人三篠会 ふれあいライフ原	20	8											
11.介護老人保健施設 しびのさと	14	-											
12.滝野川病院附属介護老人保健施設	15	-											
13.老人保健施設 かみつが	11	-											
14.介護老人保健施設 恵の杜	13	-											
15.介護老人保健施設 一心館	26	7											
16.社会福祉法人栄和会	56	4											
17.介護老人保健施設 都筑シニアセンター	8	-											
18.ヨナハ介護保健施設	9	-											
19.ウエルハウス西宮だより 介護保健施設	4	4											
20.南海医療センター附属介護老人保健施設	49	7											



21.介護老人保健施設 あげお愛友の里	25	8											
22.介護老人保健施設 (しらさぎ苑)	25	7											
23.介護保健老人施設 グリーンビレッジ朝霞台	12	4											
Total			20	5	18	20	14	14	19	16	18	8	12

Note: Blue bank means at least one the items including OHIO domain appeared in LTCHFs.

Bathing and rehabilitation domains were added because most of facility were used.

Figure 7. Descriptive of contents of resident satisfaction survey in long-term care health facilities in Japan. (N=23)

### **Data collection**

Data was collected from 106 residents who admitted to 9 LTCHFs during July to October 2017 through a mailed questionnaire. Only residents who could answer the survey by themselves and without cognitive problem (Hasegawa dementia score < 20)<sup>132</sup> were included. All residents were required to answer the questions by themselves. Among them, 3 respondents who had more than 4 items with missing responses were excluded. 10 respondents were excluded due to having more than 4 responses of “I don’t know”. 93 residents remained in the sample for the analysis.

### **Validity and reliability**

Confirmatory factor analysis (CFA)<sup>133</sup> was used to verify construct validity of the satisfaction survey of residents in LTCHFs. In this study CFA is used 1) to assess if the theoretically determined scales maintain validity after being translated 2) with assumption that measure a single construct can have a meaningful dimensional structure, and that assessing its separate dimensions would lead to a better understanding of the overall construct<sup>134</sup> – in this case, resident satisfaction in LTCHFs.

To assess the adequacy of factor structure, several model fit indices were used including the chi-square / degree of freedom ratio (normed chi-square, NC), comparative fit index (CFI), incremental fit index (IFI) and root mean square error of approximation (RMSEA).

Internal consistency reliability was assessed using Cronbach’s alpha for each factor and for the full measure. Obtaining a Cronbach’s alpha value larger than 0.6 was considered sufficient to indicate acceptable reliability. Confirmatory factor analysis was performed using IBM SPSS AMOS.

### **Ethical consideration**

This study was approved by the ethical committee of the University of Tsukuba (NO. 1164). Before completing the questionnaire, a letter with clear explanation of this study was given to participants and those who answered the questionnaire were regarded as providing consent.

### 3.2.3 Results

#### Characteristics of participants

Table 18 represents characteristics of participants. The mean age of participants were 84.3 years old, female accounted for 75.3% of the total participants and 83.9% had a care-need level 1 to 3 (higher care-need levels indicates more disability). Approximately 82% of the total participants were shared room residents.

Table 18. **Characteristics of participants (N=93)**

	Mean(SD)
Age	84.3(8.0)
Sex	n (%)
Male	23 (24.7)
Female	710 (75.3)
Care-need level	
Care-need level 1	21 (22.6)
Care-need level 2	28 (30.1)
Care-need level 3	29 (31.2)
Care-need level 4	8 (8.6)
Care-need level 5	3 (3.2)
Missing	4 (4.3)
length of stay	
Shorter than 6 months	41 (44.1)
Same or longer than 6 month	51 (54.8)
Missing	1 (1.1)
Room type	
Private room	17 (18.3)
Shared room	76 (81.7)

### **Construct validity and internal consistency reliability**

Before CFA analysis, one item related to facility environment (“Are outside walkways and grounds well taken care of?”) was excluded due to 29% of participants replied “missing-don’t know”. This might be because in LTCHFs, residents commonly are not able to go outside of the facility alone, and commonly go outside together with staff. Therefore, lots of residents remain inside the facility and don’t know the condition of outside grounds.

Table 19 presents validity of different CFA structure models. Model 1 was analyzed to investigate the theoretically determined model of ODA-RSS which includes all items. Model 2 and 3 was done to find a meaningful dimensional structure, and assess its separate domains to better understand the overall construct. Model 1 showed poor model fit ( $\chi^2 [df = 360] = 636.1, p < 0.001, CFI = 0.718, RMSEA = 0.091$ ). Three domains of “Choice”, “Bathing” and “Facility environment” indicated poor reliability in model 1. Based on model 1, items in the domains with low reliability were excluded and model 2 was tested. This provided a better model fit and smaller chi-square / d.f. ratio, however it still didn’t fit data well. Therefore, items that with factor loading lower than 0.5 were excluded and tested in model 3. Significant improvement with most of the fit indices showed sufficient fit between data and structural model. Good reliability was found for the separate domains and overall value of Cronbach’s  $\alpha$  was 0.85.

### **Relationship of domains with overall satisfaction**

Table 20 presents the relationship of the domains and overall satisfaction in order of importance. Overall satisfaction is calculated by means of two overall satisfaction items: “overall, do you like living here” and “would you recommend this place to a family member or friend”. (Cronbach  $\alpha = 0.706$ ) As a result, employee relations domain was most associated with overall satisfaction.

Table 19. Confirmatory factor analysis model fit statistics for satisfaction survey

	Factor loading		
	Model 1	Model 2	Model 3
<b>Activities</b>	$\alpha=0.71$		$\alpha=0.71$
1. Do you get enough information about the activities offered here?	0.58	0.60	0.59
2. Do you have enough to do here?	0.69	0.70	0.70
3. Are you satisfied with the activities offered here?	0.84	0.82	0.83
<b>Employee relations</b>	$\alpha=0.74$		$\alpha=0.74$
4. Are the people who work here friendly?	0.74	0.74	0.75
5. Are the employees courteous to you?	0.70	0.70	0.70
6. Can you depend on the employees?	0.66	0.65	0.65
<b>Communication</b>	$\alpha=0.81$		$\alpha=0.81$
7. Would you feel comfortable speaking up when you have a problem?	0.77	0.76	0.76
8. Are the staff available to talk with you when you have problem?	0.79	0.77	0.78
9. Do the staff take care of your problem promptly?	0.76	0.79	0.77
<b>Choice</b>	$\alpha=0.46$		
10. Can you choose the clothes that you wear?	0.17	-	-
11. Are you free to come and go as you please?	0.63	-	-
12. Are the staff available to take care of you when you go outside?	0.56	-	-
<b>Rehabilitation</b>	$\alpha=0.63$		$\alpha=0.63$
13. Do the therapist take enough time with you when having rehabilitation?	0.52	0.54	0.53
14. Do you feel the therapy is effective?	0.83	0.83	0.84
<b>Meals</b>	$\alpha=0.73$		$\alpha=0.76$
15. Do you get enough to eat?	0.49	0.44	
16. Can you get the foods you like?	0.56	0.54	0.55
17. Is the food here tasty?	0.65	0.75	0.81
18. Do you enjoy your meal?	0.80	0.79	0.76
<b>Employee responsiveness</b>	$\alpha=0.67$		$\alpha=0.64$
19. During the weekdays, is a staff person available to help you if you need it?	0.80	0.78	0.78
20. During the weekends, is a staff person available to help you if you need it?	0.48	0.67	0.65
21. Is a staff person available when you are in an emergency?	0.63	0.50	-
<b>Bathing</b>	$\alpha=0.46$		
22. Do you get enough times to have a bath?	0.25	-	-
23. Do the staff provide bathing assistance in appropriate way?	0.48	-	-
24. Do the staff take care of your privacy when having bathing service?	0.59	-	-
<b>Facility environment</b>	$\alpha=0.55$		
25. Is this place clean enough for you?	0.58	-	-
26. Do you feel safe here?	0.51	-	-
27. Is this place quiet when it should be?	0.53	-	-
<b>Resident environment</b>	$\alpha=0.62$		$\alpha=0.64$
28. Do you feel safe to put your private things in your room?	0.51	0.35	-
29. Are the satisfied with your room?	0.71	0.72	0.70
30. Do you think this is a pleasant place for people to visit?	0.53	0.67	0.72
<b>Fit indices for the alternative factor models</b>			
$\chi^2/d.f.$	1.77	1.68	1.40
p-value	<0.001	<0.001	0.03
RMSEA	0.091	0.086	0.066
CFI	0.718	0.833	0.921
IFI	0.745	0.847	0.928

The commonly used cut-points for each fit indices were: ( $\chi^2/d.f.$  <2 or 3; RMSEA<0.08; CFI>0.90; IFI>0.90,  $\alpha$ =Cronbach's  $\alpha$ ;  $d.f.$ =degree of freedom; RMSEA=root mean square error of approximation; CFI= comparative fit index, IFI=incremental fit index

Table 20. Correlation of scales with overall satisfaction

Domains in resident satisfaction survey	Correlation
1. Employee relations	6.27
2. Communication	5.93
3. Rehabilitation	4.77
4. Activities	4.67
5. Residence environment	4.52
6. Meals	4.38
7. Employee responsiveness	3.65

*Note:* All correlations are significant at the  $<.001$  level. (N: 68~75)

### 3.2.4 Discussion

This study is first to develop a resident satisfaction survey in LTCHFs by examining psychometric properties. The final model reduced a starting pool of 30 items in 10 domains to 18 items in 7 domains: activities, employee relations, communication, rehabilitation, meals, employee responsiveness, resident environment. Evidence of overall fit of the model 3 showed sufficient construct validity and consistency reliability.

Content validity of ODA-RSS is supported by literature review of existing satisfaction instrument.<sup>28</sup> 60 topic areas were selected from summarized 90 topic areas according to a rank of importance. Then, cognitive interviews were conducted to ask residents to identify additional topics important to satisfaction survey to develop a more comprehensive survey.<sup>28</sup> Based on the ODA-RSS, this study examined contents of existing LTCHFs resident satisfaction survey. Moreover, residents' opinions of inapplicable questions based on cognitive interview were investigated by me and three experts in gerontology to develop more applicable and comprehensive survey.

Good construct validity was shown after excluding three domains with low reliability (Cronbach's alpha <0.6) and two items with smaller than 0.5 factor loading. Domains from final model showed significant correlation with overall satisfaction score.

#### **Same domains of ODA-RSS and resident satisfaction survey in LTCHFs**

Six of eight domains of ODA-RSS remained in the resident satisfaction survey in LTCHFs. The domains of employee relations, communication, employee relations and responsiveness include topics such as regarding friendly, dependable staff and problem solving. These items were reported as indicative of quality of life issue,<sup>45</sup> and also identified as useful items for Canada assisted living facility. Cook et al. 2012 argued that quality of care may provide an important starting point for assessing satisfaction regardless of setting.<sup>45</sup> One Japanese study indicated that items such as listening residents problems, friendly are identified as important items included in scale of resident satisfaction survey in home care service.<sup>67</sup>

Items from meal and residence environment domain were also showed to be suitable for LTCHFs. Several previous studies supported including meal domains in

resident satisfaction measures both in assisted living and nursing home settings.<sup>28, 40, 44, 45, 126, 131</sup> This means regardless of setting, meal service and residence environment are important.

### **Excluded domains in resident satisfaction survey in LTCHFs**

Domains of facility environment and choice were excluded due to low reliability (Cronbach's  $\alpha < 0.6$ ). Items in facility environment domain were topics such as safety, cleanliness and comfortableness. These items failed to capture the same concept of facility environment. When summarizing the content of existing 23 facilities satisfaction survey, items related to facility environment or physical environment appeared in most of facilities (18/23). This means facility environment is an important domain for satisfaction in LTCHFs. Further study should be modify the contents of items in facility environment domain.

The choice domain included items covering topics such as clothes and being able to move around freely inside and outside the facility. These items were not captured in the same concept of choice. Since a domain of 'choice' appeared only in the ODA-RSS<sup>45</sup> and only five of twenty-three facilities used the items in Japan, first step of further modification should be to consider if choice is useful or important in LTCHFs. This study add new domain of bathing, however items were failed to indicate same concept. Items in the bathing domain were topics such as privacy, aids and amount of service. Since most of Japanese facilities (16/23) have items regarding bathing, it might be an important domain of satisfaction.

There are several limitations which may be of concern. First, although is has been reported that 39% of studies had sample sizes less than 100<sup>135, 136</sup> in psychology studies which use explanatory factor analysis, the small sample size of this study might be problematic for generalizability. A current review reported that an effective sample size increase by the number of factors and lower factor loading in CFA model.<sup>137</sup> A four factor, three items model requires more than 200 participants at a factor loading of 0.65. Thus, larger sample size is important to develop national satisfaction survey instrument. Second, one should mention is, compared to the interview survey of ODA-RSS, this study used a written questionnaire survey. The higher burden that residents feel with a questionnaire survey than interview might have an effect on response rates. Third, the



subjects of this study were composed of healthier residents who could answer questionnaire by themselves. It implies that satisfaction of residents with function and cognitive impairment were not reflected. Fourth, this study used satisfaction surveys from 23 Japanese facilities, publicly disclosed in a website with the purpose of assessing consistency between the OHIO survey and the Japanese survey. However, there is no doubt that interviews with residents should also be conducted to summarize important topics of resident satisfaction in Japan. The author plans to continue improving the satisfaction survey in the near future.

To sum-up, this is the first study to develop resident satisfaction survey in LTCHFs in Japan. Among 10 domains of ODA-RSS, 7 domains were shown to demonstrate good reliability and validity. Further modification of choice, facility environment and bathing should be conducted.

## Chapter 4: Overall discussion and conclusion

### 4.1 Overall discussion

In this chapter, a general discussion will be presented based on results of each studies and discussed implementations for practice and future directions. This thesis focused on quality of care measurement form both clinical outcomes and consumer's perspectives. Figure 8 presents risk factors based on findings of studies by combining with SPO system model.<sup>16</sup> According to the findings, all the components of contextual, structure, process and resident characteristics had effect on quality of care.

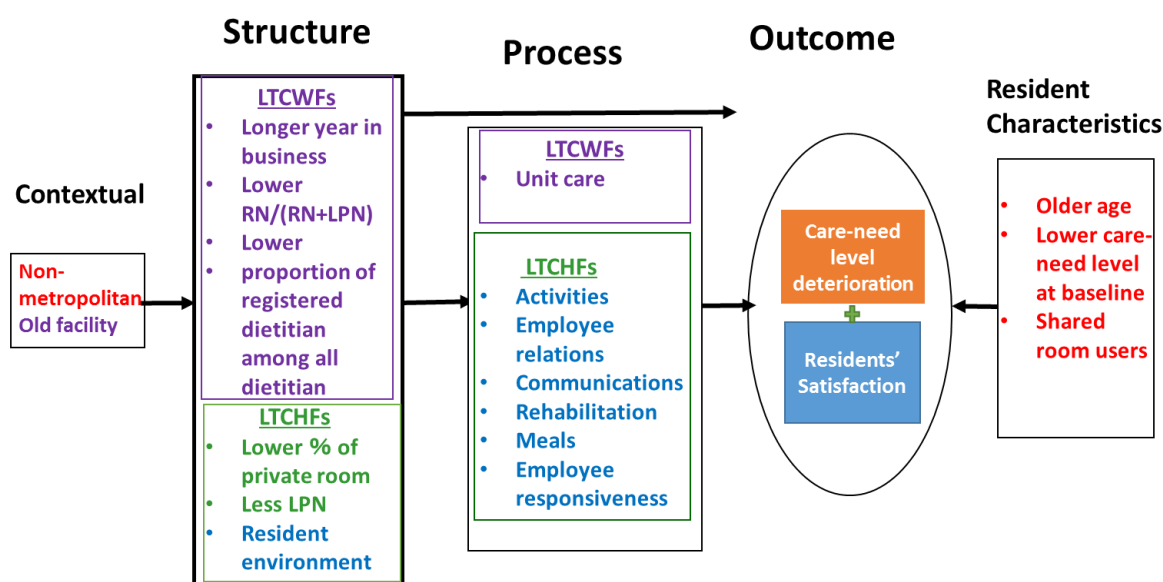


Figure 8. Results of studies combining with SPO system model <sup>16</sup>

#### Description of quality of care using care-need level outcome indicator among all facilities.

Study 1 was conducted to describe the status of quality of care in national level, by applying an outcome indicator, in terms of care-need level change. As a result, the deterioration rate among facilities on average was 15.9% and varied from 0 to 58.3%. The distribution of care-need level adjusted deterioration rate among all facilities could have practical use for evaluation of quality of care. For example, the facility with the

highest deterioration rate of 58.3% could be a problematic facility. Care-need adjusted deterioration rate is superior to existing outcome assessment in long-term care compensation such as additional charge for high home rate<sup>69</sup> because it could apply to all types of long-term care facilities and adjusted by resident's health status. In USA, facility level QIs was used to determine high or low quality of care<sup>9</sup> and QIs such as incidence of ADL decline were already disclosed in public and could be confirm in the government website.<sup>81</sup> Thus, there is possibility to apply care-need level adjusted deterioration rate as QI.

However, there are some limitations when applying care-need level adjusted deterioration as quality indicator. First, government assesses care-need level strictly according to a national standardized computer-aided system that created based on time study for caring.<sup>54</sup> Thus, care needs level might reflect care needs a little broader than ADL, and reported to have strongly correlation with ADL<sup>71</sup> which is mainly used in other countries as QI. Although, care-need level were used as outcome indicator in previous researches.<sup>75, 76, 84, 112</sup> However, the validation of the care-need level measurement itself has yet to be investigated. This should be investigated in near future. Second, this study excluded care-need level 5 when calculating deterioration rates. This is to prevent ceiling effect. However, approximately 32.7% of the total residents are care-need level 5. Future study should investigate relationship between mortality of care-need level 5 residents and deterioration rate to clarify a possible bias due to exclusion. To prevent floor effect, care-need level 1 was excluded when calculation improvement rate. Though only 3.37% of the total of residents were excluded, the bias due to exclusion should also be investigated. Third, the care-need level certificate is available for a maximum of two years (one year in principle). LTCI users are allowed to re-apply for the care-need level certificate whenever they experienced functional changes even in a short period, such as one month. However residents who did not apply for reassessment in one year were regarded as sustainment and bias due to such situation should be a concern.

### **Quality of care improvement and risk factors associated with care-need level deterioration**

Care-need level deterioration brought more burden for caregivers and higher health expenditure for individuals and government.<sup>138</sup> Care-need level could be a possible QI because it is strongly associates with ADL.<sup>71</sup> Previous studies have provided evidence of both resident and facility characteristics associated with functional decline<sup>85</sup>, however, no relevant studies was found for Japan.

Studies 2 and 3 attempted to investigate resident and facility characteristics associated in care-need level deterioration. Study 2 focused on LTCWFs and study 3 focused on LTCHFs.

### **Staffing level**

#### ***Higher proportion of RN and less LPN per 100 users***

This thesis suggests the importance of nurse staffing skill mix. A lower proportion of RN and more LPN per 100 users were risk factors. Previous studies have found nursing staff level (i.e., proportion of RN, LPN, RN.) to be an important factor in quality.<sup>98, 139, 140</sup> According to previous studies, Registered Nurses, with their higher education levels, may have better knowledge and skills to assess and monitor changes in patient condition and develop proper interventions in time, and also have better leadership and supervisory skills.<sup>110, 111, 141</sup> One previous study has reported existing phenomenon of filling most RN position with LPN, which could be contribute to poor care quality.<sup>14</sup> Thus, cost-effectiveness studies and simulation studies are necessary to inform nursing homes of different options of nurse staffing mix and level and their financial impacts.<sup>141</sup>

### ***Dietitians***

A higher proportion of registered dietitian among all dietitian were significantly less deteriorated in care-need level. A higher proportion of registered dietitians among all dietitians may affect the physical status of residents because registered dietitians may play an important role in providing appropriate instructions according to the health condition.<sup>142</sup> Based on these findings, the percentage of registered dietitian among all dietitians may need to be considered in developing requirements for the appropriate staffing of LTCWFs.

### ***Private room at resident level and facility level***

#### ***At resident level***

Private room users were less likely to deteriorate than shared room users. Additionally, no facility effect was found for private room users. This study argues that care recipients' economic status act as confounder. Thus, high SES as a protective factor, could protect residents from care-need level deterioration even if the overall facility quality of care is not high. There are several advantages to residing in a private room. Previous studies have reported that there are lower risk of nosocomial infections such as pneumonia<sup>114</sup> and higher satisfaction.<sup>143</sup> For providers and managers, shared room increased time and efforts for residents admission and managing conflict and transfers.<sup>114</sup> This may indirectly lead to higher quality of care for private room users than shared room users.

#### ***At facility level***

Facility with higher percentage of private room was significantly associated with less deterioration for shared room users. However, none of the previous studies have reported that percentage of private room as having an effect on shared room users. This study indicates that facility with higher percentage of private room may less suffer from infection because private room have less infection risk than shared room.<sup>114</sup>

### ***Rurality***

Non-metropolitan facilities were more likely to have patient deterioration than metropolitan facilities. According to previous studies, rural facility were less likely to provide staff training program, special care program and mental health services.<sup>17</sup> Additionally, higher competition in urban care markets may be related to higher quality<sup>16</sup> and have an effect on quality of care. One Japanese study have reported that the supply of long-term care facilities has exceed the demand in urban areas, however rural areas suffer from a lack of long-term care facilities.<sup>144</sup> Future study is need to clarify the reason of association between care-need level deterioration and rurality.

### **Satisfaction survey in LTCHFs**

Consumer satisfaction represents a valuable subjective measure of quality of care<sup>12, 45</sup> and it is one of the core outcome measures in health care.<sup>145</sup> DiPalo has stated that “the impact of health care cannot be fully understood without considering the satisfaction of patient”.<sup>145</sup> Study 4 was conducted to develop resident satisfaction survey for LTCHFs. As a result, 18 items converted to 7 domains were showed adequate reliability and validity.

In the USA, the state of Ohio has conducted resident satisfaction survey every two years since 2002 and all the results were disclosed on a government website.<sup>146</sup> The results have helped consumers select long-term care facilities that best meet their needs and preferences. Survey results are also made available to facility operators to help them identify areas for continuous quality improvement.<sup>147</sup> Likewise in Japan, by conducting satisfaction survey using validated and unified one, providers can compare themselves with other facilities and check for problematic aspects of their services. However there are several barriers in practical application. First, the survey developed for this study was not perfect to cover most of important domains of satisfaction survey. Thus this study recommended further refinement and test is needed. Second, most residents suffer from dementia. The participants in study 4 only covered 10% of total residents. Thus, an available quality measure for dementia resident such as observational research is recommended. Third, this study focused on LTCHFs which only accommodate residents who are in care-need level of 1 to 5. Other types of long-term care facility, such as private residential homes, might have better response rates because there are no limitations on entering private residential homes for the elderly who are older than 65.

## 4.2 Conclusion

This thesis concludes that quality of care should be measured from both, a clinical outcome and a consumer's perspective to improve quality of care comprehensively. Distribution of care-need level deterioration among all facilities varied widely (0 to 58.3%). This distribution could be a useful tool to find out possibly problematic facilities. However, the limitations regarding the assessment of care-need level certificates and the ceiling effect and floor effect should be considered. Multi-level of both resident and facility effect were found in this thesis and those associated risk factors could be a documentation of quality improve program. Additionally, most of facility characteristics used in this thesis were structural characteristics; further studies should consider process characteristics broadly. Satisfaction survey was developed with psychometric test. This survey could be a useful tool to provide information for consumers to select their preference facility. However, satisfaction survey of this thesis remains to be modified for future national level use. Despite of these limitation, this thesis is the first to measure quality of care in long-term care facilities in national level, and first to develop resident satisfaction survey with psychometric properties in Japan.

### **4.3 Author contributions**

This dissertation is based on four collaborative researches, and the author played a key role all of them and made the most substantial contribution in overall findings contained in this dissertation. Only the author conducted data management, all statistical analysis and writing.

Detail contributions to the studies in this thesis are as follows:

Conceptualization: The broad concept of the studies were discussed with Nanako Tamiya, Boyoung Jeon, Okochi Jiro and Yoko Moriyama, but the detailed hypotheses for each study were formulated by the author.

Data curation: Application of secondary data from Ministry of Health, Labour and Welfare which was used in study 1, 2, 3 were contributed by Nanako Tamiya, Akira Kawamura, Hideto Takahashi, and Haruko Noguchi. Data collection of study 4 was carried out by the author. For all studies, the management of data for initial use and statistical analysis was conducted by the author.

Formal Analysis: All the statistical analysis were conducted by the author.

Method: The method of study 1 was discussed with supervisor Tamiya Nanako and the author conducted the detailed creation of models for study 1,2,3,4.

Software: The author handled almost all of the statistical programming.



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## Appendix

### Appendix 1. Resident satisfaction survey in long-term care health facilities

## 老人保健施設における利用者満足度調査

### アンケートご協力をお願い

ご利用者様のご健勝のこととお慶び申し上げます。

このアンケート調査は、ご利用様の評価やご要望を聞かせていただき、今後の施設のサービス向上に活かしていくため、満足度アンケート調査を実施するものです。

日本では、今まで施設自由的で行われていますが、内容もそれぞれで体系化してないのが現状です。本調査は、利用者満足度の内容を全国的に統一することと調査票の効率利用を目指しています。

調査対象は認知症の重い（長谷川点数20点以下）を除いた介護保健施設の利用者です。調査への参加は利用者の方の自由意思です。また、回答中に答えたくないものには答えないことや、途中でやめることも可能です。参加頂かないことや、調査後に参加を取り下げる場合でも、施設入所生活において不利な扱いを受けたり、不利益を被ったりすることはございません。

アンケート調査の集計に際しては、プライバシーの保護に配慮して匿名化をし、分析においては調査票から個人が特定されることはできないようにします。

データは筑波大学ヘルスサービスリサーチ研究室に保管し、研究期間は倫理委員会承認後～平成30年3月末までです。研究期間終了後、取得された情報は適切な手段で廃棄します。

頂戴いたしました貴重なご意見・ご要望を参考とさせていただき、一層ご満足いただけますよう、サービスの向上に努めてまいりたいと考えております。

アンケート調査への協力に際して、ご意見ご質問などございましたら、気軽に実施責任者（田宮菜奈子）または実施分担者（金雪瑩）にお尋ねください。

本調査に関する説明事項を理解し、調査・研究をご理解いただき、アンケートにご協力くださいますようお願いいたします。

なお、アンケートの答えをもって、ご理解ご同意いただいたものとみなさせていただきます。

末筆ながら、皆さまのますますのご健勝とご多幸をお祈り申し上げます。

#### 【問い合わせ先】

筑波大学 ヘルスサービスリサーチ研究室

責任者：田宮菜奈子 教授

実施分担者：金雪瑩

電話：029-853-8849

**【ご記入にあってのお願い】**

**1. 記入の方法**

ご記入いただく筆記用具は、鉛筆またはボールペンなど、どのようなものでもかまいません。

**2. 回答は、特に説明のない限り、当てはまる選択肢の番号を○にチェックしてください。また、数字や文字を記入する設問については、具体的に数字や文字をご記入ください**

正しい例：☒

申し間違いがあったとき：（上に二重線を引いてください）

**3. 回収について**

ご記入が終わりました方は、2枚目から担当の方まで提出してください。

**性別：** ☐ 男性 ☐ 女性

**年齢：** \_\_\_\_\_ 歳

**要介護度：** ☐ 要介護度 1  
☐ 要介護度 2  
☐ 要介護度 3  
☐ 要介護度 4  
☐ 要介護度 5

**利用期間：** ☐ 1ヶ月未満  
☐ 1ヶ月～6ヶ月未満  
☐ 6ヶ月以上

**利用室：** ☐ 個室 ☐ 多床室

### 提供している活動(レクリエーション)について

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
1. 施設で提供している活動内容について知ることができますか？ (例えば: 娯楽、運動クラス、工芸、ピクニックなど)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. 自分がやりたい活動を十分にできますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. 施設があなたに提供している活動や余暇の内容については満足 していますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 施設の職員との関係について

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
4. 施設の職員は親切ですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. 施設の職員の言葉使いや礼儀は正しく接していますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. あなたは施設の職員を信頼できますか？ (例: 職員は話した通りに行動しますか？)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### コミュニケーションについて

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
7. 困ったことがあったら、職員に気楽に話せますか？ (例えば、あなたのケアをしている人)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. 困ったことに対して話したい時、職員は聞いてくれますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. 困ったことについて、すぐ対応してくれますか？ (例えば、施設はあなたの問題を扱っていますか？)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 選択について

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
10. 自分の好きな服を選べますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. 施設内自由に行ったり来たりできますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. 施設外に行きたい時に、対応してくれますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### リハビリについて

はい      はい      いいえ      いいえ      分から

	いつも	時々	いつも	時々	ない
13. リハビリテーションの時間は十分ですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. 受けているリハビリの効果的ですか？ (例: 身体状況が良くなった、或は家に帰るようになった)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### 食事について

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
15. 食事の量は十分ですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. 好きな食べ物を食べることはできますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. 食事はおいしいですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. 食事時間は楽しいですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### スタッフの対応について

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
19. 平日の日中に、あなたが必要な時に施設の職員は対応してくれますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. それ以外の時間帯(夜間あるいは休祝日)に、あなたが必要な時に施設の職員は対応してくれますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. 緊急時(熱が出た時・転んだ時など)の職員は必要な対応をしてくれますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### 入浴について

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
22. 入浴の回数は適切ですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. 入浴の介助方法は適切ですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. 入浴時にプライバシーに配慮されていますか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### 施設的环境について

	はい いつも	はい 時々	いいえ いつも	いいえ 時々	分から ない
25. 施設の外の歩道や地面は安全ですか？	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. 施設は清潔感がありますか？ (例えば施設、部屋、トイレ)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 27. 施設内では安心感がありますか？   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 28. 静かであるべきところは静かですか？ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

#### 居室の環境について

- |                                 | はい<br>いつも             | はい<br>時々              | いいえ<br>いつも            | いいえ<br>時々             | 分から<br>ない             |
|---------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 29. あなたの個人的なものは部屋に置いて安全だと思いますか？ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 30. ここは訪問者にとって快適な場所だと思いますか？     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 31. あなたは自分の部屋に対して満足していますか？      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

#### 総合評価

- |                          | はい<br>いつも             | はい<br>時々              | いいえ<br>いつも            | いいえ<br>時々             | 分から<br>ない             |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 32. 総合的に、この施設が好きですか？     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 33. 今いる施設を友達や家族に薦めたいですか？ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

以上でアンケート調査すべて修了です。  
お忙しいところ、調査にご協力いただきましてありがとうございました。