

5. Dr. Itsuro Yoshimi, National Institute of Public Health, Chief, Center for Information Research and Library, Ministry of Health, Labor and Welfare
6. Dr. Go Tanaka, Public Health and Medical Treatment Division, Department of Health and Welfare, Gifu Prefecture Government
7. Dr. Yoshiharu Fukuda, Chief, Section of Epidemiology and Informatics, Department of Epidemiology, National Institute of Public Health
8. Dr. K Kawahara, Tokyo Medical and Dental University

Dr. Kenji Hayashi delivered the opening address for the workshop and Dr. Tomotaka Sobue served as the chair. The purpose of the workshop was to discuss comprehensive cancer control activities in the United States and Japan. The workshop focused on the roles of the national and local governments and other key stakeholders with an overall objective of encouraging partnerships for successful comprehensive cancer control efforts.

Highlights of the key presentations included the following:

1. Dr. Hirohisa Imai provided an overview of Japan's cancer control status. He presented the history of the Cancer Control Act and emphasized the need for uniform quality of cancer care and a reduction in medical care discrepancies. Dr. Imai reported that medical care discrepancies occur among those who do not have equal access to quality cancer care and information and this variation is evident among the different prefectures. Dr. Imai noted that by early 2009 each prefecture must have a comprehensive cancer control plan as required by the Cancer Control Act.
2. Dr. Itsuro Yoshimi provided an overview of the national cancer control policy in Japan. He outlined a framework for cancer control in Japan that included achievement of better welfare for all Japanese men and women afflicted with cancer through prevention, early detection and treatment. The major components of the national cancer control policy include: 1) promotion of chemotherapy and radiation; 2) palliative care in the early stages of cancer; 3) designation of cancer hospitals; 4) standardization of cancer registration; 5) provision of cancer counseling and information in and out of hospital setting; 6) nationwide reduction in tobacco use; 7) increasing cancer screening rates; and, 8) promotion of cancer research. The overall message of Dr. Yoshimi's presentation was that cancer patients should enjoy a better life.
3. Dr. Go Tanaka provided an overview of activities related to cancer control in Gifu Prefecture. Dr. Tanaka reported that major barriers to reducing the cancer burden in Gifu Prefecture centered on access to care and funding. However, he stated that progress has been made in Gifu Prefecture towards comprehensive cancer control. An advisory council consisting of researchers, academics, medical personnel, pharmacists, nurses, cancer patients, representatives from home health and hospice care, and representatives from the Japan Cancer Association has been established and will begin meeting in July of 2008. The advisory council will be responsible for overseeing the implementation of Gifu's comprehensive cancer control plan. Dr. Tanaka reported that one of the major cancer control initiatives in Gifu is to eliminate tobacco use among minors. This will be done using a variety of media such as

4. Dr. Yoshihura Fukuda presented information on different websites that could be used by the Prefectures for developing and implementing their comprehensive cancer control plans and meeting the objectives of the Cancer Control Act. In particular, Dr. Fukuda displayed the homepage for the CDC/NCI's Cancer Control P.L.A.N.E.T. that can be used by the Prefectures as they develop and implement their comprehensive cancer control plans. Dr. Fukuda noted that the goal of comprehensive cancer control was developing and sustaining partnerships. He presented a schematic that identified the following partnerships: National Institute for Public Health; the Japanese Medical Association; the Institute of Nutrition; Public Health Centers; Medical Schools; the National Cancer Center; and the Japanese National Cancer Control. He emphasized that by working in partnership these organizations can advance the goals and objectives of comprehensive cancer control and ultimately reduce the cancer burden in Japan.

5. Dr. Friedman presented an overview of the U.S. National Comprehensive Cancer Control Program (NCCCP) that focused on the importance of assessing the performance of the 65 funded CCC programs in the areas of planning and implementation. With 63 NCCCP programs in various stages of implementation it was important to evaluate the impact of the CCC programs towards reducing the cancer burden. Dr. Friedman emphasized the need to address the cancer care continuum from prevention, early detection, and treatment to survivorship. Dr. Lisa Richardson presented information on goals and objectives and how to use these for evaluation purposes. She talked about the need to craft S.M.A.R.T objectives: specific, measurable, attainable, results-oriented and time bound. She illustrated this point by showing an example of using S.M.A.R.T objectives by the Utah Comprehensive Cancer Control program.

Finally, a panel discussion, led by Dr. Sobue, was held to answer questions from the workshop attendees. Dr. Friedman noted there were more similarities between the U.S. NCCCP program and Japan's comprehensive cancer control efforts than differences, while Dr. Richardson noted the U.S. NCCCP is a "bottom" up effort compared to Japan which is "top" down.

January 21
Center

**Local Cancer Plan of Osaka Prefecture: Osaka Medical
Center
For Cancer and Cardiovascular Disease (OMCC), Osaka**



Featured speakers:

1. Dr. Masahiro Tanaka, Department of Cancer Control and Statistics, OMCC
2. Dr. Yuri Ito, Osaka Cancer Registry, Department of Cancer Control and Statistics, OMCC
3. Dr. Tomio Nakayama, Chief, Division of Epidemiology, Department of Cancer Control and Statistics, OMCC

During the morning session, Dr. Hideaki Tsukuma, Director, Department of Cancer Control and Statistics, presented an overview of the Osaka Medical Center for Cancer and Cardiovascular Disease. Dr. Ito presented on time trends of cancer incidence and mortality in Osaka. Dr. Ito's original research examined the contribution from prevention, early detection and treatment towards decreasing cancer deaths. She concluded that prevention contributes to a decrease in cancer incidence, while early detection and treatment contribute towards an increase in survival; with the effect of early detection on increasing survival being 60% and the effect of improved treatment on survival being around 40%.

The afternoon workshop began with the presentation by Drs. Friedman and Richardson on the U.S. National Comprehensive Cancer Control Program. Dr. Masahiro Tanaka presented on cancer control efforts in Osaka. Dr. Tanaka noted that Osaka Prefecture has the highest cancer mortality among the Prefectures,

although the trend is expected to decrease by 10% by 2015 primarily from the decreases in stomach and liver cancer deaths. Dr. Tanaka went on to discuss the plan for further reducing cancer deaths in Osaka by 2015 by: 1) halving the current smoking rate to 20% for men and 5% for women; 2) promoting screening for HCV carrier states; 3) promoting early detection through the establishment and standardization of quality assurance systems for organized screening and a screening service system ; and 4) standardizing and centralizing cancer treatment through clarification and assessment of the roles of HCFs based on resource, designating more cancer hospitals and establishing a referral network, and assessing the need for more specialists and establishing a training program if needed. Dr. Tomio Nakayama focused on current cancer screening activities in Japan and future plans. He discussed the need for a standardized quality assurance (QA) program to evaluate screening programs.

As an example of the need for a QA program, he noted the variation in the quality of cervical cancer screening. Dr. Nakayama noted the low screening rates for Osaka Prefecture compared to the national average.

	stomach	cervical	lung	breast	colorectal
National average	12.4	18.9	22.3	17.6	18.1
Osaka Prefecture	6.8	17.7	8.2	12.5	12.1

Dr. Nakayama outlined the objectives for improving cancer screening in Osaka Prefecture, which include:

1. Conduct cancer screening that is evidence-based.
2. Monitor the quality index for cancer screening.
3. Institutionalize a standard method for the workup examination for a cancer patient and to increase the rate of use of such a workup.
4. Establish a quality assurance system for cancer screening.
5. Increase the participation rate for cancer screening.

January 22

Meeting with Osaka Prefecture Government Officials



Key presenters included:

1. Dr. Akihiro Matsushita, Director, Wellness Promotion and Infectious Disease Control Division, Osaka Prefecture Government (OPG)
2. Dr. Masaya Tadokoro, Senior Staff, Wellness Promotion and Infectious Disease Control Division, OPG
3. Dr. Yoshihiro Takayama, Senior Executive Director-Medicine, Department of Public Health and Welfare, OPG

The meeting started with a history of cancer control in Osaka beginning in 1959 with the establishment of the Osaka Center for Adult Disease (chronic diseases). In 1984 the Osaka Lung and Breast Cancer Screening Center for Cancer Prevention was established followed by the establishment of the Colorectal Cancer Council for Screening Health in 1992. In 1997, the Osaka Ten-Year Plan to overcome chronic diseases was drafted. In 2001, Healthy Osaka 21 was developed and released, which is based on the Healthy People 2010. In 2004 a comprehensive cancer control strategy was developed and in 2005-2006, midterm evaluations were conducted of Healthy Osaka 21. In 2007, efforts were underway to promote the comprehensive cancer control plan and revise the medical and health promotion plans as well.

The Osaka Prefecture government officials presented their plan for comprehensive cancer control, which included the following priority areas:

1. Promote Cancer Prevention
 - a. Establish a healthy lifestyle
 - b. Tobacco control
 - c. Improve diet
2. Promote Cancer Screening

- a. Improve the medical community and public's perceptions of cancer screening
 - b. Promote effective and evidence-based cancer screening
 - c. Introduce and maintain high-quality screening
3. Improve Cancer Therapy
- a. Designate cancer care hospitals
 - b. Analyze, evaluate and disseminate cancer care information to medical providers and the public
 - c. Improve quality of cancer care overall

January 22 Takeda Hospital Medical Examination Center, Kyoto

Drs. Friedman, Richardson and Fukuda visited the Takeda Hospital Medical Examination Center (THMEC) to see an example of cancer screening offered and conducted by the private sector. The THMEC offers cancer screenings for lung, stomach, colorectal, breast and cervical cancers in addition to several other health screenings. Approximately half the fee for these screenings is covered by insurance and the remainder is paid for by the patient. The THMEC typically sees about 40 to 50 patients a day. The meeting concluded with a tour of the clinic facilities.

January 25 Showa Health Center, Kasukabe City, Saitama

Drs. Friedman, Richardson and Imai traveled to Kasukabe City to visit the Showa Health Center, which is a public clinic. The day the site visit occurred the clinic was conducting breast cancer screening exams. Women received a clinical breast exam from one of the two staff physicians and then were asked if they wanted a mammogram. The clinic has two mammography machines and does one-view mammograms for those women who elect to have one. From 2006 to 2007, the clinic saw a total of 68,184 women and screened 5,419 (7.9%) for breast cancer. Of those screened, 2,779 women received a mammogram and two breast cancers were discovered. The clinic charges a \$3.00 to \$5.00 co-pay for its services and approximately 30-50 clients are seen a day. The meeting concluded with a tour of the clinic facilities.

Conclusions:

1. Cancer is now the leading cause of death for men and women in Japan.
2. Among Japanese men, deaths from lung, colorectal, prostate and pancreas cancers are increasing.
3. Among Japanese women, deaths from breast, ovarian, colorectal and lung cancers are increasing.
4. The cancer burden in Japan is expected to increase from slightly more than 500,000 new cancer cases diagnosed in 2000 to almost 700,000 new cancer cases diagnosed by 2020, with cancer deaths projected to follow a similar pattern.
5. To respond to the increasing cancer burden and from public pressure, the Cancer Control Act was approved in 2006 and implemented in 2007.
6. The Cancer Control Act requires that all 47 Prefectures develop and implement a comprehensive cancer control plan that addresses three major areas: 1) promotion of cancer prevention; 2) promotion of cancer research; and 3) improvement of cancer therapy and the establishment of a social system.

7. Overall screening rates for several of the major cancers remain low.

Recommendations for Further Collaboration:

1. Collaborate with researchers from the National Institute of Public Health (NIPH) on several papers comparing and contrasting the U.S. National Comprehensive Cancer Control Program and the Japanese comprehensive cancer control efforts.
2. Provide technical assistance in developing an evaluation plan for assessing the impact of the Prefecture CCC goals and objectives.
3. Provide technical assistance regarding how to increase cancer screening by sharing information on successful outreach efforts and media campaigns.
4. Provide technical assistance to NIPH on ways the Prefectures can leverage scarce funds for implementation of comprehensive cancer control activities.
5. Provide technical assistance to NIPH regarding how to engage and collaborate with the business sector regarding comprehensive cancer control activities.

Acknowledgement

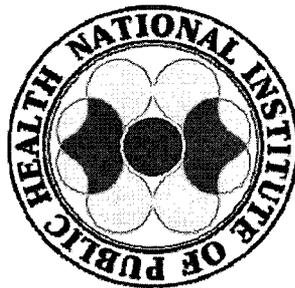
I would like to express my thanks to Drs. Hirohisa Imai and Yoshiharu Fukuda for their great humor, frank discussions and attention to detail in planning and executing my visit. I would also like to thank Ms. Yu Shibui, Ms. Hiroko Nozaki, Ms. Asami Koso and Ms. Emiko Kamiyama for their assistance in escorting me to various meetings, translating and introducing me to various aspects of Japanese culture. Finally, I would like to thank the National Institute of Public Health for sponsoring my visit.

Programme

**Comprehensive Cancer Control Research
in Japan**

Collaboration Research Project of NIPH and CDC

13 January-26 January 2008, Japan



**Department of Epidemiology
National Institute of Public Health (NIPH)**

13 January 2008, Sunday

14:25 Arrival at Narita (DL 055)

14 January 2008, Monday [National Holiday]

12:00-13:30 Welcome lunch

15 January 2008, Tuesday

at Meeting Room #5 (8th F), NIPH

9:00 Departure from Hotel Metropolitan

10:00-12:00 **Opening meeting**

- *Introduction of the Comprehensive Cancer Control Research* :Dr. Hirohisa Imai, Director of department of epidemiology, NIPH
 - *Introduction of National Institute of Public Health*
 - *Introduction of program*
 - *Introduction of participants*

13:30-16:00 **Meeting 1: Introduction**

- *History and overview of the CDC National Comprehensive Cancer Control Program (NCCCP): Drs. Friedman C and Dr. Richardson L*
- *Overview of public health in Japan: Dr. Yuichiro Yahata (Department of Epidemiology, NIPH)*

16 January 2008, Wednesday

at National Cancer Center

9:00 Departure from Hotel Metropolitan

10:00-13:00 **Meeting 2: Overview of National Cancer Control**

- *Overview and Funding Issues of NCCCP. Drs. Friedman and Richardson*
- *Cancer Control Strategy and Perspectives: Experience in Japan. Dr. Tomotaka Sobue, Department Head, the Cancer Control and Information Services, NCC*
- *Cancer Screening in USA and Japan*

14:00-15:00 **Media Interview by Nikkei Medical**

15:00-16:00 **Meeting 3: Cancer Information**

- *"Cancer Control P.L.A.N.E.T".*
- *How to use cancer information for policy making.*

17 January 2008, Thursday

at Meeting Room #5 (8th F), NIPH

9:00 Departure from Hotel Metropolitan

10:30-12:00 **Meeting 4: Promoting local cancer control (1)**

- *Roles and responsibility of national government*
- *Partnerships for promoting local cancer control*

13:30-13:30 **Greetings**

Public Health Dr. Kenji Hayashi. Vice president, the National Institute of

13:30-15:00 **Meeting 5: Promoting local cancer control (2)**

- *Capacity Buildings of Practitioners for Cancer Control*

15:00-16:00 **Preparation of International Workshop**

18 January 2008, Friday

10:00-16:00 **International Workshop**

18:00-20:00 Reception

20 January 2008, Sunday

Move to Osaka

21 January 2008, Monday

at Osaka Medical Centre for Cancer and Cardiovascular Disease

9:00 Departure from Hotel

10:00-12:00 **Technical Visit 1: Osaka Medical Centre for Cancer and Cardiovascular Disease**

13:00-17:00 **Workshop: Local cancer plan of Osaka prefecture**

22 January 2008, Tuesday

at Osaka Prefectural Government

9:00 Departure from Hotel

10:00-12:00 **Technical Visit 2: Osaka Prefectural Government**

Move to Kyoto

14:00-16:00 **Technical Visit 3: Cancer Prevention in Private Sectors**
Takeda Health Checkup Center, Kyoto

23 January 2008, Wednesday

Move to Tokyo

24 January 2008, Thursday

at Room #2 (5th F), NIPH

9:00 Departure from Hotel Metropolitan

10:00-12:00 Preparation of the final reports

25 January 2008, Friday

10:30 Departure from Hotel Metropolitan

12:30-15:00 **Technical Visit 4: Cancer Screening in Communities**
Showa Health Center, Kasukabe City, Saitama

26 January 2008, Saturday

11:00-13:00 **Closing meeting for future collaboration and Farewell
Brunch**

13:00 Departure from Hotel Metropolitan

16:30 Departure from Narita *Airport, DL056*

V. 研究成果の刊行物・別刷



Health-related quality of life and beneficiaries of long-term care insurance in Japan

Hirohisa Imai^{a,*}, Yoshinori Fujii^b, Yoshiharu Fukuda^a,
Hiroyuki Nakao^a, Yuichiro Yahata^a

^a Department of Epidemiology, National Institute of Public Health, 2-3-6 Minami,
Wako, Saitama 351-0197, Japan

^b Faculty of Education and Culture, University of Miyazaki, Japan

Abstract

Objectives: A long-term care insurance (LTCI) system was introduced in 2000 in Japan. The clarification of information on the users and the ways in which services under this system have been utilized is essential for improving the system operation. This study was conducted for the purpose of clarifying what level of health-related quality of life (HRQOL) was achieved by individuals using the services under the LTCI system.

Methods: The subjects were inhabitants of two cities in the Kyushu district of Japan who were receiving daily home care services under the LTCI system. To analyze the relationships of the beneficiaries' HRQOL with their characteristics, the dependent variable was the EuroQol-5D (EQ-5D) scores adopted as an index of HRQOL, and the independent variables comprised the demographic features (gender, age, and living condition) of users receiving long-term care service as well as their opinions about fees for services, satisfaction with the services provided, and the degree of support/care required.

Results: The EQ-5D score was higher for females than for males and higher for the subjects living alone than for those displaying any other family composition. EQ-5D score decreased with an increase in the degree of support/care required. Multivariate analysis revealed that the degree of support/care required, gender and living condition were found to serve as variables that significantly contribute to utility.

Conclusions: Our analysis of the relationships between the characteristics of the LTCI beneficiaries and their HRQOL has yielded basic data that will be useful for improving the recently introduced LTCI system.

© 2007 Elsevier Ireland Ltd. All rights reserved.

Keywords: Long-term care; Quality of life; Aged; Insurance

1. Introduction

Japan implemented a new social insurance scheme for the frail and the elderly, namely, the long-term care insurance (LTCI) system, on 1 April 2000 [1]. Japan has the most rapidly aging population in the

* Corresponding author. Tel.: +81 48 458 6167;
fax: +81 48 469 2677.
E-mail address: imaihiro@niph.go.jp (H. Imai).

world and will soon have the highest percentages of the elderly and the very old in its population [2,3]. Also, with the demographic trends toward fewer children and an aging population, attitudes toward supporting elderly parents and aged relatives are changing markedly; thus, the traditional system of informal caregiving by family members is said to be in crisis [4]. Under these circumstances, a new public LTCI system was introduced. The new insurance system is aimed at the “socialization” of care through mandatory social insurance [2]. Everyone aged 40 and older pays premiums, and everyone aged 65 and older is basically eligible for benefits based strictly on physical and mental disabilities. After application of care requirements, a care manager assigned to a particular case conducts an assessment of the client’s physical disability during a home visit using an approximately 82-item questionnaire developed by the Ministry of Health, Labour and Welfare. The assessment forms are processed using a computer program that classifies applicants according to the degrees of support/care required. The municipal certification committee renders a final judgment of the degree based on the computer-generated classification and the opinion of the client’s primary care physician. Eligibility status is classified into one of the following six levels after an assessment of the physical and cognitive functions of the individuals: Support Level, which is for individuals who are generally capable of conducting basic daily activities, but require some assistance; and five Care Levels, which are Care Level I (for individuals requiring partial care) to Care Level V (for those whose ability to conduct daily activities is almost impossible without extensive assistance) [5].

The number of benefits an individual receives from LTCI varies with eligibility status, increasing with the amount of support or care required. Benefits under this system are provided in the form of services, with money being paid to service providers directly. In principle, the beneficiaries can receive services under LTCI either at home or in appropriate facilities. Individuals eligible for the Support Level can only receive services at home. In the beginning, the system described in this outline was not a complete program, and various problems in the system have been noted since its implementation. The ability to clearly identify these problems and improve the sys-

tem requires accurate information on users of LTCI, what they think about the system, and the condition of their health. The government officials in charge of the system have stated their intention to closely monitor the implementation of this new system and conduct reviews every 3–5 years [6,7]. To date, few numerical analyses of service utilization under this insurance system have been performed. The clarification of basic information on users of this system and ways in which services under this system have been utilized is necessary.

Various attempts have been made to perform quantitative analyses of health-related quality of life (HRQOL), with the goal of evaluating the quality of health-related services provided [8–10]. Of the scales used for HRQOL assessment, those allowing calculations of the health utility (degree of contribution to health) of various factors are called “preference-based measures”. EuroQol-5D (EQ-5D) is one such tool [11]. With this, all possible health states are arranged in a five-dimensional grid, and each dimension is rated by respondents on a three-level scale from 1 (no problem) to 3 (unable or extreme problem). The health status of an individual is assessed using this five-dimensional method and expressed numerically by “utility,” which is the value of a particular health state, usually expressed on a scale from 1, perfect health, to 0, a state equivalent to death [12,13]. The utility is useful not only for the calculation of quality-adjusted life years (QALY) and other indicators, but also for cost-effectiveness analysis in health service research.

This study was conducted for the purpose of clarifying what level of HRQOL was achieved by individuals using the services under the LTCI system. To analyze the relationships of the beneficiaries’ HRQOL with their characteristics, the dependent variable was the EQ-5D scores adopted as an index of HRQOL, and the independent variables comprised the demographic features (gender, age, and living condition) of users receiving long-term care service as well as their opinions about fees for services, satisfaction with the services provided, and the degree of support/care required. In this manner, we presented the level of the beneficiaries’ HRQOL and the status of the utilization of the care services provided under this recently introduced LTCI system.

2. Methods

2.1. Subjects

This study was performed in Miyazaki City and Nobeoka City, both in Miyazaki Prefecture in the Kyushu district of Japan. Miyazaki City has a population of 305,270, and 16.9% of the population are elderly (≥ 65 years old) [14]. Nobeoka City has a population of 126,305, and 21.3% of the population are elderly [14]. The inhabitants of these two cities who have been receiving daily home care services under LTCI represented the pool from which subjects were drawn for this study. In Miyazaki City, 2000 individuals were selected by stratified randomization (depending on the degree of support or care required) from among 3567 individuals receiving home care services. Well-trained interviewers met with the 2000 subjects in their homes and conducted an original-questionnaire survey in January 2002. In Nobeoka City, all 1962 individuals receiving home care services were enrolled as subjects in this study, and were queried using the same original questionnaire that was used for the Miyazaki City subjects. The questionnaire was mailed to the subjects in August 2002. The subjects themselves filled out the questionnaire. For both surveys, if the subjects were unable to fill out the questionnaire by themselves, their family members filled it out for them. For both surveys, if the target subject was unable to fill out the questionnaire by himself, a close relative of the person was asked to fill out the form. This was not only the case for the survey conducted by mail. Informed consent was obtained in writing from all of the subjects. This study was approved in advance by the Institutional Review Board of Miyazaki Medical College.

2.2. Surveyed items

A questionnaire prepared by the authors was used for this study. The questionnaire included questions regarding basic demographic features, opinions about the fees for services, satisfaction with the services provided, and EQ-5D-related questions. Gender, age and the degree of support required were not asked in the questionnaire. They are from the data provided by the government. Living condition was rated by assigning the subjects to one of four categories (i.e., living alone, elderly couple living alone, living with children, and

others). Opinions about fees for services were rated on a 4-point scale: expensive, reasonable, cheap, and others. The degree of satisfaction with services provided was also rated on a 4-point scale: satisfied, moderately satisfied, unsatisfied, and others.

2.3. Analysis

The EQ-5D score was rendered as a utility value from 1 (perfectly healthy) to 0 (dead) using a conversion table developed for the Japanese population [8]. We analyzed the relationships of the EQ-5D score with the characteristics of beneficiaries. Student's *t*-test and analysis of variance were used to estimate the relationships of EQ-5D score with demographic features, opinions about fees for services, satisfaction with services provided, and the degree of support/care required. Significant differences between categories were evaluated using the Tukey–Kramer post hoc test. Stepwise linear regression analysis was used to develop the most parsimonious model from among all the factors. All statistical analyses were performed using JMP statistical software (ver. 3.25) and SPSS (ver. 10.0.5J, SPSS Japan, Tokyo, Japan).

3. Results

Responses were collected from 2659 subjects, comprising 1644 of the subjects in Miyazaki City (response rate: 82.2%) and 1015 of the subjects in Nobeoka City (response rate: 51.7%). By excluding subjects for whom complete data were unavailable, data for 2411 subjects (710 men, 1701 women) were analyzed. Table 1 shows the percentages of female and male subjects assigned to each category on the basis of answers to the five items: (1) age, (2) living condition, (3) opinions about fees for services, (4) satisfaction with services provided, and (5) the degree of support/care required.

Fig. 1 shows what level of EQ-5D score was achieved by users of the service who were classified according to the various characteristics. The EQ-5D score was significantly higher for females than for males. Among the beneficiaries <90 years old, the EQ-5D score was unaffected by age. The EQ-5D score was higher for subjects living alone than for subjects with other living conditions. The EQ-5D score of the indi-

Table 1
Proportion (%) in characteristics of beneficiaries receiving daily home care services under long-term care insurance

Characteristic	Total (N=2411)	Female (N=1701)	Male (N=710)
Age			
<65	3.3	2.6	4.9
65–69	6.3	4.9	9.6
70–74	13.1	10.9	18.6
75–79	18.7	18.8	18.7
80–84	24.1	24.5	23.4
85–89	20.9	23.1	15.8
90–	13.3	15.0	9.0
NA	0.2	0.2	0.0
Family composition			
Living alone	27.8	32.3	17.0
Elderly couple alone	22.4	14.6	41.1
Living with children	37.4	39.6	32.1
Others	11.7	12.8	9.0
NA	0.7	0.8	0.7
Opinion about fee for services			
Expensive	20.4	19.5	22.7
Reasonable	56.5	56.3	56.9
Cheap	6.1	6.9	4.4
Others	5.7	6.1	4.6
NA	11.2	11.2	11.4
Satisfaction with services			
Satisfied	42.4	43.2	40.6
Moderately satisfied	39.6	40.5	37.5
Unsatisfied	3.1	2.9	3.5
Others	7.7	6.8	9.9
NA	7.2	6.6	8.6
Degree of support/care			
Support	23.8	27.9	14.1
I	33.2	35.0	28.9
II	18.4	16.3	23.4
III	9.6	7.6	14.5
IV	6.3	5.6	8.0
V	5.6	4.8	7.6
NA	3.0	2.8	3.5

NA = not available.

individuals who used the services and who felt that the services were inexpensive was high. The EQ-5D score was significantly lower for unsatisfied subjects than for subjects satisfied or moderately satisfied with the services. The EQ-5D score decreased with an increase in the degree of support/care required, and the decrease in the score was particularly marked as the degree of support/care required increased from Care Level III to Care Level IV. There were significant differences between the degrees of support/care required. The range of this

parameter was wide for the subjects at Care Level IV. Table 2 shows the results of multivariate analysis. The degree of support/care required, gender and living condition were found to serve as variables that significantly contribute to utility.

4. Discussion

Developed countries around the globe currently face many difficulties in implementing and operating health policies related to long-term care, owing to the progressive aging of the population and financial constraints [3,15,16]. When evaluating whether LTCI is functioning well, the need to improve or review the current system should be considered on the basis of data from practical studies (reflecting the real situations of beneficiaries), instead of attaching primary importance to opinions of experts or data from the analysis of abstract models [17]. In this study, we analyzed the relationships of utility using EQ-5D with the characteristics and other variables of individuals utilizing care services at home under the LTCI system. This enabled researchers to collect basic data that will prove useful for finding ways to improve the operation of the LTCI system that has recently been introduced in Japan.

When the scores of males and females were compared utilizing rough EQ-5D values, the scores of females were higher than those of the males; when the EQ-5D scores were adjusted for the degree of support/care required and living condition, the scores of the males were higher than those of the females. This is because males show higher HRQOL scores even with the same degree of support/care required. In the multivariate analysis adjusted for gender and the degree of support/care, the EQ-5D score was higher for the subjects living alone than for those living with a spouse. This may be interpreted as indicating that individuals too sick to live alone have already been accommodated in care facilities and that individuals who live alone and receive care services at home are often in relatively good health, resulting in a higher utility for subjects living alone.

HRQOL refers to the overall health-related quality of life, which is indicated as a utility value (a score of EQ-5D) in this study. Meanwhile, the degree of support/care required is a classification determined upon evaluation of 82 items focusing on the degree of lim-

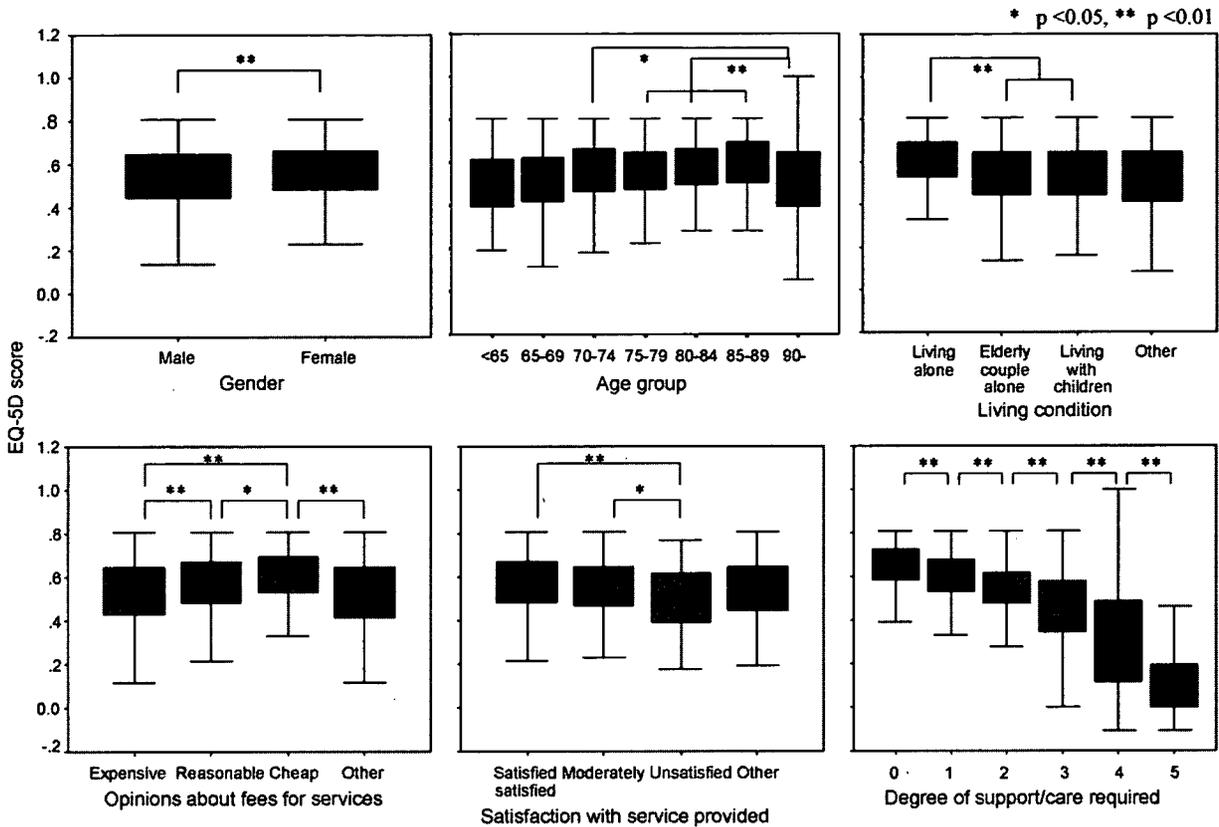


Fig. 1. Box and whisker plots of EQ-5D score achieved by users of the service who were classified according to the various characteristics: (1) gender, (2) age group, (3) living condition, (4) opinion about fees for services, (5) satisfaction with service provided, and (6) degree of support/care required. Median EQ-5D scores are indicated by horizontal bars. The vertical bars indicate the range, and the horizontal boundaries of the boxes represent the first and third quartiles.

itation of daily physical exertion. Thus, basically, the concepts of HRQOL and the degree of support/care required are different although both have overlapping contents. For example, EQ-5D includes psychological items such as “I’m anxious or depressed”; however, the degree of support/care required does not include items that measure psychological conditions. The degree of support/care required was found to be the factor exerting the greatest influence on EQ-5D score. As the degree of support/care required increased, the utility indicated by the score decreased. This decrease was not linear, but followed a sharp downward curve as the degree of support/care required increased from Care Level III to Care Level V. The range of the scores was considerably wider for subjects in Care Levels III and IV than for those in the other care levels. In a study of individuals requiring support or care con-

ducted by Honma and Katoh [18] using functional independence measure (FIM), which is one of the methods for the objective evaluation of activities of daily living (ADL), the FIM score was found to decrease sharply as the degree of support/care required increased from Care Level III to Care Level V. If such findings concerning decreases in ADL as evaluated using FIM are combined with the present results, which revealed a decrease in utility as determined by self-evaluation, utility or ADL begins to decrease markedly as the degree of support/care required increases beyond Care Level III. This finding suggests that the current criteria for classifying the degree of support/care required are not appropriate. Considering that the range of EQ-5D scores was relatively wide at Care Levels \geq III, the degrees of care above Care Level III may be broken down into more detailed classifica-

Table 2

Results of multivariate analysis for health utility of beneficiaries receiving daily home care services under long-term care insurance (coefficient of determination, $R^2 = 0.43$)

	Coefficient	95% CI	<i>p</i> -Value
Intercept	0.675	0.667, 0.684	
Gender			0.012
Male	0		
Female	-0.023	-0.031, -0.016	
Degree of support/care			<0.01
Support	0		
I	-0.061	-0.074, -0.049	
II	-0.123	-0.138, -0.108	
III	-0.222	-0.241, -0.203	
IV	-0.365	-0.387, -0.342	
V	-0.521	-0.545, -0.498	
Living condition			0.022
Living alone	0		
Elderly couple alone	-0.019	-0.032, -0.007	
Living with children	0.007	-0.004, 0.017	
Others	-0.014	-0.029, -0.002	

tions. After reviewing the current LTCI system, a more sophisticated classification of the degree of support/care appears warranted, so that the physical and mental statuses of beneficiaries will be reflected more accurately.

According to the figure of age and EQ-5D scores, although there was a significant difference in individuals older than 70 years of age, the differences in EQ-5D scores by age were not very large in general. This may be because the elderly who are in a physically serious condition are already in care facilities (the subjects in this study are beneficiaries at home). In the case of providing long-term care service to the elderly at home, age may not be a significant index; therefore, it may be necessary to use caution in classifying users according to their age when designing a system of long-term care service provision as a health policy. This study found that the HRQOL scores of the users classified into 4 and 5 in terms of the degree of support/care required were significantly low. It is necessary to clarify the degree of the contribution of the service currently provided to the improvement of their HRQOL. The results of this may provide a certain answer to the discussion between two major opinions, which are “the service should be increased due to the insufficiency of the current benefit and payment” and “the service should be reduced because provision does not contribute to the improvement of HRQOL.”

A previous study showed that the perception of fees for services as “expensive” is associated with a low degree of satisfaction with the services provided [19]. In this study, a small percentage of the subjects (3.1%) were unsatisfied with the services provided, and their EQ-5D score was significantly lower than that of the subjects satisfied or moderately satisfied with the services. However, in the multivariate analysis, neither opinions about fees for services nor the degree of satisfaction with the services provided served as significant independent variables. In this study, which was designed as a cross-sectional study, whether subjects who said they were unsatisfied with services were actually unsatisfied with the services or simply answered this because they were in poor health (probably also accompanied by a low health-related quality of life) remains unclear. A more detailed study is needed to answer this question.

This study has several limitations. First, the method of collecting questionnaire responses differed between the two cities. The interviewers visited the care service users in one city to collect questionnaire responses; however, responses from care service users in another city were collected by mail. In spite of this, no significant differences were noted between these two groups of care service users in terms of male-to-female ratio or age distribution. No significant differences in EQ-5D score were observed between the two cities ($p = 0.35$)

when an ANOVA was conducted to adjust for gender, degree of support/care required, and living condition. Although the distribution of the degree of support/care required differed significantly between these two cities ($p < 0.01$), combining the data from these two cities using different methods of data collection does not seem to have significantly affected the analysis. Second, the results do not represent all of the recipients of the long-term care insurance service as this study only targets people receiving the service in their homes but does not include people who are at care facilities. The reason why we limited the target of this study was because its purpose was to clarify the characteristics that impact on the HRQOL of elderly individuals. To do so, it was necessary to separate those who were staying at home and who were staying at care facilities due to the differences in various conditions that might impact on their HRQOL (e.g., status of individual lives and living condition). Other studies are necessary to examine the HRQOL of the elderly staying at care facilities.

In conclusion, our analysis of the relationships between demographic characteristics and EQ-5D score for care service users at home under LTCI revealed that the degree of support/care required, gender and living condition are factors that significantly influence the operation of this insurance system. This study has yielded basic data that will be useful for improving the LTCI system recently introduced in Japan. Practical analyses should be continued to monitor the actual status of services under this system.

References

- [1] Matsuda S. The health and social system for the aged in Japan. *Aging-Clinical and Experimental Research* 2002;14(4):265–70.
- [2] Campbell JC, Ikegami N. Long-term care insurance comes to Japan. *Health Affairs (Millwood)* 2000;19(3):26–39.
- [3] Anderson GF, Hussey PS. Population aging: a comparison among industrialized countries. *Health Affairs (Millwood)* 2000;19(3):191–203.
- [4] Lai OK. Long-term care policy reform in Japan. *Journal of Aging & Society Policy* 2001;13(2–3):5–20.
- [5] Health and Welfare Statistics Association. Long-term care insurance. *Journal of Health and Welfare Statistics* 2000;47(9):238–43.
- [6] Health and Welfare Statistics Association. Long term care insurance. *Journal of Health and Welfare Statistics* 1999;46(9):236–9.
- [7] Sasaki M. Outline of long-term care insurance system in Japan [Article in Japanese]. *Nippon Naika Gakkai Zasshi* 2004;93(12):2579–86.
- [8] Ikeda S, Ikegami N. Preference-based measure (focus on EQ-5D). In: Ikegami N, Fukuhara N, Shimozuma K, Ikeda S, editors. *Handbook of QOL evaluation*. Tokyo: Igaku-Shoin; 2002. p. 45–9.
- [9] Kurimori S, Fukuda Y, Nakamura K, Watanabe M, Takano T. Calculation of prefectural disability-adjusted life expectancy (DALE) using long-term care prevalence and its socioeconomic correlates in Japan. *Health Policy* 2006;76(3):346–58.
- [10] Borowiak E, Kostka T. Predictors of quality of life in older people living at home and in institutions. *Aging-Clinical and Experimental Research* 2004;16(3):212–20.
- [11] Brooks R. EuroQol: the current state of play. *Health Policy* 1996;37(1):53–72.
- [12] Dolan P. Modeling valuations for EuroQol health states. *Medical Care* 1997;35(11):1095–108.
- [13] Tsuchiya A, Ikeda S, Ikegami N, Nishimura S, Sakai I, Fukuda T, et al. Estimating an EQ-5D population value set: the case of Japan. *Health Economics* 2002;11(4):341–53.
- [14] Society for the study of a municipality. *Survey of municipality*. Tokyo: Daiichihouki; 2002.
- [15] Ikegami N, Campbell JC. Japan's health care system: containing costs and attempting reform. *Health Affairs (Millwood)* 2004;23(3):26–36.
- [16] Frist WH. Health care in the 21st century. *New England Journal of Medicine* 2005;352(3):267–72.
- [17] Messinger-Rapport BJ. Evidence-based medicine: is it relevant to long-term care? *Journal of the American Medical Directors Association* 2004;5(5):328–32.
- [18] Honma S, Katoh E. Relationship between FIM and the officially recognized level of support/care required. *Journal of Japanese Association of Rehabilitation Nursing* 2001;13:186–8.
- [19] Miura K. Evaluation of certification of care needs in Japan's long-term care insurance and the determinants of degree of satisfaction with the certification. *Keio Igaku* 2002;79(1):17–26.

Are health inequalities increasing in Japan? The trends of 1955 to 2000

Yoshiharu Fukuda*, Hiroyuki Nakao, Yuichiro Yahata, Hirohisa Imai

Department of Epidemiology, National Institute of Public Health, 2-3-6 Minami, Wako, Saitama, Japan.

SUMMARY This study aimed to elucidate trends in socioeconomic inequalities in health during the past half century in Japan. Association of life expectancy and age-adjusted mortality with per capita income was examined using data on prefectures and municipalities in Japan of 1955 to 2000 via the slope index of inequality (SII) and Poisson regression. Although there were a few differences among health indicators and sex, health inequalities by prefecture, measured by the SII, decreased from 1955 to 1995. However, health inequalities increased from 1995 to 2000 both for life expectancy and mortality. Similar trends were found in municipal analyses: the association between income and mortality, measured by the rate ratio from Poisson regression, decreased until 1995 but increased from 1995 to 2000. In the past half century, and especially until 1995, geographical health inequalities decreased in Japan, while from 1995 to 2000 health inequalities appeared to increase. Recent social conditions including the possible increase in social inequalities may have contributed to this increase. Careful monitoring and elimination of social and health inequalities should be encouraged.

Key Words: Health inequalities, socioeconomic factors, life expectancy, ecological study

Introduction

Elimination of health inequalities has been a great challenge in international and domestic public health policy. A large number of studies have demonstrated health inequalities attributable to socioeconomic conditions, including income, educational attainment, social class, and other factors (1-4). The degree of socioeconomic inequalities in society is closely linked to the health of the population (5,6).

Japan has shown marked improvement in the health of the population in the past half century. Major health indicators such as life expectancy and infant mortality have been ranked as some of the world's highest (7). In addition to economic growth and improved living standards, decreased socioeconomic inequalities and an egalitarian social system are considered to contribute to the health improvement of Japanese (6,8-11).

This egalitarian society, however, may be changing. Researchers in the fields of economics, sociology, and

education are extremely concerned about increasing socioeconomic inequalities in Japan, and especially in the past decade (12-14). Although more discussion is needed, the social conditions underlying the increasing inequalities include economic recession and recent economic, taxation, and social security policies (12-14). Little is known about the influence of the possible increase in socioeconomic inequalities in health, leading to the question of if health inequalities are increasing in Japan.

This study elucidated the trends in health inequalities during the past half century in Japan. To this end, an ecological approach was taken at the prefectural and municipal levels to gather data in order to facilitate further debate on health inequalities.

Methods

Populations studied and observation period

The populations studied were prefectures and municipalities. These are basic administrative divisions in Japan: the prefecture is the higher level and consists of municipalities. There are currently 47 prefectures, an increase from 46 after 1972 with the reversion of

*Correspondence to: Department of Epidemiology, National Institute of Public Health, 2-3-6 Minami, Wako, Saitama 351-0197, Japan; e-mail: fukuday@niph.go.jp

Received May 9, 2007
Accepted May 24, 2007