

to streamline the performance of communication/recording tasks as well as to ease the rush of these tasks thereby improving the quality of nursing services.

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*Keywords:* Long-term care insurance; Communication/recording task; Nursing service setting; In-home nursing care service; Information technology (IT)

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## 1. Introduction

The aging of society is a phenomenon affecting many developed countries today (Itouji, 1996; Adachi, 1998; Hattori et al., 2000; David et al., 2001; Esping-Andersen, 2001; Robert, 2002), and the need to establish nursing care systems that adequately meet the increasing related demands is thus evermore pressing (Adachi, 1998; Hilary, 2001).

In April 2000, Japan introduced a social insurance system for elderly care based on the principle of Socialization of Elderly Care (Masuda et al., 2001; Matsuda, 2002), whereby the burden of the care for the elderly is shared by society as well as the family (Hattori et al., 2000; Hilary, 2001). Prior to the introduction of the system, some had predicted a shortage in nursing service provision (Ueda et al., 1994; Hashimoto, 1996; Itouji, 1996). A quantitative increase in nursing service demand was reported after the adoption of the system (Miyatake, 2001), and the shortage of services seems to have intensified.

Moreover, under this insurance system, the professional carers are faced with the additional task of administrating the service provision. In order to provide a greater range of services, more precise planning is needed, and care plans must be carefully implemented and evaluated. Additional exchanges of information or communication/recording tasks among the professional carer are also required. Such tasks include face-to-face conversations, record entries, telephone calls, facsimiles, voicemail, and others. With the increasing demand for nursing services covered by the insurance, the associated communication/recording tasks may lower the quality of nursing services.

With the rapid advance of information technology (IT) in recent years, the trend can be found in medical sectors as in many other industries toward improving operational efficiency of services with the help of IT driven management systems (Laerum et al., 2001; Stamouli and Mantas, 2001). These systems allow for efficient processing of electronic medical charts, order entry, administration of materials and laboratory results, etc. In nursing settings also, carers can resort to IT systems to reduce their communication/recording workload, thereby spending more time and energy providing nursing services.

The purpose of this research is to clarify the possible changes induced by the introduction of Japan's new insurance system in terms of number of communication/recording tasks, related nursing services in use, and when and where these tasks occurred. Furthermore, during the periods of time when significant increases in the number of communication/recording tasks were observed, the detailed content of communication/recording was examined to explore the possibility of introducing IT systems to improve the efficiency of the nursing service settings.

## 2. Methods

### 2.1. Subject and sessions of research

The subject of this research is a medical institution located in the Mikawa region of Aichi Prefecture, Japan. The institution consists of a clinic with a rehabilitation facility (Clinic), a geriatric intermediate care facility (GICF) (providing a certain amount of medical care), an In-home nursing support center, a helper's station, and a visiting care station, providing nursing services such as visiting medical care, visiting rehabilitation, rehabilitation for outpatients, visiting nutrition guidance, and short-stay services.

The research was conducted in two sessions in February 2000 and August 2000, namely before and after the nationwide introduction of the elderly care insurance system. At each session, all the communication/recording tasks that occurred in relation to nursing service provisions during a continuous 48 h were recorded.

Given the fact that no significant variation in terms of number of users on workdays was shown in a preliminary research, Tuesdays and Wednesdays were selected for both the February and August sessions.

### 2.2. Content of research

A fill-out-type questionnaire was designed and used for the research (see Fig. 1). The items to fill out were: (1) nursing service in use, (2) type of job, (3) date and time, (4) from whom/what, (5) to whom/what, (6) communication tools and (7) content. The entry was performed by the staff carrying out each particular communication task. A preliminary meeting was held for orientation and instruction as well as to identify any problems with the procedure. The management of the forms was conducted by off-duty staff trained in advance. They were stationed at each facility and their duty was to check and collect the forms as appropriate.

#### 2.2.1. Category of nursing services in use

Utilized in-home nursing services in relation to specific communication tasks were categorized as follows: daycare service at clinic, daycare service at GICF, short-stay service at GICF, in-home helper service, visiting nursing, visiting nutrition guidance, visiting rehabilitation, visiting medication, and others.

#### 2.2.2. Job type

The job types of the staff involved in communication tasks were categorized as follows: physician, nurse, pharmacist, radiological technologist, physical therapist (PT), occupational therapist (OT), trainer, professional carer, consultant, secretary, nutritionist, cook, driver, and others.

#### 2.2.3. Date and time

The specific dates and times when communication tasks occurred were recorded.

#### 2.2.4. From whom/what and to whom/what

When a communication event occurred, the names of the persons involved were recorded in the columns 'From' and/or 'To whom'. When information was referenced and/or recorded

Nursing service in use	Daycare at Clinic	Daycare at Center	Short-stay at Center	Helper	Visiting care	Visiting nutrition guidance	Visiting rehabilitation
User's name	Mr./Ms.			Home visit	(	Others	
Entered by:				Medical Doctor	Nurse	Pharmacist	Radiological Technologist
Type of Job	PT	OT	Trainer	Nursing staff	Consultant	Office worker	
	Nutritionist	Cook	Driver	Others			
Date/hour of occurrence	Date: day, dd/mm/yy am./pm.		Hour: hh/mm				
From whom	Family	User	Staff		Others (	)	
From what	Form/Notes/Voicemail/Others						
To whom	Family	User	Staff		Others (	)	
To what	Form/Notes/Voicemail/Others						
Communication tool	Message	Face-to-face conversation	Voice mail	Notes	Wiseman barcode		Wiseman keyboard
	Extension	Outside line	Facsimile	Entry in charts	(		Others
	Instruction (prescription)		Info	Report	Consultation	Record	Confirmation
Brief content							

Fig. 1. Questionnaire on communication tasks.

in some medium such as recording forms, the type of medium was entered in the column 'To what' and/or 'From what'. Entries in the 'From/To whom' column indicate the involvement of some person categorized as family, user, staff or others. Entries in the 'From/To what' column indicate the involvement of some recording medium categorized as forms, notes, voicemail or others. Forms are any recording medium of paper such as medical records. Notes represent Notes<sup>®</sup>, a groupware of Lotus. Groupware is any type of software designed for groups and for communication, combining various software for supporting collaboration among a group of people with functions such as email, document management and schedule management.

#### 2.2.5. Communication tools/media

The communication tools/media used in communication/recording tasks were categorized as follows: message, face-to-face conversation, voicemail, Notes, Wiseman Barcode, Wiseman Keyboard, extension call, outside line call, facsimile, medical record entries, references to other forms, and others.

Wiseman Barcode<sup>®</sup> and Wiseman Keyboard<sup>®</sup> represent the utilization of the nursing information management system of Wiseman<sup>®</sup>, making use of barcodes and keyboards, respectively, for data entry. Wiseman Barcode<sup>®</sup> barcodes date, treatment, person-in-charge of treatment, and vital signs, and then reads them via a reader device. Wiseman Keyboard<sup>®</sup> utilizes a keyboard for data input.

#### 2.2.6. Content

The content of communication/recording was categorized as follows: instruction (prescription), information, report, consultation, record, confirmation and others. Information means an unofficial communication which does not require reporting or recording.

### 2.3. Analysis

The changes between the two sessions of research were analyzed in terms of number of users, number of occurrences of communication/recording tasks, and category of service in use in relation to communication/recording tasks that occurred. To eliminate the influence on the number of communication/recording tasks induced by the change in total number of users, the data of the same users (153) was analyzed in both sessions.

Further, for these 153 users, a detailed analysis was conducted for a period of time where a significant change in the number of occurrences of tasks was found.

Data analysis was performed by Statview 5.0. For testing statically significant differences, the chi-square test was utilized with  $P < 0.05$  as criteria.

## 3. Results

### 3.1. Total number of users and number of occurrences of communication/recording tasks

Table 1 shows the total number of users and the number of occurrences of communication/recording tasks. The total number of users was 400 in February and 442 in the August

Table 1  
Number of occurrences of communication/recording tasks

	February	August	<i>P</i>
Overall			
Total number of users	400	442	
Occurrences of tasks	2811	4235	<0.001
153 subjects			
Total number of users	232	249	
Occurrences of tasks	1883	2244	0.300

Note: A chi square test was conducted between February and August sessions on the total number of users divided by the number of occurrences of the task.

session and the number of occurrences of communication tasks was 2811 and 4235, respectively. The increase in the number of occurrences of communication tasks was statistically greater than the increase in the number of total users ( $P < 0.001$ ).

In the analysis of the 153 users whose data was obtained in both sessions, no statistical difference was found in the total number of utilized services, nor in the increase in the number of occurrences of tasks in comparison with the increase in the number of times at which they utilized these services.

### 3.2. Category of services

Table 2 shows the type of utilized in-home nursing service in relation to a particular communication/recording task. In both sessions, more than 80% of all utilized services belonged to one of the three most popular categories, i.e., daycare at clinic, daycare at GICF and short-stay at GICF. In August, both daycare at clinic and daycare at GICF were more often used ( $P = 0.002$ ,  $<0.001$ ) while short-stay at center was less often used ( $P < 0.001$ ) than in February (Table 3).

Table 2  
Number of occurrences of in-home nursing service by category

Service category	February ( <i>N</i> = 1883)	August ( <i>N</i> = 2244)	<i>P</i>
Daycare at clinic	340	493	0.002
Daycare at GICF	781	1071	<0.001
Short-stay at GICF	558	390	<0.001
In-home helper	102	107	0.381
Visiting care	86	95	0.656
Visiting rehabilitation	8	11	0.938
Home visit	2	2	0.999
Others	2	7	0.282
Unknown	4	68	<0.001

Note: A chi square test was conducted between February and August sessions. GICF: geriatric intermediate care facility.

Table 3  
Number of occurrences of in-home nursing service by place

Place	February (N = 1883)	August (N = 2244)	P
Clinic	302	464	<0.001
GICF	1263	1434	0.036
At home	143	67	<0.001
Others	172	192	0.550
Unknown	3	87	<0.001

Note: A chi square test was conducted between February and August sessions. GICF: geriatric intermediate care facility.

### 3.3. Time of occurrence

Fig. 2 indicates the time of occurrence of communication/recording tasks. Peaks were found in the 8:00–12:00 and 14:00–18:00 periods. Also, the number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 periods.

### 3.4. Detailed analysis of 8:00–9:00 and 10:00–11:00 time periods

Regarding the communication/recording tasks that occurred in the 8:00–9:00 and 10:00–11:00 time periods, when an increase in tasks was observed, was further analysis was

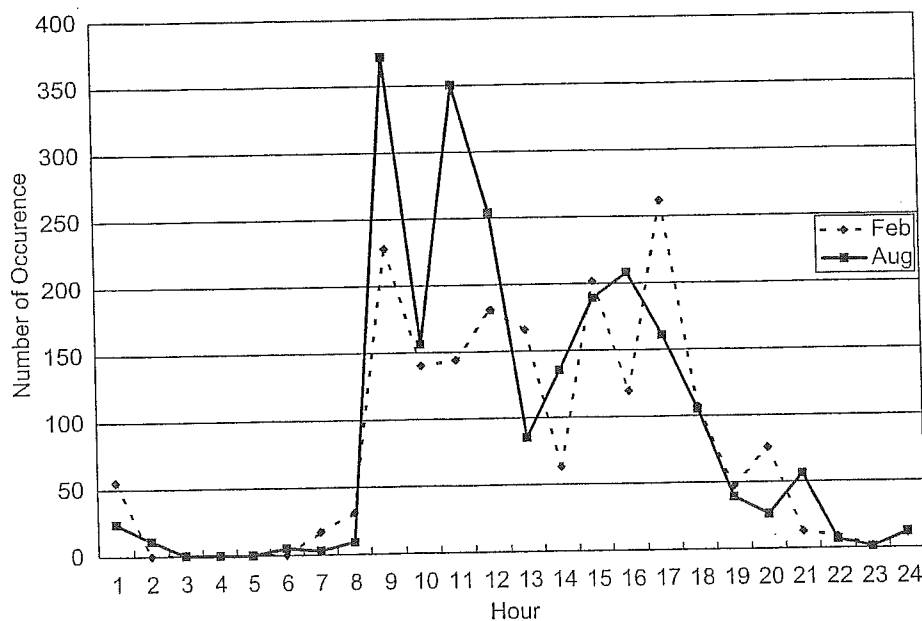


Fig. 2. Time of occurrence of communication/recording tasks. The number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 time periods.

Table 4  
Number of occurrences of communication/recording tasks by involved staff's job type

Job type	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February ( <i>N</i> = 228)	August ( <i>N</i> = 372)		February ( <i>N</i> = 144)	August ( <i>N</i> = 350)	
Physician	3	0	–	0	5	–
Nurse	75	68	<0.001	42	40	<0.001
Pharmacist	0	0	–	0	4	–
Radiological technologist	1	0	–	2	0	–
PT	3	4	0.999	2	5	0.999
OT	0	0	–	0	7	–
Trainer	0	0	–	0	0	–
Professional carer	99	266	<0.001	49	187	<0.001
Consultant	11	7	0.071	20	20	0.004
Secretary	12	12	0.307	9	54	0.009
Nutritionist	0	7	–	14	1	<0.001
Cook	0	0	–	0	1	–
Driver	5	2	0.150	4	18	0.359
Others	19	0	–	2	1	0.425
Unknown	0	6	–	0	7	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted. PT: physical therapist; OT: occupational therapist.

conducted to determine the possible changes in job types of the staff involved, communication routes, tools or media in use and contents of communication/recording.

Table 4 shows the job types of staff involved in communication/recording tasks that occurred in the 8:00–9:00 and 10:00–11:00 periods. From 8:00 to 9:00, more professional carers were involved in communication/recording tasks in August (71.5%) than in February (43.4%) ( $P < 0.001$ ). A significant decrease in the number of nurses involved in communication/recording tasks was also observed between August and February ( $P < 0.001$ ).

From 10:00 to 11:00, more professional carers carried out some kind of communication/recording task in August (53.4%) than in February (34.0%) ( $P < 0.001$ ), while significantly less nurses and consultants were involved in communication/recording tasks ( $P = 0.004$ ,  $<0.001$ ).

Table 5 shows the communication routes in relation to the tasks that occurred at various time periods. In the 8:00–9:00 period, more staff-staff communication took place in August (54.3%) than in February (37.7%) ( $P < 0.001$ ), while less staff's recording to forms was observed in August ( $P < 0.001$ ). However, in the 10:00–11:00 period, the rate of staff-staff communication decreased in August ( $P = 0.002$ ).

Table 6 shows the means by which communication was conducted at various time periods. In the 8:00–9:00 period, face-to-face conversations were most frequently seen in both sessions (79.8% in February, 71.2% in August). However, despite the increase in the number of occurrences of direct conversation, the rate of overall communication decreased ( $P = 0.025$ ). Also, in the 10:00–11:00 period, a decreased rate of direct conversation was found ( $P < 0.001$ ), and voicemail was more frequently used ( $P = 0.019$ ). In this period, a prominent increase in the number of staff using forms was observed, jumping from 0 to 74 times.

Table 5  
Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by communication route

Communication route	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February ( <i>N</i> = 228)	August ( <i>N</i> = 372)		February ( <i>N</i> = 144)	August ( <i>N</i> = 350)	
Staff ⇒ staff	86	202	<0.001	55	83	0.002
Staff ⇒ records	85	21	<0.001	45	134	0.169
Staff ⇒ others ('What')	19	28	0.841	8	16	0.817
Staff ⇒ user(s)	6	1	0.026	1	7	0.514
Records ⇒ staff	2	9	0.292	0	3	–
User(s) ⇒ staff	2	3	0.999	1	5	0.823
Family ⇒ staff	1	8	0.184	1	4	0.999
Records ⇒ records	1	1	0.999	1	8	0.406
Staff ⇒ family	1	0	–	0	3	–
Staff and/or records ⇒ staff	0	41	–	0	3	–
Staff and/or others ('What') ⇒ staff and/or others ('What')	0	19	–	0	1	–
Staff and/or records ⇒ staff and/or records	0	0	–	0	24	–
Others	22	36	0.999	30	54	0.186
Unknown	3	3	0.853	2	5	0.999

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted. 'What' refers to medium.

Table 6  
Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by communication tool

Communication tool	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February ( <i>N</i> = 228)	August ( <i>N</i> = 372)		February ( <i>N</i> = 144)	August ( <i>N</i> = 350)	
Messages	3	3	0.853	3	14	0.429
Direct conversation	182	265	0.025	65	87	<0.001
Voicemails	1	1	0.999	2	25	0.019
Notes	0	0	–	0	0	–
Wiseman Barcode	6	0	–	18	10	<0.001
Wiseman Keyboard	6	3	0.150	4	24	0.117
Extension calls	3	1	0.311	9	0	–
Outside calls	7	10	0.984	1	16	0.061
Facsimiles	0	4	–	0	2	–
Record entries	7	0	–	15	0	–
Reference to forms	9	6	0.131	0	74	–
Others	4	44	<0.001	27	60	0.767
Unknown	0	35	–	0	38	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted.



Table 7  
Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by content

Communication Tool	8:00–9:00		P	10:00–11:00		P
	February (N = 228)	August (N = 372)		February (N = 144)	August (N = 350)	
Instruction	0	1	–	1	17	0.048
Information	180	148	<0.001	58	42	<0.001
Reporting	6	30	0.011	17	17	0.010
Consultation	3	3	0.853	5	5	0.265
Recording	20	13	0.010	51	131	0.750
Confirmation	19	106	<0.001	11	25	0.998
Others	0	33	–	1	9	0.320
Unknown	0	38	–	0	104	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted.

Table 7 shows the breakdown of contents of communication that occurred in the various periods. In the 8:00–9:00 period, information decreased from 78.9 to 39.8% ( $P < 0.001$ ), but more reporting and confirmation were observed ( $P = 0.011$ ,  $<0.001$ ). In the 10:00–11:00 period, information decreased again from 40.3 to 12.0% ( $P < 0.001$ ) while instruction increased ( $P = 0.048$ ). With respect to reporting, the rate in all communication tasks decreased significantly ( $P = 0.010$ ).

#### 4. Discussions

##### 4.1. Background of the increase in total number of users and communication/recording tasks

This research reveals an increase in total number of users after the introduction of Japan's elderly care insurance system. Even before the implementation of the system, a quantitative increase both in number of users and provision of services (Wada, 1996) had been predicted. In fact, traditionally, the administration (Hattori et al., 2000) determined the nursing services to be provided to users (Hashimoto, 1996; Wada, 1996), but under the new system, users are able to choose the nursing services they wish to receive. The findings of this research seem to support this prediction.

On the other hand, although the overall rate of increase in the number of occurrences of communication/recording tasks was greater than that of users, the analysis of the 153 users who had already used some nursing services before the new system was launched did not reveal any significant increase in the number of occurrences of communication/recording tasks for such users. This suggests that the increase in communication/recording tasks for new users after the adoption of the system was reflected on the overall increase in the number of occurrences of communication tasks. In addition, the possible lack in necessary medical and/or nursing-related information on these new users may have lead to greater information exchange among staff.

Meanwhile, the 153 former users may have benefited from the fact that such information had already been gathered in the institution as they had started using services before the system was launched. However, no trend toward a decrease in the number of communication/recording tasks was observed among these users. The introduction of the elderly care insurance system has undoubtedly brought about some increase in communication tasks. For example, the system requests preciseness in procedure such as the preparation of care plans and the management of nursing service provision, both of which necessarily involve more frequent information exchanges. Also, following the adoption of the system, changes in the type and frequency of services made by users may trigger an increase in communication/recording tasks. According to a report, daycare service provisions increased and short-stay service decreased after the system was introduced in Japan (Miyatake, 2001), and this could also be the case in the subject institution. Changes in users' choices from short-stay service to daycare may prompt an increase of communication/recording tasks because the latter is provided per day and requires more information exchange among staff in comparison with the former. The types and frequency of services in use were not studied in this research. However, an increase in daycare and a decrease in short-stay were observed in the category of utilized services in this research, in agreement with the above-mentioned report.

#### 4.2. Time of occurrence of communication/recording tasks

Firstly, communication tasks were observed more often in the 8:00–11:00 and 14:00–17:00 time periods. The subject institution is open from 9:00 to 16:30, and at 8:30–9:00 and 16:00–16:30, short staff meetings are held for the purpose of exchanging information on short-stay users. The peaks of occurrence of communication/recording tasks in the morning and the afternoon fall respectively around the opening and closing times of this institution, presumably because of these correspond to those times when greater information exchange occurs and patient updates are provided.

Secondly, there are various possible factors behind the steep increase in the number of communication/recording tasks in the 8:00–9:00 and 10:00–11:00 time periods. As mentioned above, these periods fall around the opening time of the institution. In fact, it is inferable that the 8:00–9:00 period corresponds to the time when patient updates and information exchanges take place before opening.

Regarding job types of staff, a more prominent increase in the number of professional carers was noticed as compared to other staff. This suggests that the introduction of the new insurance system may have increased the number of communication/recording tasks performed by the professional carers during specific periods of time. Meanwhile, some reports have indicated that a greater number of inpatient falls occurred during those periods of time when the nurses were busy performing a communication or recording task (Taira et al., 1999; Kanemura et al., 2000). In facilities where nursing care services are also provided, the rush of communication tasks may deteriorate the quality of nursing services and increase the risk of accidents on the part of users. It thus appears necessary to take some measures to prevent such concentration of communication tasks. However, this study is limited in the sense that it does not shed adequate light on the burden put on the professional carers for the following reasons: (1) the study focused on the number of communication

tasks, not the needed time for a task to be performed, (2) the study did not take into account the number of such tasks performed by each professional carer, and (3) the number of professional carers rose from 72 to 78 between the two sessions of this research.

Regarding communication route, significantly more staff-staff communication and less staff-form recording were observed in the 8:00–9:00 period. In terms of tools, including form of communication, a prominent increase in face-to-face conversation was recorded. This suggests that information exchange in the form of direct conversation among the staff increased. In the 10:00–11:00 period, however, the rate of staff-staff communication decreased. The use of voicemail, keyboard and reference to records seemed to decrease the rate of direct conversation and staff-staff communication. In terms of tools, a significant increase was seen in the use of voicemail and keyboard as well as reference to records, and the rate of direct conversation in all communication/recording declined. The promotion of the use of such tools in the 8:00–9:00 period also can be expected to curb the rate of increase of communication/recording tasks.

With respect to contents, the following were observed: a decrease of information and an increase of report and confirmation in the 8:00–9:00 period, as well as a decrease of information and an increase of instruction in the 10:00–11:00 period. The possible reasons for the decrease of information in both periods are: (1) the call for a more precise implementation of care plans following the introduction of the system, (2) the increased number of reports and confirmation in place of information, and (3) the diminished necessity for simultaneous communication such as short staff meetings to share information thanks to IT driven devices. Meanwhile, the increase of report, confirmation and instruction around the opening time is presumably due to the preciseness requested by the new insurance system both in the contents of tasks and the time to provide services.

#### *4.3. Possibility of applying information technology*

The outcome of this research highlights the necessity for greater operating efficiency of communication/recording tasks. IT driven devices such as groupware are effective as they facilitate sharing, storage, retrieval and reutilization of information (Shintani, 2000; Nishimura, 2001; Rowe and Brimacombe, 2003). In this research, an increase of report, confirmation and instruction was observed in terms of content of communication. The use of IT driven devices on users and individual progress reports may help reduce the need for report and confirmation (Rowe and Brimacombe, 2003). Also, instruction can be more efficiently conducted when past instructions have been easily stored and can be retrieved and reutilized as needed.

Moreover, when IT driven devices are used, the staff can work more freely with less restrictions of time or space (Nishigaki, 1994; Nishimura, 2001). IT devices also contribute to alleviate the rush of communication/recording tasks, as previously suggested in this research.

Other benefits of IT systems can also be expected for users as the time normally devoted to communication tasks may be spent on the nursing service itself.

Although the use of IT is undoubtedly beneficial, as demonstrated above, we should nevertheless solve some of the most pressing disincentives which include cost, safety, staff

education, and delayed development of user-friendly peripheral tools, in order to efficiently apply IT driven devices.

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ORIGINAL ARTICLE

# Transfer of elderly patients from health care facilities to emergency departments: Prospective observational study of the emergency department in Japan

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**Background:** The purpose of the present paper is to describe the current status of emergency departments (ED) that are used by health care facilities for elderly (HCFFE) residents in Japan.

**Methods:** The present paper is based on a prospective, observational study that was undertaken at a teaching hospital in Nagoya city over a 12-month period. All patients transferred to the hospital ED from a regional HCFFE were analyzed. Demographic data, timing of the visit, the primary reason for transfer, diagnosis and disposition were recorded. The need for ambulance use was graded prospectively using three categories of urgency.

**Results:** A total of 102 HCFFE residents made 116 ED visits. Their mean age was 83.3 years (range 58–101), 68% were female. The majority of patients (93%) were transferred by ambulance. Ambulance transfer was classified as emergency (20% of patients), urgent (51%) and routine (29%). The main reasons for patients to be transferred were fever (15.5%), fall (11.2%), altered mental status (10.3%), focal neurological deficits (10.3%), and weakness (9.5%). A total of 88% of the ED visits led to admission to the hospital. After admissions, the mean length of stay was 21.4 days and the mortality rate was 13%.

**Conclusion:** Elderly patients staying in HCFFE are frequently transferred to an ED, and their visits are likely to lead to admission to the hospital, which is associated with prolonged lengths of stay as well as high mortality rates.

**Keywords:** health care facility, emergency department, patient transfer, geriatrics.

## Introduction

The proportion of elderly persons in the Japanese population is rapidly progressing. The elderly population makes up almost 18% of the Japanese population and

accounts for almost 40% of hospital admissions and total health care costs.<sup>1</sup> Accordingly, the use of emergency departments (ED) by the elderly is increasing. In particular, Japanese care givers are increasingly confronted by problems associated with the acute care of frail elderly patients who have multiple illnesses and functional impairment. In Japan, those elderly patients who stay in health care facilities for the elderly (HCFFE) (these facilities are very much like the nursing homes (NH) found in the USA) are generally quite frail. Many of these residents have progressive neurological diseases such as Alzheimer's disease or vascular dementia. When

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these patients become ill, they may be transferred to an ED. Since they frequently have complicated medical histories and cognitive impairments, history taking and evaluation can be difficult for the ED physicians who are unfamiliar with them. The transfer to the ED is both physically and emotionally hard for the HCFE patients and their families, and it is expensive in terms of transportation, ED evaluation, hospital admission, and readmission to the HCFE.<sup>2</sup> Finally, when admitted to the acute care hospital, elderly patients face the additional risk of exposure to iatrogenic illness.<sup>3</sup> To develop guidelines for reducing the incidence of inappropriate ED transfer and to provide a higher quality of acute care that will prevent some of these hospital admissions, it is essential to understand the present situation of ED use by HCFE residents. However, little is known about the medical problems that are part of the acute care of frail elderly persons.

The purpose of this research was to provide a description of the ED use of elderly patients who stay in HCFE. We conducted a prospective study to examine the ED visits by HCFE residents with respect to demographics and the main cause of ED visits and the subsequent admission to the hospital.

## Methods

The present paper is based on a prospective, observational study at Nagoya Ekisaikai Hospital during a 12-month period. Between 1 April 2002 and 31 March 2003, 116 consecutive patients transferred to Nagoya Ekisaikai Hospital ED from HCFE in the south part of Nagoya were enrolled in the study. Nagoya Ekisaikai Hospital serves the south part of Nagoya city, which in 2002 had a population of 560 000, 17.8% of whom were 65 years of age or older.<sup>4</sup> This hospital is one of the largest in Nagoya city: there are 662 beds and 56 intensive care unit beds; and there were 214 960 admissions, 5222 ambulance transfers and 378 995 outpatients visits in 2002.

We reviewed all ED records for the 2002 calendar year, identifying patients whose visits originated from HCFE. From each ED record we extracted demographic data, including age and sex. We also recorded the date and time of each ED visit, the HCFE from which the patient was transferred, the primary symptom or complaint leading to the visit, the initial diagnosis in the ED, the patient disposition following the ED visit, and lengths of stay in the hospital. The chief complaint at arrival to the ED and initial diagnosis in the ED were provided by the ED physicians. The need for ambulance use was graded using three categories of urgency that were developed in other studies<sup>5</sup> and defined as: (i) emergency: death or permanent morbidity will result if there is no treatment within 1 h; (ii) urgent: threat exists to life or bodily functions if care is delayed more than

several hours; and (iii) routine: care could be delayed 24 h without compromise to the patient's condition. Patients were classified into one of these categories by the ED physician in charge of the patient.

## Results

### Demographics

During the study interval, there were 27 759 ED visits, and 20.9% of all ED visits and 52% of admissions from the ED were made by patients 65 years or older. During the study interval, 102 HCFE residents made 116 visits to the ED as a result of transfers from 10 facilities. All facilities were located in the south part of Nagoya city.

Eighty-seven per cent (89/102) of the patients made only one visit; 11.7% of the patients made two visits, and only one patient made three visits. Of the HCFE residents visiting the ED, 68.1% were women. The age of HCFE residents visiting the ED ranged from 58 to 101 years, with a mean of  $83.3 \pm 8.6$  years. Of all visits by HCFE residents, 62.9% (73/116) were made by residents older than 80 years, 45.7% (53/116) by those older than 85 years, and 22.4% (26/116) by those older than 90 years (Fig. 1). None of the 102 residents who visited the ED had expressed his or her health care wishes in the form of advance directives.

There were variations in visit frequency by calendar month. More visits were made in fall through to spring months and slightly fewer in the summer (Fig. 2). A total of 56.8% of ED visits occurred during regular working hours (8 a.m. to 5 p.m., Monday to Friday) (Fig. 3), and there were more visits on weekdays than on weekends (Fig. 4).

### Clinical

Of all visits, 93.1% (108/116) were by ambulance. Ambulance transfer was classified as emergency in 20.3% (22/108), urgent in 50.9% (55/108), and routine in 28.7% (31/108) of the cases.

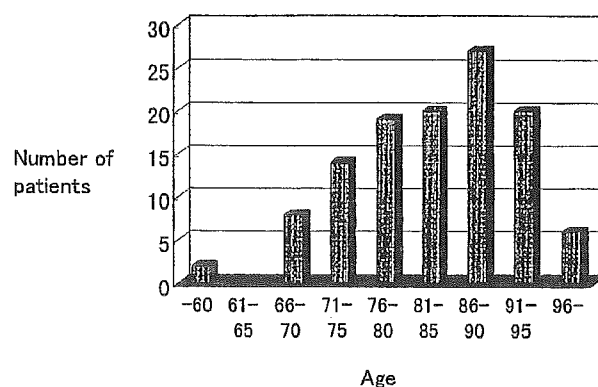


Figure 1 Age of the patients at the health care facility for the elderly who were transferred to the emergency department.

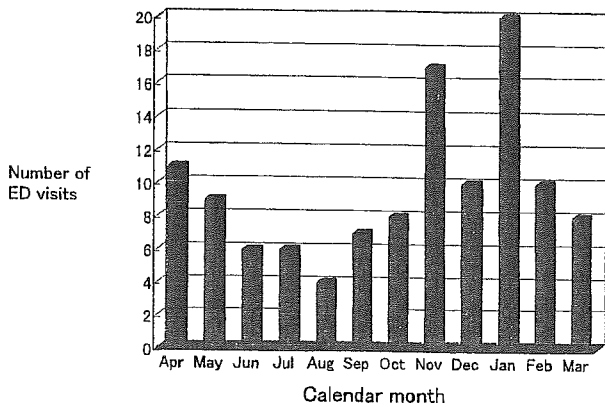


Figure 2 Emergency department visit frequency by calendar month.

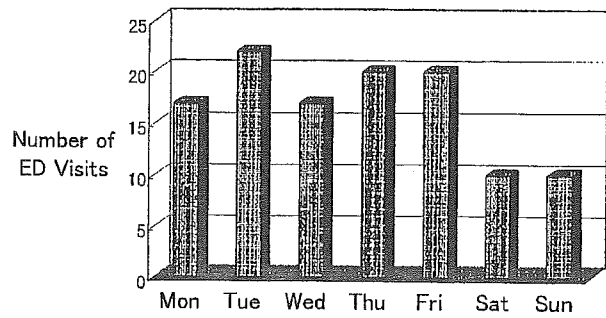


Figure 4 Number of emergency department visits in 1 week.

Table 1 Common reasons for patient transfer to the emergency department

Chief complaint	No. visits	% visits	No. admitted	% admitted
Fever	18	15.5	18	100
Fall	13	11.2	11	84.6
Altered mental status	12	10.3	12	100
Focal neurological deficits	12	10.3	12	100
Weakness	11	9.5	9	81.8
Anorexia	9	7.6	9	100
Abdominal pain	8	6.9	8	100
Cardiopulmonary arrest	5	4.3	2	40
Hematoemesis/melena	5	4.3	5	100
Dyspnea/cough	4	3.4	2	50
Nausea/vomiting	4	3.4	3	75
Chest pain	4	3.4	4	100
Extremity trauma	4	3.4	2	50
Seizure	3	2.6	3	100
Palpitation	1	0.9	1	100
Vertigo	1	0.9	0	0
Hematuria	1	0.9	1	100
Ischuria	1	0.9	0	100
Total	116		102	87.9

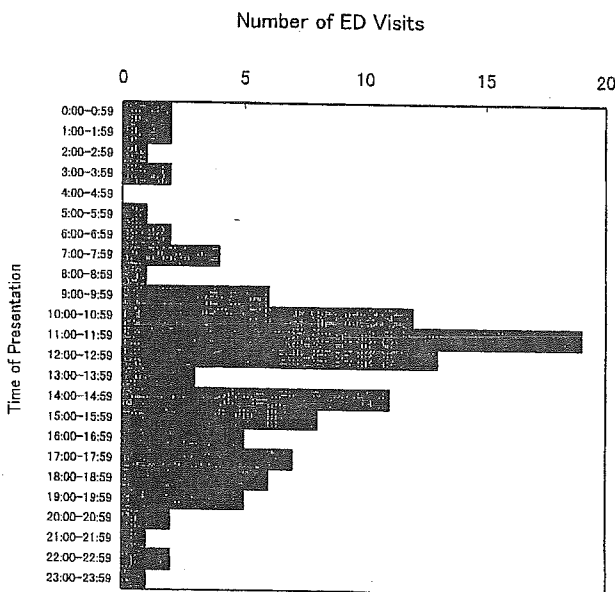


Figure 3 Time of emergency department presentation by the patients of the health care facility for the elderly.

Table 1 delineates the chief complaints for ED visits. Fever was the most common complaint in patients making ED visits from HCFE, and other most common chief complaints in descending order of frequency were fall, altered mental status, focal neurological deficits, weakness, and anorexia. These six most common chief complaints accounted for 60% of all reasons for ED visits. Table 2 delineates the initial diagnosis in the ED. The most common diagnosis was pneumonia (23%, 27/116), and the next most common diagnoses were stroke and extremity trauma.

**Outcome**

Disposition after the ED visit was recorded for all visits by HCFE residents. In 88% (102/116) of cases, the

patient was admitted to the hospital; in 55.2% (64/116) of cases, the patient was admitted to an intensive care unit, and in 9.5% (11/116) of cases, the patients returned to his or her facilities without admission. When compared to the facility statistics for acute care admission during the study period ( $n = 4058$ ), patients in the study population ( $n = 102$ ) had a much more prolonged mean length of stay of  $21.3 \pm 22.8$  days (range 0–109 days), compared with the mean of 16.3 days for non-study patient admissions during that period. The diseases which most often prolonged a hospital stay were transcervical fracture ( $29.7 \pm 9.5$  days, range 21–58 days), pneumonia ( $28.7 \pm 19.4$  days, range 2–98 days), and stroke ( $23.3 \pm 18.9$  days, range 1–109 days). In 2.6%

**Table 2** Primary emergency department diagnosis given to the patients of the health care facility for the elderly

Diagnosis	No. visits	% visits	No. admission	% admission	ALOS*
Respiratory problems	30	25.9	29	96.7	28.2
Pneumonia/bronchitis	27		26		
Asthma	1		1		
Pleural effusion	2		2		
Neurological problems	22	19	21	95.5	22.7
Stroke	18		18		
Seizure	2		2		
Vertigo/dizziness	2		1		
Gastrointestinal problems	18	15.5	17	94.4	20.4
GI bleeding	8		8		
Ileus	6		6		
Cholecystitis	2		2		
Gastroenteritis	1		0		
Hernia	1		1		
Trauma	18	15.5	14	77.8	24.7
Fracture	10		9		
Head trauma	2		2		
Other extremity trauma	6		3		
Cardiovascular problems	10	8.6	9	90	20.9
Heart failure	8		8		
Atrial fibrillation	1		0		
Abdominal aortic aneurysm	1		1		
Other internal problems	8	6.9	6	75	18.6
Hypovolemia	3		2		
Fever	2		1		
Hypoglycemia	2		2		
Exacerbation of chronic renal failure	1		1		
Urological problems	1	4.3	1	80	9.6
Urinary tract infection	3		3		
Hematuria	1		1		
Ischuria	1		0		
Cardiopulmonary arrest	5	4.3	2	40	0.8
Asphyxia	4		1		
respiratory failure	1		1		
Total	116	100	102	87.9	21.36

\*ALOS, average length of stay (days).

(3/116) of the cases, HCFE residents were pronounced dead in the ED. Cardiopulmonary resuscitation was attempted with all of them. In the study period, emergency admissions from HCFE accounted for only 2.5% (102/4058) of all emergency admissions but 8.4% (15/177) of deaths after admission. Total mortality of patients transferred to the ED from HCFE accounted for 15.5% (18/116). A total of 83% (85/102) of admitted patients returned to HCFE. Only two patients remained in the hospital at the end of the study period.

## Discussion

In Nagoya Ekisaikai Hospital, about 20.9% of ED visits are made by elderly patients, and 52% of admissions

from ED are elderly patients. This proportion is the same in other general hospital ED in Japan and the USA.<sup>6</sup> Previous observations in the USA suggested that elderly patients who visit an ED are more likely to use an ambulance, have severe illness, be admitted to the hospital from the ED, and have a higher mortality rate than non-elderly patients.<sup>7-11</sup> Our study results showed that the elderly in Japan have the same tendencies as do elderly patients in the USA.

More than 56% of all transfers in our study occurred during regular weekday working hours. This may be a result of the regular HCFE staff's coming on duty in the morning and observing ill HCFE residents. Although we expected a relative overuse of ED service on weekends, we did not find that to be the case. This



might be related to the lower number of HCFFE staff on weekends.

In previous studies in the USA, the main causes of ED visits in nursing home residents were infections, fall, altered mental status, and extremity trauma.<sup>12-15</sup> In the present study we found that the major symptoms, including fever, fall, altered mental status, focal neurological deficits, weakness, and anorexia, accounted for more than 60% of ED visits by residents of HCFFE, and 52.5% of ED visits resulted in a diagnosis of pneumonia, stroke, or extremity trauma. Thus, the main causes of ED visits in HCFFE residents are similar to those of NH residents in the USA. As far as we know, the causes of prolonged hospital admissions of elderly persons has not been investigated. In this study, we found that the diseases that resulted in prolonged hospital stays were transcervical fracture, pneumonia, and stroke. We believe that developing strategies that prevent these diseases are essential to reduce ED visits and hospital admissions of HCFFE residents.

In this study, we speculated that all visits without ambulance use except for fractures, and 28.7% of all ambulance transfers classified as routine were inappropriate ED visits.

Moreover, even in cases classified as urgent, ED physicians' diagnoses suggest some of the ambulance use and admissions could be prevented if an appropriate evaluation and early management had been accomplished in the HCFFE. The rate of admission of patients transferred from HCFFE was 87.9% in our study. This rate is about twice as high as that of the previous studies made in the USA.<sup>12,14,15</sup> In the 11 cases which returned to HCFFE, residents were judged to be able to undergo care in their facilities without hospital admissions by ED physicians

In the study period, CPR was attempted in five cases but was unsuccessful in all. This is consistent with previous observations, which show dismal results for CPR in the frail population.<sup>16-19</sup> Surprisingly, none of the 102 residents who visited the ED had expressed his or her health care wishes in the form of advance directives. In the USA, 4-8% of long-term care residents transferred to an ED are accompanied by advance directives.<sup>12</sup> Our results suggest that the concept of advance directives is not recognized in Japanese society, where the proportion of elderly people is growing rapidly. A recent study in the USA indicates that elderly patients would rather receive acute treatment in their nursing homes than in hospital.<sup>20</sup> Continuing to educate the population and encourage discussion of advance directives in HCFFE is imperative, and more studies will be required to verify the efficiency of clear communication in advance directives which might prevent a transfer to the ED and a resuscitation that patients themselves do not want.

In Japan, HCFFE must have a full-time physician in residence who can evaluate residents' health status. A

report suggests that in the USA, the number of transfers from a NH to the ED might be decreased if physicians who understand residents' complicated histories visited several times per week.<sup>21</sup> Van Buren *et al.* described a case series in which 39% of admissions from nursing homes were probably preventable, and they believed that most of these admissions were caused by lack of physician visits in the NH setting.<sup>22</sup> In Japan there are resident physicians in HCFFE who evaluate residents' health status daily, so we would expect the rate of admission of HCFFE residents to be lower than that in the USA. We would also expect that, when HCFFE residents are admitted, their stay in the hospital would be shorter than that of NH residents in the USA. However, as shown by our study results, the rate of admission of HCFFE residents was about twice that of the NH residents according to the results of past studies in the USA,<sup>12,14,15</sup> and there was no difference in the length of hospital stay observed between our study and that of the USA.<sup>14</sup> Why were hospital admissions of HCFFE residents not preventable in Japan, contrary to our expectation? Primarily because even though full-time physicians are resident in HCFFE, the present medical financing system in Japan limits acute medical care in HCFFE. If physicians who work in HCFFE were allowed to evaluate and manage acute care problems, ED transfer and hospital admission might be avoidable in many cases. More prospective studies will be required to verify this hypothesis. Secondly, most physicians in HCFFE specialise in areas other than geriatrics and have not received sufficient training in geriatric medicine. The lack of geriatric expertise and training keeps some physicians in HCFFE away from effectively treating acute illness or preventing and treating chronic disorders in HCFFE residents. If these physicians could obtain training in geriatric medicine and acquire the ability to manage acute care problems that cause ED transfer and hospital admission, the quality of care in HCFFE could be improved. However, there is no widespread availability of geriatric medicine training programs in Japan. Some reports suggest that geriatrician interventions in nursing homes improve ED transfer and admission.<sup>21</sup> A training system in geriatric medicine should be established as soon as possible in Japan.

Ours is the first study to describe the present situation of ED use by HCFFE residents in Japan. This study makes clear some of the problems associated with acute care of frail elderly. This information is useful for many physicians who would like to obtain training in geriatric medicine.

## Conclusion

HCFFE residents frequently are transferred to the ED for a variety of medical reasons. In the present study, 87.9% of the ED visits by HCFFE residents led to hos-

pitalization. When considering the complicated medical history and unique presentations of diseases in frail elderly patients, ED and HCFFE physicians would be likely to benefit from more training in geriatric medicine. Physicians providing care for HCFFE residents and ED physicians should communicate closely with each other in order to provide appropriate and high-quality medical care for frail elderly people.

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## Effect of long-term care insurance on communication/recording tasks for in-home nursing care services

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### Abstract

The purpose of this research was to clarify the possible changes brought about by the introduction of the long-term care insurance system in terms of number of communication/recording tasks, related nursing services in use, and when and where these tasks were performed. By examining the detailed content of communication/recording tasks, this study also sought to explore the advantages of introducing information technology (IT) systems in nursing service settings. The study was designed before-and-after study in two sessions, February 2000 and August 2000, namely before and after the introduction of Japan's long-term care insurance system. Participants were clients using the institution's in-home nursing services and all staff in a medical institution located in the Mikawa region of Aichi Prefecture, Japan. Following measurements were performed: (1) nursing service in use, (2) type of job, (3) date and time, (4) from whom, (5) to whom, (6) communication tool and (7) content, related to a particular communication. Communication/recording tasks were frequently performed around the starting and closing time of services. Following the adoption of the new system, these tasks tended to occur mostly around the starting time of services. As for the staff, the involvement of the professional carers increased. Regarding content of communication/recording, reports, confirmation and instruction increased. In conclusion, the use of IT driven devices is recommended

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to streamline the performance of communication/recording tasks as well as to ease the rush of these tasks thereby improving the quality of nursing services.

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*Keywords:* Long-term care insurance; Communication/recording task; Nursing service setting; In-home nursing care service; Information technology (IT)

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## 1. Introduction

The aging of society is a phenomenon affecting many developed countries today (Itouji, 1996; Adachi, 1998; Hattori et al., 2000; David et al., 2001; Esping-Andersen, 2001; Robert, 2002), and the need to establish nursing care systems that adequately meet the increasing related demands is thus evermore pressing (Adachi, 1998; Hilary, 2001).

In April 2000, Japan introduced a social insurance system for elderly care based on the principle of Socialization of Elderly Care (Masuda et al., 2001; Matsuda, 2002), whereby the burden of the care for the elderly is shared by society as well as the family (Hattori et al., 2000; Hilary, 2001). Prior to the introduction of the system, some had predicted a shortage in nursing service provision (Ueda et al., 1994; Hashimoto, 1996; Itouji, 1996). A quantitative increase in nursing service demand was reported after the adoption of the system (Miyatake, 2001), and the shortage of services seems to have intensified.

Moreover, under this insurance system, the professional carers are faced with the additional task of administrating the service provision. In order to provide a greater range of services, more precise planning is needed, and care plans must be carefully implemented and evaluated. Additional exchanges of information or communication/recording tasks among the professional carer are also required. Such tasks include face-to-face conversations, record entries, telephone calls, facsimiles, voicemail, and others. With the increasing demand for nursing services covered by the insurance, the associated communication/recording tasks may lower the quality of nursing services.

With the rapid advance of information technology (IT) in recent years, the trend can be found in medical sectors as in many other industries toward improving operational efficiency of services with the help of IT driven management systems (Laerum et al., 2001; Stamouli and Mantas, 2001). These systems allow for efficient processing of electronic medical charts, order entry, administration of materials and laboratory results, etc. In nursing settings also, carers can resort to IT systems to reduce their communication/recording workload, thereby spending more time and energy providing nursing services.

The purpose of this research is to clarify the possible changes induced by the introduction of Japan's new insurance system in terms of number of communication/recording tasks, related nursing services in use, and when and where these tasks occurred. Furthermore, during the periods of time when significant increases in the number of communication/recording tasks were observed, the detailed content of communication/recording was examined to explore the possibility of introducing IT systems to improve the efficiency of the nursing service settings.