stomach pains, palpitations, and chronic fever. The patients were to respond to simple questions such as, "What is wrong with you today?" or "How long has this continued?" Three males volunteered as simulated patients. Their responses were recorded with a high-resolution camera. The individuals were instructed to stare at the camera aperture during the recording. Moreover, to eliminate visual stimuli from the background, a white board was placed behind them. The video of each filmed individual was converted to pictures of three different sizes: 70 cm × 40 cm (large picture), 26 cm × 20 cm (medium picture), and 14 cm × 12 cm (small picture) and viewed on a 32-inch Sony KD32HD700 monitor (Sony, Tokyo, Japan). Nine doctors (eight physicians, one pediatrician; average experience, 10.4 years) watched the videos assuming that the videos represented medical interviews of first-time patients. The distance between the display and the doctor was set at 130 cm, assuming the large, medium, and small pictures represented an actual medical interview, an interview on television conference system, and an interview on a cellular videophone, respectively. At the set distance, the small picture appears like an image on a real-size cellular videophone as illustrated in Figure 1. To ensure easy playback, the videos were edited to be approximately 3 minutes in length and recorded on a DVD-R in motion picture experts group (MPEG)-2 format. The videos were played on a Panasonic DV474 DVD player (Panasonic, Tokyo, Japan).

Each doctor viewed the different-sized pictures of all three patients; however, the pictures were viewed in a random order to eliminate the influence of habituation and fatigue. A gaze point recorder (EMR-8B, NAC Image Technology, Tokyo, Japan) was used to record eye movements. This special camera reads the infrared rays reflected from the pupil/cornea, and thereby, tracks the movements of the gaze point. For analysis, these tracks were mapped on a picture captured simultaneously using the gaze point recorder (Fig. 2). To examine the focusing activity on the face, the standard deviation of the gaze-point coordinates for horizontal direction (x) and vertical direction (y) was calculated.

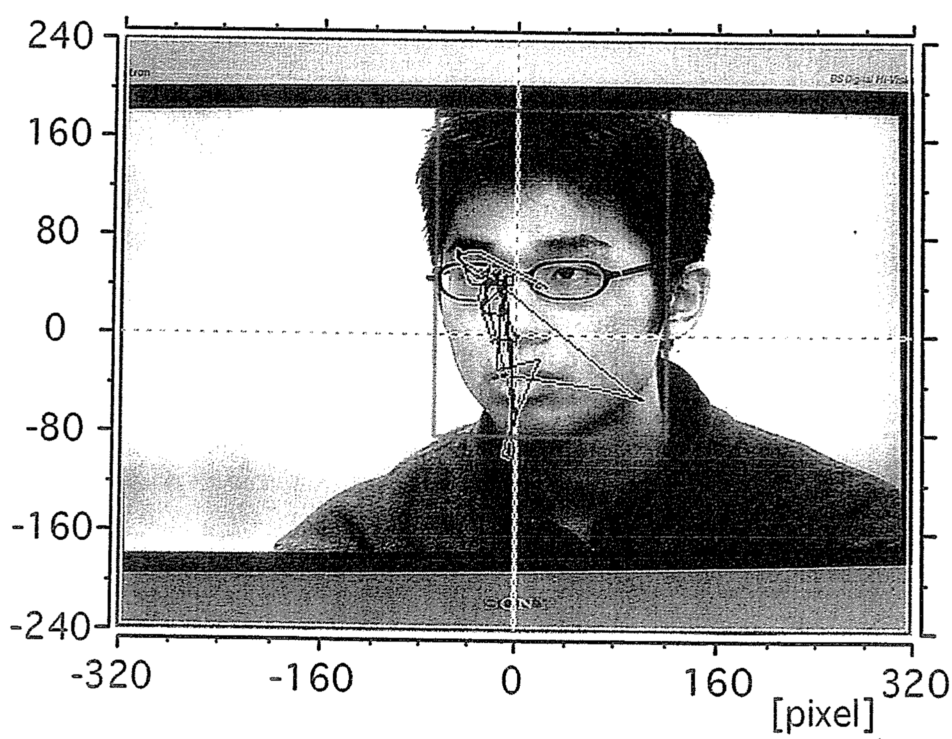

FIG. 2. An example of tracks of gaze points. Gaze points were plotted on an area of 640 × 480 pixels using a gaze-point recorder. The area of the face is shown as a rectangle.

In order to confirm the gazing, the temporal movement and retention of the gaze were distinguished. When the gaze was static for longer than 0.1 second, the gaze was assumed to be retained. The position and time of the retention were obtained. The total retention time during which the gaze position was within the face range was defined as the facial retention time. The area of the face was considered a rectangle that included the face, as shown in Figure 2. In the present study, we considered the facial retention time as the time during which eye contact was established. This definition of the eye contact, however, does not necessarily mean the situation of gazing at each other. The ratio of the facial retention time to the total retention time was measured as the eye contact rate.

After watching the videos, the doctors filled out a questionnaire for the respective picture sizes, and their subjective evaluations on the pictures were statistically examined. The Student's paired t test was used for the statistical analysis.

RESULTS

The standard deviation values of the gaze-point coordinates decreased with the picture size (Table 1). These changes suggest that as the picture size decreased, the doctors had to make an effort to concentrate on the pictures by suppressing their eye movements and focusing on the smaller range of the face.

As a result of the intense concentration, the average of the eye contact rate was relatively high; it was 92.2% for the large pictures, 91.8% for the medium pictures, and 85.1% for the small pictures. The reduction in the average of the eye contact rate in the case of small pictures was derived from the extreme reduction in eye movements observed in a doctor. Therefore, no significant difference was observed between the medium and small pictures, although the eye contact rate showed a statistical decrease in the case of medium/small pictures as compared to the large pictures (Fig. 3).

In contrast, the subjective evaluations showed that the impression of the medical interview worsened in the small pictures that simulated a medical interview using a cellular videophone (Table 2). The scores for all the questions were significantly lower with the small pictures than with the medium/large pictures. However, there was no correlation between the eye contact rate and the evaluation scores (data not shown).

DISCUSSION

Using a gaze-point recorder, we could evaluate an eye contact rate in situations envisioning a medical interview in telemedicine. The gaze-point recorders have been applied to various medical fields in order to determine the effectiveness of medical education, the ability to make diagnosis with medical images, or the usability of the machine-user interface[5]; however, there have been no reports thus far on its application to the evaluation of telemedicine.

The present results suggest that the doctors had to make an effort to look at the patients' faces. As the picture size decreased, the doctors' gaze range became narrower. It is known that some special techniques that are different from the actual medical interviews are neces-

TABLE 1. STANDARD DEVIATION OF GAZE-POINT COORDINATES

Standard deviation (pixel)	*Large picture*		*Medium picture*		*Small picture*
Horizontal direction	34.8	a	29.4	a	24.1
(Large vs. Small)			a		
Vertical direction	39.0	a	29.2		28.2
(Large vs. Small)			a		

[a]Student's paired t test, $p < 0.05$.

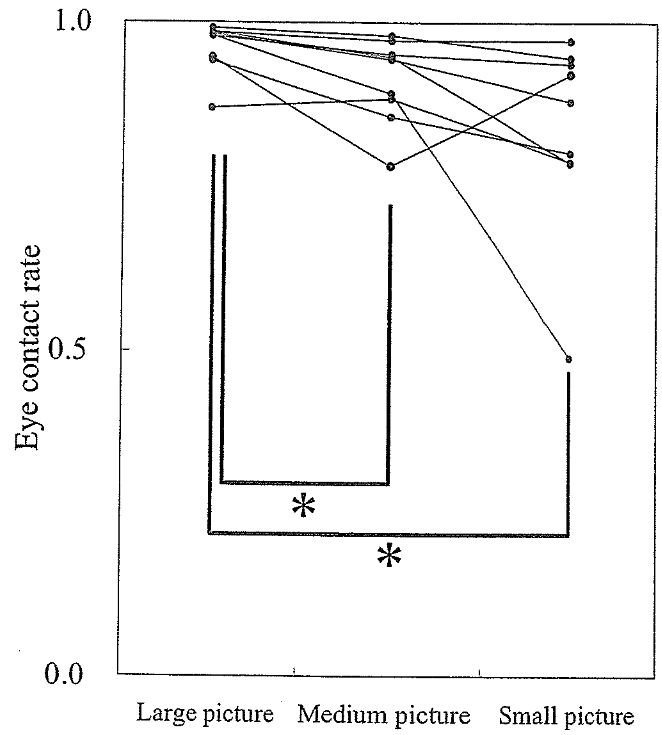

FIG. 3. Eye contact rate. * Student's paired t test, $p < 0.05$.

sary for telemedicine.[6,7] Focusing on the face appears to be an important communication skill that is used unconsciously during telecommunication. The effort of the concentration resulted in high values of the eye contact.

It is believed that eye contact during examination has two implications—the patient's satisfaction and improving the doctor's interviewing skill. Nonverbal communication skills, including eye contact, have been reported to improve patient satisfaction.[8] Giron also reported that eye contact is associated with a doctor's psycho-diagnostic ability.[9] Therefore, we could presume that a low rate of eye contact leads to low patient satisfaction. This is also indicative of a doctor's low psycho-diagnostic ability, although we could not estimate the lower limit of the eye contact rate.

TABLE 2. SUBJECTIVE EVALUATION OF QUESTIONNAIRES

Question	*Large picture*	*Medium picture*	*Small picture*
Was the screen sharp?	4.67	3.89	2.67
Were you able to perceive the change in expression or facial color from the screen?	4.67	4.44	3.11
Was it almost equivalent to the information that can be obtained from an actual examination?	4.11	4.00	2.78
Was it of a quality that can be used in an actual examination?	4.44	4.00	2.78

[a]Student's paired t test, $p < 0.05$.

With regard to the experiments on gaze, the analysis might have to be performed at an actual telemedicine site; however, in order to mimic environmental conditions, the present experiment was performed in a controlled telemedicine environment. In addition, the present virtual patients continued to stare at the doctor (the recoding video camera). These optimized conditions might also improve the rate of eye contact. In other words, the direction of the patient's face and actual background with various visual stimuli could affect eye contact in the conditions where a videophone is actually used.

One of the nine doctors showed a prominent decrease in the eye contact rate with a decrease in the picture size. The type of focusing skill may show considerable differences among the individuals. Whether the focusing skill can be improved by practice will be confirmed in the future.

In the subjective evaluations by the questionnaires, no significant difference was observed between the large and medium pictures, suggesting that a television conference could be an alternative method to the face-to-face medical interview. Although the average of the eye contact rate in the medium picture was statistically lower than that in the large picture, both these values were almost the same. On the other hand, the impressions of the small picture yielded low scores as compared to others. However, because there was no correlation between eye contact and subjective evaluations, the low evaluation scores may not be the result of the reduction in the amount of acquired information.

In fact, the average of the eye contact rate did not significantly decrease despite a prominent reduction in eye movements of one doctor. In order to maintain a high value of the eye contact rate, the eye movements were suppressed to a narrow range. This concentration on a narrow field may produce fatigue and cause low subjective evaluation scores.

Consequently, we found that a cellular videophone could be useful during medical interviews in telemedicine. The eye contact rate in the small picture was almost same as that in the medium picture simulating a television conference system. However, the subjective impressions were not necessarily good, and it appeared that certain arrangements for using the system may be required. For first-time patients, a television conference system with a medium-size display is a better choice for a medical interview because the medium picture yielded good eye contact and subjective evaluations. The cellular videophone could be a useful device for following up patients with ease for the second time and later.

CONCLUSION

Analysis of the eye movements of the doctor during a simulated medical interview in telemedicine was performed by using videos of various sizes. The results showed that the doctor intentionally narrowed the gaze fields and managed to look at the patient's face. We observed that a specific skill was required for the communication in telemedicine. The responses given in the questionnaires revealed that the doctors did not have a good impression of the medical interviews with a cellular videophone. However, the results also indicated that the use of a cellular phone in telemedicine is an effective method of medical interview with a good eye contact, because no significant difference in the eye contact rate was observed between the medium and small pictures produced by a simulated television conference system and a cellular videophone, respectively.

REFERENCES

1. Yoshino A, Shigemura J, Kobayashi Y, Nomura S, Shishikura K, Den R, Wakisaka H, Kamata S, Ashida H. Telepsychiatry: Assessment of televideo psychiatric interview reliability with present- and next-generation internet infrastructures. *Acta Psychiatr Scand* **2001**;104:223–226.
2. Tachakra S, Wang XH, Istepanian RS, Song YH. Mobile e-health: The unwired evolution of telemedicine. *Telemed J E Health* **2003**;9:247–257.
3. Summers LC. Mutual timing: An essential component of provider/patient communication. *J Am Acad Nurse Pract* **2002**;14:19–25.
4. Street RL, Wheeler EJ, McCaughan WT. Specialist-primary care provider-patient communication in telemedicine consultations. *Telemed J* **2000**;6:45–54.

5. Bettley RJ. Applications of low-cost eye tracking in telemedicine. *J Telemed Telecare* **1999**;5(Suppl 1):S4–6.
6. Miller EA. The technical and interpersonal aspects of telemedicine: Effects on doctor–patient communication. *J Telemed Telecare* **2003**;9:1–7.
7. Doolittle GC, Allen A. Practising oncology via telemedicine. *J Telemed Telecare* **1997**;3:63–70.
8. Griffith Wilson JF, Langer S, Haist SA. House staff nonverbal communication skills and standardized patient satisfaction. *J Gen Intern Med* **2003**;18:170–174.
9. Giron M, Manjon-Arce P, Puerto-Barber J, Sanchez-Garcia E, Gomez-Beneyto M. Clinical interview skills and identification of emotional disorders in primary care. *Am J Psychiatry* **1998**;155:530–535.

Address reprint requests to:
Professor Sumio Murase, M.D., Ph.D.
Division of Medical Informatics
Shinshu University Hospital
3-1-1 Asahi Matsumoto, 390-8621
Japan

E-mail: murase@hsp.md.shinshu-u.ac.jp

TELEMEDICINE AND e-HEALTH
Volume 13, Number 1, 2007

DOI: 10.1089/tmj.2006.0033

New Approach for the Early Detection of Dementia by Recording In-House Activities

TOSHIRO SUZUKI, M.D.,[1] SUMIO MURASE, M.D., Ph.D.,[1] TOMOYUKI TANAKA, B.S.,[2] and TAKAKO OKAZAWA, B.S.[2]

ABSTRACT

People with dementia often have low physical activity and some sleep problems. This study focused on daily life activities and sleeping conditions, and examined the use of these parameters for detecting dementia. Five passive infrared (IR) sensors were installed in each of 14 subject's houses. Each patient lived alone. The subjects' in-house movements were recorded by the passive IR sensor for approximately 3 months (average, 78 days). Based on these records, the following parameters of life activities were assessed: (1) the number of outings, (2) total sleep time, (3) number of sleep interruptions, and (4) sleep rhythm. Subjects with impaired cognition (Mini Mental State Examination [MMSE] $<$ 24) had a significantly lesser number of outings ($p = 0.001$) and a tendency toward a shorter sleep time ($p = 0.054$) in comparison with control subjects (MMSE $\geq$ 24). These results suggest that the monitoring of life activities by using passive infrared sensors could be an efficient method for detecting dementia.

INTRODUCTION

In Japan, the population of elderly people is increasing dramatically. The Japanese society is facing severe problems: the burgeoning cost of medical and nursing care, shortage of nursing care facilities, and increasing number of solitary deaths. Moreover, several reports have shown that the elderly living alone are at a higher relative risk for dementia.[1,2] Dementia is considered one of the most serious diseases in the health management of elderly people.

It is important to detect dementia at an early stage. Early detection makes early treatment possible. The importance of early detection, however, has not been widely recognized in Japan. As a consequence, this often gives rise to an awkward situation in which patients with dementia are brought in to see a doctor after showing symptoms of dementia, such as poriomania. The early detection of dementia is particularly difficult in the elderly living alone.

Recently, some commercial services have been provided for the elderly living alone in Japan. We supposed that in-house movement data obtained using these commercial sensors could be utilized for detecting early dementia; however, in previous studies, monitored data was not used as clinical data but was mainly used to confirm the safety of the concerned individual.[3–5]

[1]Division of Medical Informatics, Shinshu University Hospital, Matsumoto Japan.
[2]Matsushita Electric Works Information Systems Co., Ltd, Osaka, Japan.

MATERIALS AND METHODS

This study consisted of 14 volunteers who each lived alone in Matsumoto, Japan. The mean age of the subjects was 80.0 years (range, 67–90 years). Before monitoring, the subjects' signatures' were voluntarily obtained in an informed consent document. The study was carried out for 3 months from February to April 2005. The mean study period was 78 days.

Infrared sensors

Infrared (IR) sensors provided by the Mimamori net service (Matsushita, Osaka, Japan) were used to monitor the subjects' in-house activities. "Mimamori" means "watching over someone" in Japanese. In this study, five passive IR sensors were installed in each subject's house (Fig. 1). The sensors are activated by human movements when an elderly person enters a radial area that is within approximately 5 meters of the sensor. When a sensor is activated by movement, the place and time are recorded. The sensed data are automatically transmitted wirelessly and temporarily stored at a receiver unit in the house. Once per day, the receiver transfers the data to a data center with an embedded mobile phone module in the receiver unit.

Evaluation of subjects

After the experiment, the cognitive functional status of the subjects was assessed by performing a Mini Mental State Examination (MMSE). Additionally, in order to improve the validity of data analysis, by using questionnaires, the number of outings and sleep time were determined.

Analysis of sensor data

A computer program to analyze the sensed data was created. From the data, this program could extract the times at which the subjects left and returned to their homes and their sleep onset and wake-up times based on the following simplified patterns: (1) going out pattern—a definite no-response period after the activation of a sensor installed at an entrance; (2) coming home pattern—activation of an entrance sensor after going out; (3) sleep onset pattern—a definite no-response period after activation of a sensor installed in a bedroom at night; and (4)

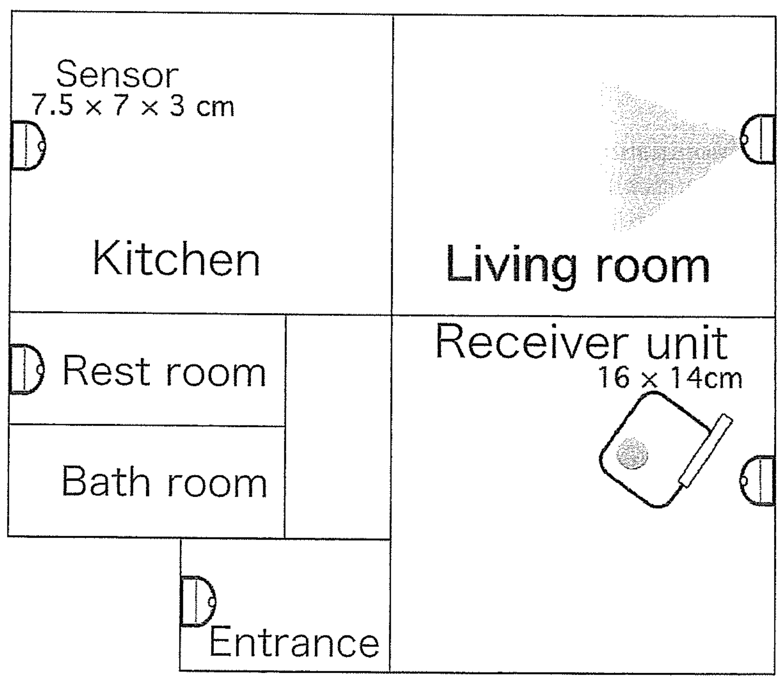

FIG. 1. Infrared sensors and a transceiver—an installation example. Each sensor with a cover range of 5 meters has a potential to detect motion in the ordinary size of Japanese rooms. The rental fee for this system is approximately $30 per month.

TABLE 1. CHARACTERISTICS OF SUBJECTS AND EXTRACTED DATA FROM SENSORS

Subjects	*Age*	*Gender*	*MMSE*	*Outing/month*	*Sleeping time (min)*	*Bedtime ± 1 SD (min)*	*Wake-up time ± 1 SD (min)*	*Interruption sleep/day*
No. 1	70	F	20	15	251	22:35 ± 99	6:51 ± 50	4.5
No. 2	84	F	27	18	397	22:09 ± 59	6:22 ± 38	2.0
No. 3	67	M	22	10	434	20:27 ± 75	7:16 ± 42	3.5
No. 4	81	F	29	24	488	19:59 ± 115	8:03 ± 48	3.8
No. 5	80	F	29	13	564	20:58 ± 45	7:18 ± 10	1.7
No. 6	88	F	27	27	537	20:27 ± 57	7:12 ± 25	3.5
No. 7	81	F	29	20	395	23:15 ± 23	6:51 ± 26	1.1
No. 8	77	F	26	25	325	23:31 ± 76	7:47 ± 36	4.3
No. 9	82	F	27	18	388	22:54 ± 58	6:31 ± 52	1.4
No. 10	82	F	23	19	371	20:04 ± 36	4:26 ± 39	2.7
No. 11	76	F	30	28	486	21:35 ± 118	7:25 ± 67	1.7
No. 12	90	F	21	4	317	21:49 ± 120	6:38 ± 134	2.9
No. 13	85	M	29	25	401	21:01 ± 63	5:39 ± 40	2.6
No. 14	77	F	27	16	412	23:20 ± 82	6:60 ± 26	1.1

MMSE, Mini Mental State Examination; SD, standard deviation.

interruption of sleep pattern—activation of sensors installed in rooms other than a bedroom. The time of sleep onset was defined as the bedtime and the last sleep interruption as the wake-up time. The number of outings, total sleep time, number of sleep interruptions, and sleep rhythm were analyzed. These data were compared between subjects in an impaired cognition group (MMSE < 24) and those in a control group (MMSE ≥ 24).

RESULT

Some important parameters could be extracted from the data measured by infrared sensors that were used to evaluate the daily activities and sleep rhythms of the subjects (Table 1). We found that the standard deviations of the bedtimes and wake-up times could be utilized as an indicator of sleep rhythm. The comparison of the impaired cognition group with the control group revealed a significantly lower number of outings and a tendency toward a shorter sleep time in the impaired cognition group (Table 2).

We compared the analysis data to the questionnaire answers. Excellent agreement and significant positive correlations were found between these data (number of outings: correlation coefficient $R^2 = 0.84$ $p < 0.001$, sleep time: $R^2 = 0.83$ $p < 0.001$).

DISCUSSION

The present study showed that the number of outings and sleep time were probably good indicators for the early detection of dementia. For elderly people living alone, an outing appeared to be not only a physical activity but also a social activity. Fratiglioni et al.[1] enu-

TABLE 2. COMPARISON BETWEEN THE IMPAIRED COGNITION GROUP AND CONTROL GROUP

	MMSE < 24	*MMSE ≥ 24*	p
Age	77.3	81.1	0.32
Number of outing/month	12.0	21.3	0.01[a]
Sleeping time (min)	343.0	439.0	0.05
Standard deviation of wake-up time (min)	50.2	36.8	0.18
Standard deviation of bedtime (min)	82.3	69.5	0.50
Interruption of sleep/day	3.4	2.3	0.12

Student's paired t test, [a]$p < 0.05$.
MMSE, Mini Mental State Examination.

merated "living alone" and "without any close social ties" as risk factors for developing dementia. In contrast, it was reported that an active and social lifestyle was effective in preventing the development of dementia.[6,7]

To evaluate sleep, we extracted the sleep time and number of sleep interruptions. Statistical analysis revealed fluctuation in bedtime and wake-up time. Sleep disorders include not only a reduction in sleep time but also the comprehensive inclusion of multiple factors. It is well known that people with dementia often have sleep disorders.

This study showed that the impaired cognition group experienced significantly lower number of outings and tended to have some kind of sleep problem as compared with the control group. There are several reports indicating that people with dementia become inactive prior to the development of dementia.[8] The continuous monitoring of living conditions was considered necessary for the early detection of dementia.

CONCLUSION

We were able to estimate the living pattern of elderly people from data obtained without any problems or restrictions. The present study indicates that some parameters can be utilized as indicators of early dementia. In addition, the method used in this study is highly feasible and can be performed at low cost in Japan because of the application of commercially provided services.

REFERENCES

1. Fratiglioni, L, Wang, HX, Ericsson, K, Maytan, M, Winblad, B. Influence of social network on occurrence of dementia: A community-based longitudinal study. Lancet **2000**;355:1315–1319.
2. Arai, A, Katsumata, Y, Konno, K, Tamashiro, H. Sociodemographic factors associated with incidence of dementia among senior citizens of a small town in Japan. Care Manag J **2004**;5:159–165.
3. Tang, P, Venables, T. 'Smart' homes and telecare for independent living. J Telemed Telecare **2000**;6:8–14.
4. Ohta, S, Nakamoto, H, Shinagawa, Y, Tanikawa, T. A health monitoring system for elderly people living alone. J Telemed Telecare **2002**;8:151–156.
5. Chan, M, Campo, E, Esteve, D. Assessment of activity of elderly people using a home monitoring system. Int J Rehabil Res **2005**;28:69–76.
6. Fabrigoule, C, Letenneur, L, Dartigues, JF, Zarrouk, M, Commenges, D, Barberger-Gateau, P. Social and leisure activities and risk of dementia: A prospective longitudinal study. J Am Geriatr Soc **1995**;43:485–490.
7. Fratiglioni, L, Paillard-Borg, S, Winblad, B. An active and socially integrated lifestyle in late life might protect against dementia. Lancet Neurol **2004**;3:343–353.
8. Friedland, RP, Fritsch, T, Smyth, KA, Koss, E, Lerner, AJ, Chen, CH, Petot, GJ, Debanne, SM. Patients with Alzheimer's disease have reduced activities in midlife compared with healthy control-group members. Proc Natl Acad Sci USA **2001**;98:3440–3445.

Address reprint requests to:
Toshiro Suzuki, M.D.
Division of Medical Informatics
Shinshu University Hospital
3-1-1 Asahi
Matsumoto, 390-8621
Japan

E-mail: tos@hsp.md.shinshu-u.ac.jp

平成１７年度厚生労働科学研究費補助金
医療技術総合評価研究事業
財団法人日本救急医療財団　研究成果等普及啓発事業助成

第一回遠隔医療調査研究班
報告会プログラム

日時　平成 17 年 10 月 22 日（土）　18 時 15 分～18 時 45 分
場所　サンポート高松シンボルタワー会議室

-プログラム-

1. 開会

2. 研究の概要
班長　村瀬澄夫　（信州大学）

3. 研究の計画
長谷川高志　（東北大学先進医工学研究機構）

平成１７年度厚生労働科学研究費補助金

医療技術総合評価研究事業

財団法人日本救急医療財団　研究成果等普及啓発事業助成

第二回遠隔医療調査研究班
報告会プログラム

日時　平成 18 年 3 月 10 日　17 時 30 分～20 時
会場　東京国際フォーラム

-プログラム-

（１）開会挨拶　村瀬澄夫（信州大学）
（２）研究の背景と目的（５分）　村瀬澄夫（信州大学）
（３）テレケア機器に関する調査結果（２０分）　長谷川高志（東北大学）
（４）遠隔医療（テレケア）モデルの事例報告（９０分）

1. **テレケアにおけるネットワーク技術の動向**　**広川博之（旭川医大）**
   IPv6 在宅健康管理システム
2. **テレケア機器評価とビジネスモデルの検討**　**鎌田弘之（岩手医科大学）**
   １）テレケア機器の外形的性能評価
   ２）ネットワーク対応型携帯心電計(net-AECG)の新しいビジネスモデル検討
3. **健康管理端末を用いた健康アドバイス**　**鈴木敏郎（信州大学）**
   家庭用健康管理端末
4. **小型機器による健康管理**　**坂田信裕（信州大学）**
   生体センサーシステム
5. **テレケアにおける運動負荷と栄養管理**　**木村　穣（関西医科大学）**
   １）テレケア運動負荷心電図
   ２）テレケア栄養指導管理システム
6. **在宅遠隔栄養指導とサプリメント**　**郡　隆之（利根中央病院）**
   e-nutrition system
7. **非拘束無侵襲の健康管理**　**村瀬澄夫（信州大学）**
   みまもり健康管理システム
8. **在宅テレケア端末の活用**　**太田隆正（新見医師会）**
   １）新見地区在宅医療介護へのＩＰＴＶ電話利用の試み
   ２）山間僻地における携帯型通信端末の応用について
   ３）遠隔在宅医療支援のための機器開発

4）携帯型通信端末機による遠隔医療へのニーズ（参考）
5）新見市遠隔在宅医療支援システム （参考）
6）新見市ＩＴ事業への取り組み （参考）

9.　テレケアのリアルタイムコミュニケーション　　酒巻哲夫（群馬大学）

ＴＶ電話を備えたテレケアシステム

10.　モバイル技術を用いた在宅ハイリスク妊婦管理システムの開発

モバイル在宅妊婦管理システム　　**原　量宏（香川大学）**

11.　携帯電話を利用した生体情報管理　　岡田宏基（岡山大学）

生体情報リアルタイム収集及び支援システム

（５）総合討論（２５分）

（６）閉会挨拶　　村瀬澄夫（信州大学）

平成18年度第一回遠隔医療調査研究班会議

(1)　日時　平成１８年９月２１日（木）１６時-１８時
(2)　会場　高崎医療福祉大学　１号館第３会議室
(3)　プログラム

16:00	開会の挨拶	村瀬澄夫　（信州大学）
16:00-16:10	ご挨拶	三田晃史（厚生労働省）
16:10-16:20	テレケアモデルとしてのコールセンター	村瀬澄夫　（信州大学）
16:20-17:20	各研究領域からの報告	

I テレケアモデル

1. テレケアのコミュニケーション	酒巻哲夫（群馬大学）
2. 北海道におけるコールセンター	廣川博之（旭川医科大学）
3. フィンランドのコンタクトセンター	村瀬澄夫　（信州大学）
4. テレケアモデルの経済性	辻　正次　（兵庫県立大学）

II 携帯電話の活用

5. 携帯電話による在宅妊婦管理	原　量宏（香川大学）
6. Ecological Momentary Assessment(EMA)	岡田宏基（岡山大学）

III 継続的指導

7. テレケアにおける心電図計測の意義	鎌田弘之（盛岡赤十字病院）
8. フィットネスクラブと連携した運動指導	木村　穣（関西医科大）
9. 在宅遠隔栄養指導	郡　隆之（利根中央病院）
10. テレナーシング	亀井智子（聖路加看護大学）

IV 緊急対応時の課題

11. 沖縄でのトライアスロン支援の経験	久木田一郎（琉球大学）
12. 緊急医療支援ネットワーク	中島　功（東海大学）

17:20-17:30	評価調査方法の検討	長谷川高志（国際医療福祉大学）
17:30-18:00	総合討論	
18:00	閉会の挨拶	村瀬澄夫（信州大学）

財団法人　日本救急医療財団　研究成果等普及啓発事業助成
平成１８年度厚生労働科学研究費補助金・医療技術総合評価研究事業

情報技術マネジメントによる高い医療の質と効率化を可能にする
遠隔医療（テレケア）モデルの開発と評価の研究

遠隔医療調査研究班報告会

平成19年3月9日（金）　13：00〜15：30
日本コンベンションサービス　会議室

13:00	開会の挨拶	村瀬澄夫（信州大学）
13:00-13:10	ご挨拶	三田晃史（厚生労働省）
13:10-13:20	研究の背景と目的	村瀬澄夫（信州大学）
13:20-13:40	コンタクトセンター調査結果	長谷川高志（国際医療福祉大学）
13:40-15:10	各研究領域からの報告	
	Ⅰテレケアモデル	
	1.北海道のコンタクセンターの状況	廣川博之（旭川医科大学）
	2.テレケアによる医療経済効果	辻　正次（兵庫県立大学）
	3.高齢者のテレケアニーズ	坂田信裕（信州大学）
	Ⅱ携帯電話モデル	
	4.遠隔在宅妊婦管理	原　量宏（香川大学）
	5.医療・健康指導への携帯電話の応用	岡田宏基（岡山大学）
	Ⅲインターネットモデル	
	6.心電図計測による健康指導	鎌田弘之（盛岡赤十字病院）
	7.遠隔運動指導の効果	木村　穣（関西医科大）
	8.遠隔栄養指導の意義	郡　隆之（利根中央病院）
	9. IP ビデオ通話による診療支援の可能性	山口典秀（恵明会クリニック）
	Ⅳ衛星・国際モデル	
	10.沖縄における医療支援の経験	久木田一郎（琉球大学）
	11.国際医療支援ネットワーク	中島　功（東海大学）
	12.多言語問診システムによる診療支援	酒巻哲夫（群馬大学）
15:10-15:30	総合討論	
15:30	閉会の挨拶	村瀬澄夫（信州大学）