ICT Trends in Japan's Healthcare Policy

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With the coming of a super-aging society, Japan is faced with pressing social problems including medical expenditures increasing at an annual rate of about 1 trillion yen and an overstretched healthcare system—drastic structural reform in healthcare and medical care has become an urgent matter. Under the Japan Revitalization Strategy (revised in June 2014) to promote national growth, Japan aims to "extend the nation's healthy life expectancy" while simultaneously sustaining the social security system, providing high-quality healthcare services, and stimulating the healthcare industry in Japan. The government has also enacted the Act on Promotion of Healthcare Policy, which aims to promote medical care using world-class technologies and contribute to economic growth as basic principles, and the Healthcare Policy (July 2014), which incorporates specific measures and emphasizes the importance of applying ICT to medical care. This paper describes the latest policy trends in using ICT in the healthcare, medical care, and nursing care fields with a focus on the Healthcare Policy.

1.   Introduction

Japan has the world's highest life expectancy thanks to its universal public health insurance system, first-rate public health measures, and advanced medical technologies. However, the coming of a super-aging society means great changes in the balance between the supply and demand of medical care. Japan's national medical expenditure, which is approaching 40 trillion yen a year (about $333 billion at the rate of 120 yen per dollar), is increasing at an annual rate of approximately 1 trillion yen (about $8.3 billion), and the lack and uneven distribution of medical practitioners is starting to create a gap in healthcare services between metropolitan and regional areas. At the same time, establishing reasonable charges for medical care and maintaining regional healthcare systems are becoming urgent social issues.

With an eye to resolving these issues, the Japanese government has formulated the Japan Revitalization Strategy,[1] which establishes "extending the nation's healthy life expectancy" as a national goal. It focuses on not only extending the average life expectancy of its citizens but also enabling them to live a more healthy life as well. The government has also

formulated the Healthcare Policy[2] incorporating strategies aimed at achieving the world's most advanced healthcare technologies and services and on fostering industrial development and international expansion in the health and medical care fields.

These strategies incorporate policies for promoting the effective application of information and communications technology (ICT). This paper describes trends in ICT policy in the healthcare, medical care, and nursing care fields.

2.   Overall picture of national strategies

The Japanese government is promoting healthcare and medical care policies in a number of national strategies. The relationship between three key national strategies and the Healthcare Policy at their core is shown in **Figure 1**. Each of these national strategies led to policies based on the view that healthcare, medical care, and nursing care are vitally important fields. Specifically, the Japan Revitalization Strategy, the Declaration to be the World's Most Advanced IT Nation,[3] and the Comprehensive Strategy on Science, Technology and Innovation[4] respectively formulate these policies in terms of fortifying industrial

Comprehensive Strategy on Science,
Technology and Innovation
(Council for Science, Technology
and Innovation)
• Promote development of most advanced
  healthcare technologies
• Foster growth industries in fields of health and
  medical care through science and technology

Japan Revitalization Strategy "Extending
Healthy Life Expectancy"
(Headquarters for Japan's Economic
Revitalization)
• Improve both sustainability and quality of medical
  care and nursing care
• Create diverse healthcare industries
• Provide both advanced technologies and services

Declaration to be the World's Most
Advanced IT Nation
(IT Strategic Headquarters)
• Develop effective, efficient, and high-quality
  medical and nursing services using IT
• Promote effective use of diverse types of data
  including healthcare, medical care, and
  nursing care information

Healthcare Policy
(Headquarters for Healthcare Policy)

1) Measures related to medical R&D, etc. that contribute to the provision of the world's best medical care
• Promote integrated medical R&D activities, from basic R&D to R&D focused on practical
  applications, and facilitate the practical application of the results of these activities
• Improve industrial competitiveness in fields associated with drugs, medical devices, etc. and
  medical technology, as well as promote international medical collaboration and contributing to
  the international community

2) Measures related to promoting the creation of new industries and facilitating overseas expansion
   in the healthcare and medical care sector
• Create new industries focused on healthcare and medical care
• Create new markets for healthcare services not covered by public insurance

3) Measures for promotion of education and securing of personnel related to cutting-edge healthcare
   and medical R&D and the creation of new industries
• Secure and cultivate the personnel required to promote cutting-edge healthcare and medical R&D
• Secure and cultivate the specialist personnel required to promote the creation of new industries

4) Measures related to digitization and ICT use associated with the medical, nursing, and health
   care required to achieve the world's most advanced medical care
• Establish digital infrastructure in the fields of medical, nursing, and health care
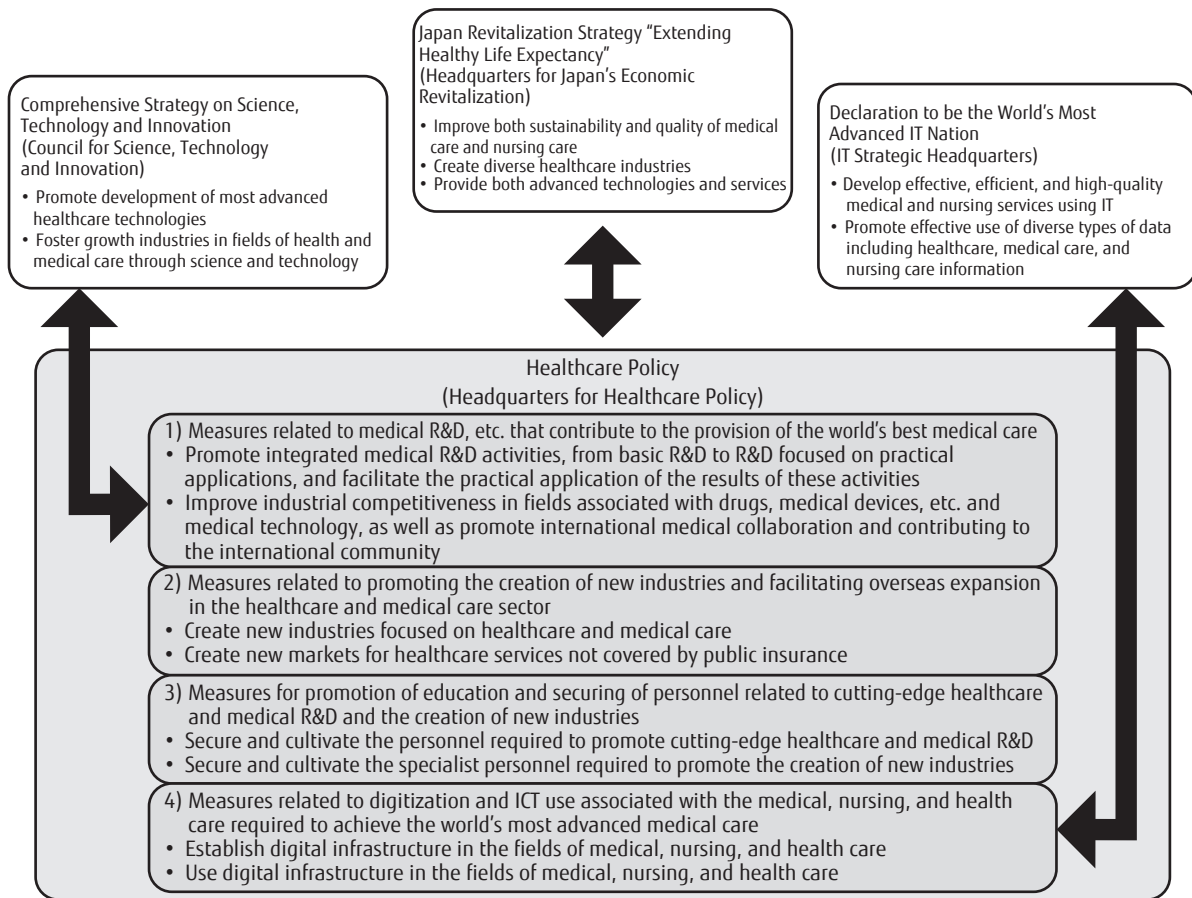• Use digital infrastructure in the fields of medical, nursing, and health care

Figure 1
Overall picture of strategies in health and medical care fields.

competitiveness, applying information technology (IT) effectively, and researching and developing advanced technologies.

1) Japan Revitalization Strategy

This is a growth strategy that aims to fortify industrial competitiveness toward a virtuous cycle of the economy. It promotes policies such as the development of industries that contribute to extending healthy life expectancy with the aim of extending the nation's healthy life expectancy on the whole. Specifically, the idea behind the Japan Revitalization Strategy is to improve the sustainability and quality of medical care and nursing care, create diverse healthcare, medical care, and nursing care industries, and create advanced technologies and healthcare services.

2) Declaration to be the World's Most Advanced IT Nation

This strategy promotes the use of ICT in a variety of areas. In the healthcare, medical care, and nursing care fields, it begins with the digitization of on-site systems in medical care and nursing care. It then moves on to the development of nationwide healthcare information networks (digital infrastructure) essential to medical care and nursing care and the effective use of healthcare, medical care, and nursing care information. Specifically, this strategy promotes the following measures:

• Development of effective and efficient medical and nursing services through the use of IT

• Promotion of good health and prevention of disease exacerbation by using the costs and findings of health examinations performed on working age people

3) Comprehensive Strategy on Science, Technology and Innovation

This strategy aims at social reform through the

development of science and technology. It focuses on enabling a "healthy long life" and vigorously promotes the research and development of drugs and medical devices and technologies that can be used in clinical practice.

3. Healthcare Policy
3.1 Main measures

The Healthcare Policy consists of four types of measures as described below.

1) Measures related to medical R&D, etc. that contribute to the provision of the world's best medical care

With the aim of providing the world's highest level of medical care, these measures promote medical R&D from basic research and development to advanced medical care technologies that can be used in actual clinical practice while also promoting the R&D of sophisticated drugs. To this end, the Japan Agency for Medical Research and Development (AMED) will be established (scheduled for launch in fiscal year 2015) and given a "control tower" function to oversee research and development in the field of medical care. Specific objectives to be achieved by 2020 include the commencement of trials for at least ten types of drugs for cancer treatment and the identification of ten drugs for development.

2) Measures related to promoting the creation of new industries and facilitating overseas expansion in the healthcare and medical care sectors

These measures aim to create a market for new healthcare, medical care, and nursing care services outside the public insurance system such as disease prevention and everyday support during the chronic phase of a disease. They will also promote the creation of a system for widespread sharing of diverse types of information related to medical and nursing care and the formulation of technical requirements, operating rules, and standards for linking information using ICT. One objective is to expand the market scale of industries involved in promoting good health, preventing disease, and providing everyday support from the present 4 trillion yen to 10 trillion yen by 2020. Another is to establish a 5-trillion-yen overseas market for Japanese medical technologies and services by 2030.

3) Measures related to promoting education and securing personnel for cutting-edge healthcare and medical R&D and for creating new industries

These measures aim to promote the development and procurement of the personnel needed for conducting cutting-edge research and development in the healthcare, medical care, and nursing care fields and the development and procurement of specialized personnel for creating new industries in the same fields. They also aim to promote learning and expand public relations activities in these areas.

4) Measures related to digitization and ICT use associated with the medical, nursing, and health care required to achieve the world's most advanced medical care

The aim is to construct by 2020 a digital infrastructure that would enable those concerned to share digital information collected from medical care and nursing care sites.

3.2 Direction of digitization and ICT use

Councils and task forces[5] within the Headquarters for Healthcare Policy established by the Cabinet Secretariat are studying specific undertakings and activities of the Healthcare Policy (**Figure 2**). Here, we discuss in particular the introduction of digital, ICT-based systems in medical care, nursing care, and healthcare, as described in "3.1 Main measures (4)" above. The Task Force for Next-generation Medical ICT is in charge of this undertaking, and, under interim guidelines, is promoting the introduction of ICT in medical care, nursing care, and healthcare on three levels (**Figure 3**).

• Level 1
Digitize systems at medical care, nursing care, and healthcare sites
• Level 2
Construct an overall digital infrastructure for the healthcare, medical care, and nursing care fields
• Level 3
Apply information on medical care, nursing care, and healthcare stored in the digital infrastructure

On levels 1 and 2, the various types of information generated at medical care, nursing care, and healthcare sites will be digitized to enable it to be shared via the digital infrastructure. On level 3, the application of information stored in the digital infrastructure to medical care administration, medical services, and clinical research will be facilitated. The idea is to use
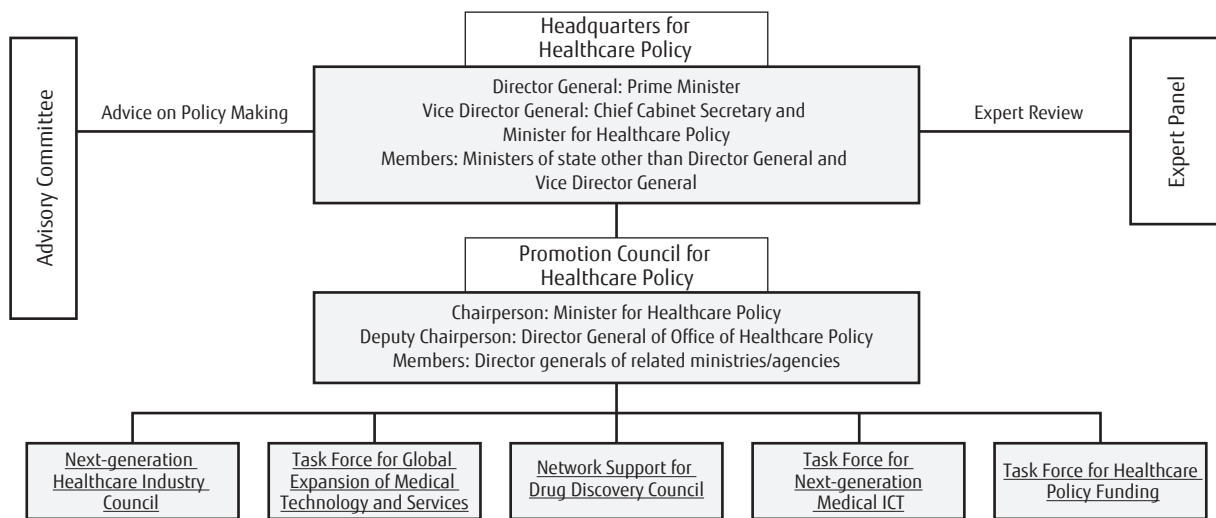
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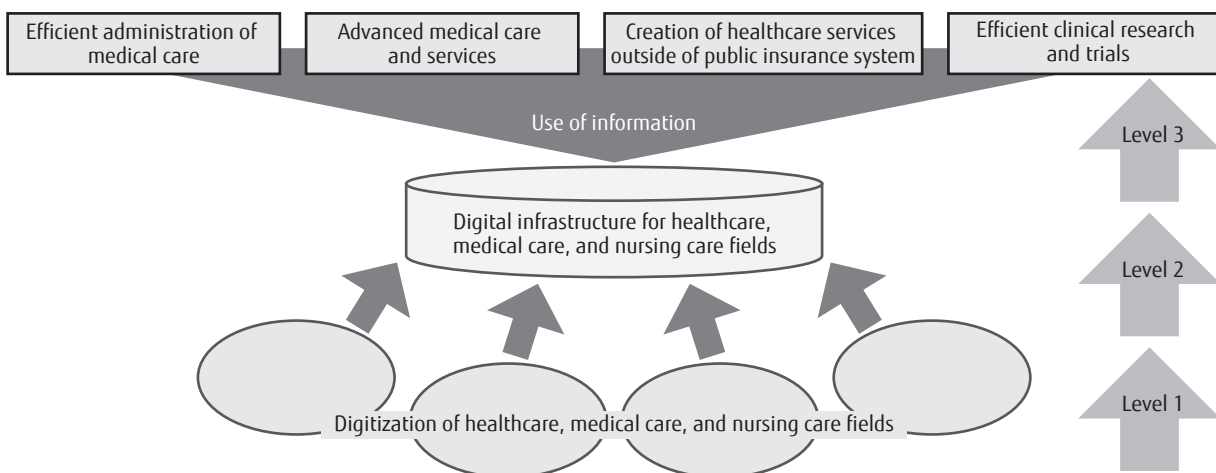Healthcare Policy promotion system.

Figure 3
Digitization and ICT use in healthcare, medical care, and nursing care fields.

this digital infrastructure to develop innovative medical technologies and advanced medical services, to create healthcare services outside the public insurance system, and to raise the efficiency of clinical research and trials.

4. Government budget for implementing ICT in healthcare, medical care, and nursing care fields

The Japanese government has taken a variety of budgetary steps to implement ICT as described in the Healthcare Policy. The main measures and budgets of various ministries and agencies are listed in **Table 1**.[6)–10)] This section takes up "comprehensive funding for regional medical/nursing care," "promotion of data health plans," and "R&D in medical care."

4.1 Comprehensive funding for regional medical/nursing care

On the basis of the "Acts for Promoting Comprehensive Measures for Securing Regional Medical and Nursing Care" approved in an ordinary session of the Diet, the Ministry of Health, Labour and Welfare (MHLW) formulated the "Basic Policy on Comprehensive

Table 1
Main ICT government budgets in health, medical care, and nursing care fields.

Field	Ministry/Agency	Measure	Budget*	Summary
Provision of regional medical/nursing care	Ministry of Health, Labour and Welfare (MHLW)	Comprehensive funding for regional medical/nursing care	FY2014 main budget: 60.2 billion yen FY2015 draft budget: 108.5 billion yen	Provides funding based on Acts for Promoting Comprehensive Measures for Securing Regional Medical and Nursing Care in Japan's administrative districts. Financial support will be provided for securing medical care personnel. Targets include development of regional healthcare information networks using ICT.
Health improvement and disease prevention	MHLW	Promotion of data health plans	FY2014 main budget: 690 million yen FY2015 draft budget: 660 million yen	Provides funding for evaluating and analyzing data health plans formulated by medical care insurers and others and results of business based on those plans with the aim of horizontally expanding advanced health-preservation business based on the work of those insurers.
Health improvement and disease prevention	Ministry of Economy, Trade and Industry (METI)	Promotion of new industries for extending healthy life expectancy	FY2014 main budget: 870 million yen FY2015 draft budget: 820 million yen	Promotes creation of business models for regional healthcare services outside public insurance system and healthcare investment based on incentive measures.
Health improvement and disease prevention	Ministry of Internal Affairs and Communications (MIC)	Achieving advanced ICT for next-generation medical care, nursing care, and healthcare	FY2014 main budget: 1.2 billion yen FY2015 draft budget: 470 million yen	Promotes information linking and ICT-based health model in health, medical care, and nursing care fields as well as construction and demonstration of information infrastructure using ICT.
Promotion of R&D	Cabinet Secretariat MEXT MHLW METI	R&D in medical care	FY2014 main budget**: 121.5 billion yen FY2015 budget request: 124.8 billion yen	Promotes collaboration among ministries under Headquarters for Healthcare Policy and R&D in medical care as a unified government effort. Aims to help Japan achieve the world's most advanced medical care by developing advanced drugs and medical devices and performing advanced clinical research and trials. Promotes R&D in relation to illnesses such as cancer, dementia, and infectious diseases. All such R&D will be unified under the Japan Agency for Medical Research and Development (AMED) scheduled for launch in fiscal year 2015.

*Total budget including non-ICT
**FY2014 MEXT main budget includes FY2013 supplementary budget

Prepared using summaries of FY2014 budgets and FY2015 draft budgets of Cabinet Secretariat, MIC, MEXT, MHLW, and METI

Measures for Securing Regional Medical and Nursing Care." This policy provides guidelines for conducting healthcare, medical care, and nursing care projects in each of Japan's administrative districts (Tokyo, Osaka, Kyoto, Hokkaido, and remaining prefectures). Budgets for these projects were allocated on the basis of the administrative district plans in accordance with these guidelines, and funds were dispersed to each district in Fall 2014.

In anticipation of the arrival of the super-aging society, this funding supports the following initiatives with the aim of creating a seamless system of medical care and nursing care based on the situation in each region while keeping the user's viewpoint and needs in mind.

1) Functional differentiation and coordination of hospital beds

This initiative deals with the establishment of regional healthcare information networks using ICT and the establishment of infrastructures and facilities for promoting the functional differentiation and coordination of hospital beds toward reform of the healthcare provision system.

2) Promotion of in-home medical care

This initiative promotes in-home medical care (including dentistry and drug dispensing) and deals with the establishment of hubs and support systems for conducting in-home medical care and the securing and training of the personnel needed to perform in-home medical care and make home visits for nursing

purposes.

3) Securing and training of medical care professionals

This initiative promotes measures for securing medical practitioners and nursing personnel and measures for improving the employment environment for medical care professionals.

The use of ICT is indispensable to maintaining a high-quality healthcare system and constructing integrated community care systems. The plan is to expand these initiatives to each administrative district in Japan by making use of the dispersed funds.

4.2 Promotion of data health plans

The MHLW will evaluate and analyze data health plans formulated by medical care insurers and the results of business based on those plans to promote efficient and effective business by medical care insurers through the Plan-Do-Check-Act (PDCA) cycle.

Medical care insurers, meanwhile, will strive to determine the health state of insured persons on the basis of, for example, the costs and findings of health examinations with the aim of preventing disease exacerbation and promoting good health overall. These efforts should help the insured become more health conscious, extend healthy life expectancy, and keep medical expenditures at an appropriate level.

The Fujitsu Health Insurance Society was selected as a lead model for this measure in fiscal year 2014.

4.3 R&D in medical care

The Center of Innovation (COI) program is a groundbreaking endeavor launched in fiscal year 2013 by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). This program sets the vision for a desirable society ten years out, uses the backcasting method to identify R&D challenges for making that vision a reality, and takes up those challenges through industry-academia collaboration and cross-disciplinary efforts. Achieving a sustainable society in Japan by extending the nation's healthy life expectancy is a major aspect of that vision.

Fujitsu is participating in the COI program and is engaged in joint research and development with The University of Tokyo and other institutions to contribute to the provision of evidence-based medicine through the integration, analysis, and application of health and medical care information.

As mentioned earlier, the AMED will be set up as a national research and development institution in fiscal year 2015. It will consolidate the budgets drafted separately by MEXT, MHLW, and the Ministry of Economy, Trade and Industry (METI) for nine key areas including regenerative medicine, genomic medicine, cancer, dementia and psychiatric disorders, and drug discovery. It will also support a full range of research and development projects, from basic research to development of practical applications. The area of genomic medicine, for example, will include the creation of a virtual biobank on the scale of several hundred thousand people and the analysis of that data as part of a MEXT initiative. At the same time, MHLW will promote the development of clinical applications using that information for establishment of predictive diagnostics and preventive medicine based on genetic risks.

In the above ways, the Japanese government is energetically backing the use of ICT in the fields of healthcare, medical care, and nursing care from a budget perspective as well.

5. Establishing an environment to promote medical ICT

The Japanese government is simultaneously working to establish an environment that promotes the use of ICT in the healthcare, medical care, and nursing care fields.

5.1 Revision of Personal Data Protection Law

One pillar of the Japan Revitalization Strategy is revival of the economy through the effective use of data, but a regulatory system, rules and guidelines, etc. are needed for using information appropriately in the field of medical care if new industries and services are to be created. Recognizing this need, the Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society convened a Committee on Personal Data to investigate revisions to the Personal Data Protection Law, and, in June 2014, the Cabinet approved the "Policy Outline of the Institutional Revision for Utilization of Personal Data."[11] This Outline calls for an institutional revision based on the following points. The aim is to determine an appropriate framework for handling personal data that achieves a balance between privacy protection and

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data usage in this era of increasingly advanced ICT.

- Introduce a framework that enables the use of personal data without consent of the individual provided that due consideration has been given to concerns regarding infringement of the person's rights or interests
- Clarify the scope of "personal information," decide on rules and regulations for handling that information, and make use of private and voluntary activities in this regard
- Ensure effective enforcement of rules and regulations by setting up an independent third-party authority

The Japanese government will draft a bill for revising the Personal Data Protection Law based on this Outline. It plans to submit the bill to the Diet and receive approval at the earliest possible date.

5.2 Number-based identification system for medical care field

The Social Society and Tax Number System (The Number System) was enacted in May 2013, but approval was withheld for using The Number System for medical care such as when receiving a medical examination. The government therefore decided to promote continued studies on the system including revisions to the act with a view to expanding its scope of use. The MHLW subsequently set up a "committee on the use of a numbering system in medical care" in July 2014 to investigate the need for such a numbering system in medical care and specific usage scenarios. This study group investigated, in particular, "specific usage scenarios of the numbering system in the field of medical care," an "information linkage platform using that numbering system," and "technology verifications, costs, effects, etc. in relation to that platform." In December 2014, interim guidelines were announced that are based on the current state of revisions to the The Number System (The Number System Section Meeting, Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society) and of revisions to the Personal Data Protection Law (Committee on Personal Data, Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society).

These interim guidelines took up a variety of usage scenarios that include number-based information linking in medical care and related fields (here, "number" is not limited to The Number System). They include linking between a medical institution and a nursing-care provider, linking between health and medical care research projects, online checking of entitlements for medical care insurance, and management of immunization histories. For such types of information linkage, it was decided that studies would be performed on a mechanism with safety, personal data protection, and efficiency and convenience while taking into account the particular characteristics of personal information used in medical care. Moreover, considering that the objective of the The Number System is to raise the efficiency of administrative operations in government institutions, these guidelines highlighted the desirability of linking with numbers (including magnetic codes) generated by some conversion process from Japan's resident identification number or The Number System itself, thereby avoiding the use of The Number System itself in medical care and similar facilities.

The Japanese government plans to use these interim guidelines as a basis for designing a number-based identification system for medical care after 2015.

6. Conclusion

As described in this paper, the Japanese government is energetically promoting the use of ICT to achieve a healthy, long-life society through the Japan Revitalization Strategy, the Healthcare Policy, and other national strategies, but some problems still remain. They include revision of the Personal Data Protection Law in the wake of privacy considerations governing the use of various types of information in the healthcare, medical care, and nursing care fields and the creation of a number-based identification system for medical care. There is also a need to establish procedures for obtaining consent from individuals on the use of personal data and to establish guidelines for institutions on using personal data. In addition, it will be necessary to standardize information in healthcare, medical care, and nursing care, to encrypt that information as a technology-oriented response to privacy concerns, and to establish anonymous data processing techniques, security technologies, interconnection technologies, etc.

Early creation of an environment for even more efficient and effective use of ICT in the healthcare,

medical care, and nursing care fields will make Japan the world's first healthy, long-life society. As an opinion leader in the use of ICT in medicine, Fujitsu is committed to working with the government, universities, and research institutions to disseminate this model and these technologies throughout the world. In this way, Japan will be able to make real contributions to achieving a healthy, long-life global society.

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