ICT and Healthcare in Korea: Present and Perspectives*1

JMAJ 57(2): 75-83, 2014

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I believe this topic includes a wide range of issues, but the time is limited. So, I would like to refer to the questions that were raised by the Japan Medical Association to organize my presentation so that my presentation will be more relevant to this occasion. **[Slide 2]** Those questions were: 1) Present progress of Information and Communication Technology (ICT) in the health care area in my country, 2) current status of privacy and personal information protection, 3) the numbering system, and 4) merits and demerits of healthcare supported by ICT.

[Slide 3] Upon reviewing these questions, I have organized my presentation into 3 categories: 1) Progress of ICT in the healthcare sector in Korea, 2) current status of privacy and personal information protection, 3) and the merits and demerits of ICT in healthcare.

[Slide 4] Now, the first part; the ICT progress in Korea. Let's start from 1988. **[Slide 5]** We made the national health information network plan in 1988, however there were not very many

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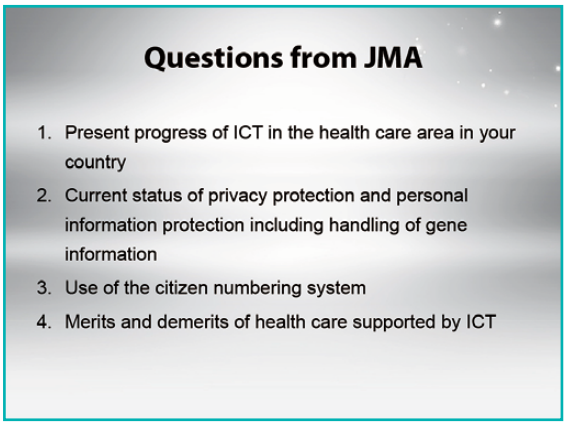

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*1 This article is based on the lecture at the JMA Conference on Medical Information Technology held on February 8-9, 2014.

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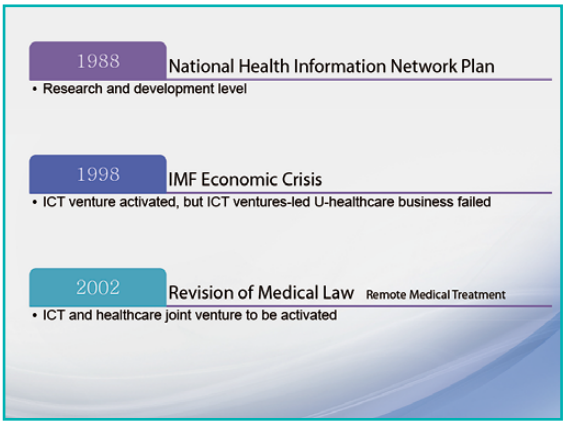

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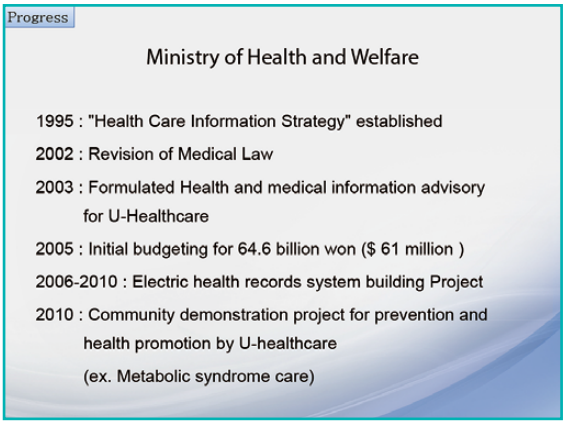

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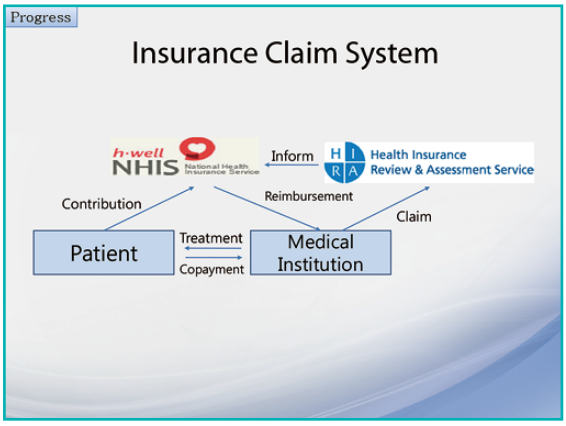
activities to be implemented at that time. Ten years later in 1998, the IMF crisis occurred—it was the first serious economic crisis that Korea experienced, and it shook our whole country economically. Paradoxically, joint venture companies of information technology (IT) and ICT were also formed around this time, and they were blooming, too. However, most of them collapsed eventually. Back then, they probably saw the crisis as the real opportunity, so they tried again and again. The national slogan in those years was, "Our country, Korea, cannot get behind in IT and ICT in the world." The country believed that we were behind in industrialization in the modern society. That drove us to the current status, and now, Korea is one of the most advanced ICT country in the world. The efforts and experience over the years provide us with many technological tools. However, we do not necessarily have enough safetyguards to use ICT in the health fields. The remote medical training was legally accommodated for the first time in 2002; I will talk about this topic in the next slide.

[Slide 6] The Ministry of Health and Welfare of Korea has implemented several actions since the mid 1990's. The Health Care Information Strategy started in 1995, and the medical law was revised to accommodate the medical remote medical training in 2002. In 2003, the Ministry formed the advisory committee for ubiquitous healthcare system (called U-Healthcare) and provided some seeding money to develop detailed plans. The development of the electronic health/medical records (EMR) system by the government started in 2006. However, the private sector like my university hospital, the Severance, had already developed it in early 2000. In 2005, we made an ubiquitous system in the Severance Hospital, which we called the U-Severance. In 2010, the government started conducting some demonstration/pilot projects to prove the cost-effectiveness of the ICT use in the healthcare sector. However, I believe it has not been very successful so far.

[Slide 7] Owing to the rapid development of ICT in Korea, most of hospitals and clinics have the tool to claim insurance reimbursement using electronic medical record system. **[Slide 8]** In addition, we have the drug utilization system checked by the ICT system to verify the proper use of drugs.

[Slide 9] Let's revisit to the law. As I mentioned in my previous slides, we had the first revision of the law in 2002 and revised it



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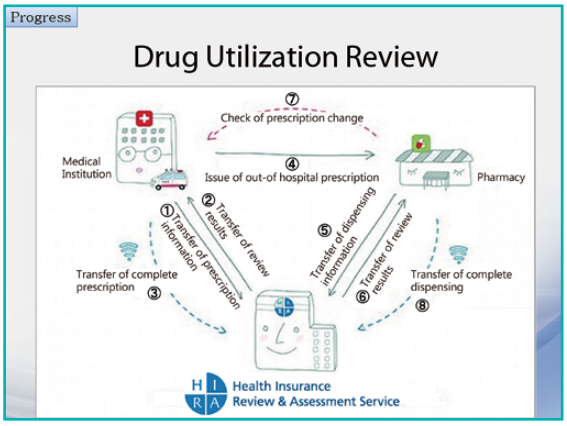

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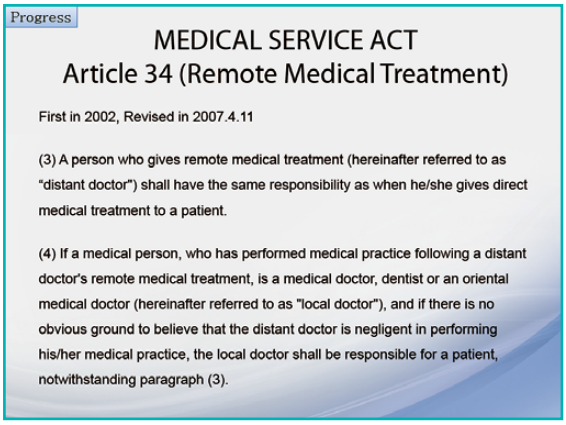

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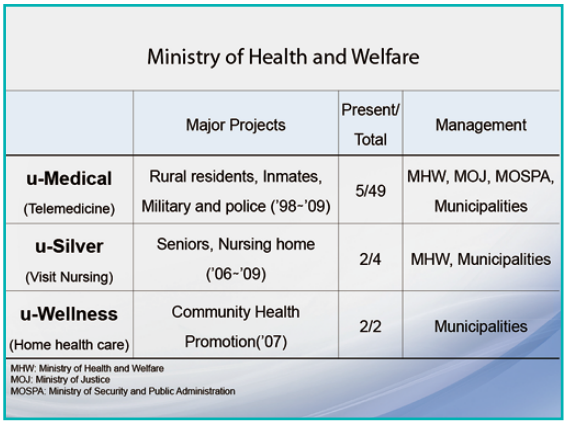

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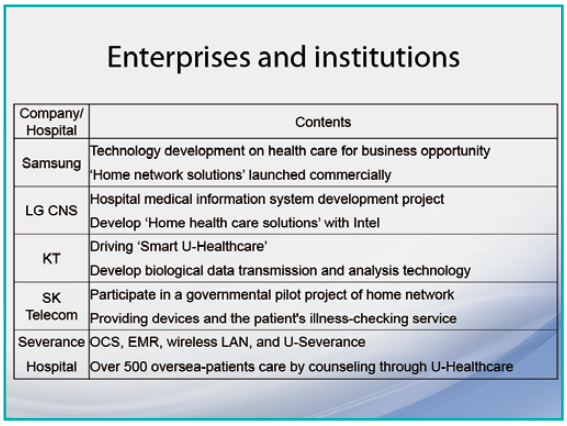
in 2007. This Medical Service Act Article 34 made the remote medical treatment possible, and stipulated that a distant doctor who gave a consultation to a local doctor has the same responsibility for most treatment of the patient. However, the recipient doctor—the "local doctor" who may be a medical doctor, dentist, or oriental doctor—has the primary responsibility, as stated in the paragraph. So, the local doctor working in the medical area has the primary responsibility.

[Slide 10] The Ministry of Health and Welfare categorized the ICT in healthcare into 3 groups. The u-Medical is for the rural and remote areas and targets inmates in prisons, military and police. The Ministry tried to conduct 5 demonstration projects until 2009 with other relating ministries such as the Ministry of Justice and Ministry of Safety and Public Administration, with the cooperation from the municipalities. The second category is the u-Silver, which allows nurses visiting seniors at home or working in nursing homes to perform care upon consulting with medical doctors. The last category is the u-Wellness, which consists of community health promotion projects. These are the categories that the Ministry of Health and Welfare suggested until 2007, but they changed slightly in recent years.

[Slide 11] Next, let me talk about what is happening in the enterprises and institutions. There are many giant companies promoting healthcare and ICT. Nowadays, they have commercially come up with home network solution to help their business opportunities, and have built EMR systems for hospitals. The KT, a telecommunication company, is operating the smart U-Healthcare, and the LG and KT even transmit biological data via telephone line. The SK Telecoms is also



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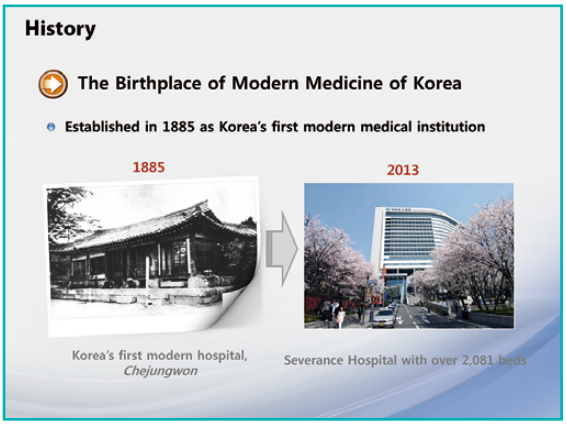

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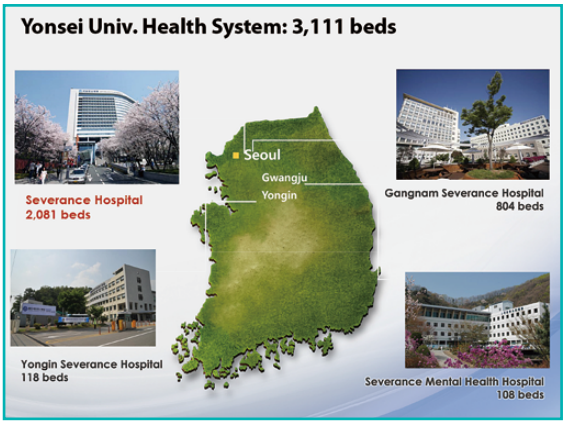

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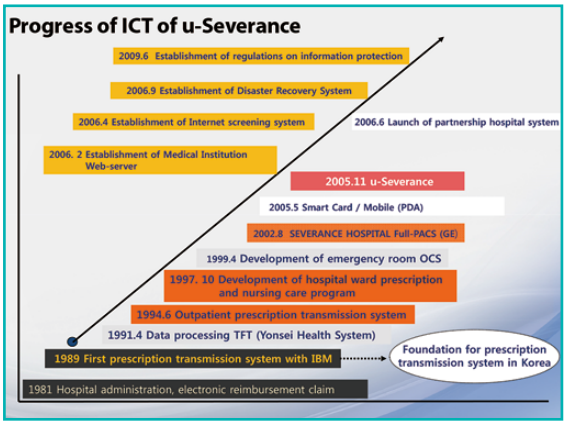
operating similar systems, participating in governmental pilot projects and devising patient checking service systems.

Lastly, the Severance Hospital where I work now already set up order communication systems (OCS) since 2005—auto-communicating system, and EMR system, and ubiquitous system—that we collectively call the u-Severance.

[Slide 12] Let's move on to the next slide, which shows the situation in my hospital, the Severance Hospital. I would like to start from its history. We started in 1885, which is 129 years ago, from a traditional infirmary in a small house. Now, it has grown to this hospital with 2,000 beds. **[Slide 13]** It is a modern hospital, and now we almost finished constructing a cancer hospital as part of the Yonsei University Severance Hospital System on the other side of the main hospital. The cancer hospital is almost 70% of the size of the main hospital. **[Slide 14]** We also have the Gangnam Hospital, which is the main branch hospital. You may all know about the Gangnam Hospital; it is located in the Gangnam area, and we have 12 other small community hospitals.

[Slide 15] We, the Severance Hospital, developed our own ICT, called the u-Severance. The Severance Hospital completed OCS in 1989, and established u-Severance in 2005 as I mentioned previously. This u-Severance include OCS, EMR system, full personal access communications system (Full-PACS), wireless local area network, and smart-card.

[Slide 16] Next category is the current status of privacy and personal information protection. Privacy is a big problem in Korea. **[Slide 17]** The number of complaint is increasing year after year; it exceeded 35,000 cases in 2009, which has



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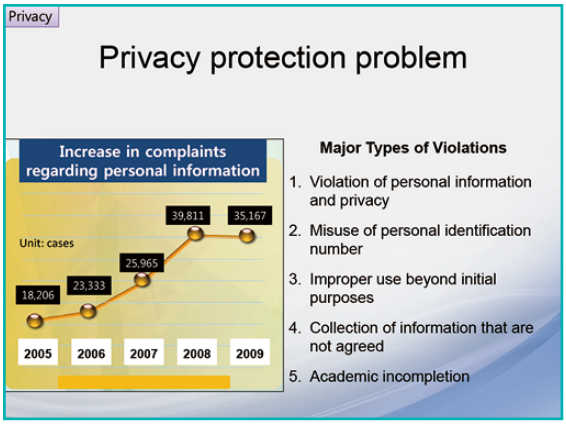

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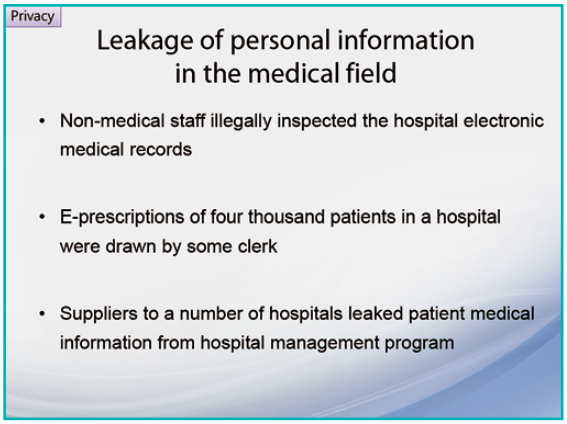

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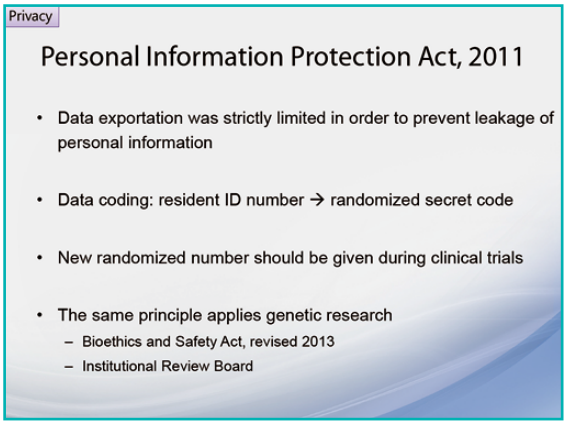
roughly doubled compared to 2005. Types and numbers of violations in descending order are: 1) infringement of private information, 2) misuse of residential identification number by others, 3) transfer of personal information to others, 4) collecting personal information without consent, and 5) various technical mistakes.

[Slide 18] I would like to introduce some detailed stories from actual cases. Bleach or theft of personal information has been committed by non-medical staff, in that they illegally inspected hospital's electronic records. Electronic prescriptions of 4,000 patients in a hospital were extracted by some clerks. Even the suppliers to a number of hospitals leaked patients' medical information from hospital management programs. As these examples suggest, there are many risks.

[Slide 19] So, the Korean government legislated the Personal Information Protection Act in 2011, which strictly limits data exportation. One critical change that became mandatory was the



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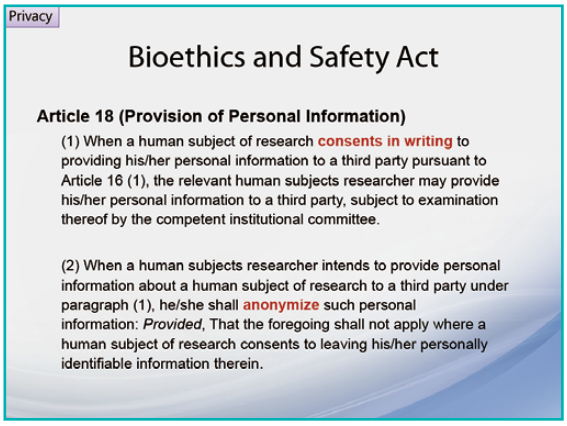

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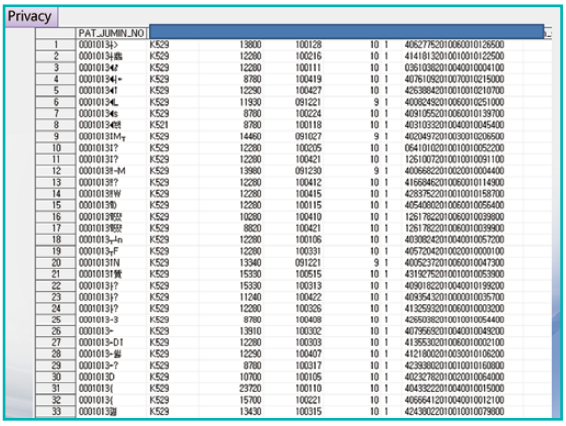

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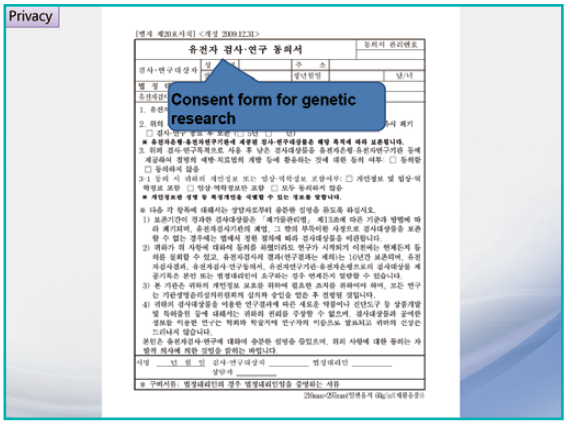

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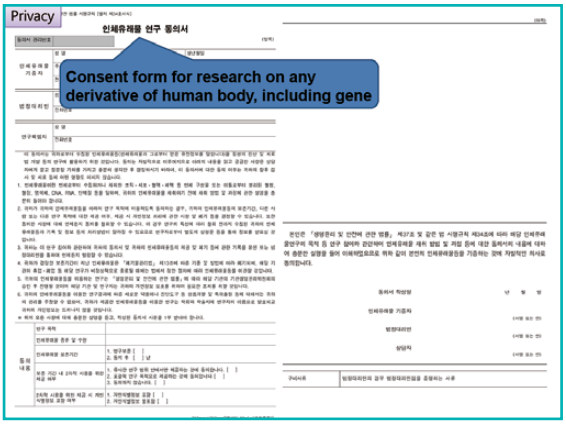

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change in the numbering system; it was changed from the resident identification numbers to the randomized secret codes. A new randomized number should be given for a clinical trial, as well. The same principle also applies to genetic research. The Bioethics and Safety Act was revised in 2013, and the monitoring by the Institutional Review Board is strictly enforced.

[Slide 20] In the Bioethics and Safety Act, it states that any research involving human subjects requires consent in writing, and that their personal information should be anonymized. So, the law was made to effectively protect people's privacy. **[Slide 21]** Under the randomized numbering system, we cannot see any personal information in the computer system; only dates of visits and some other numerical data. **[Slide 22]** The consent form for genetic research also has been strengthened, **[Slide 23]** and the target has been expanded to include not only genetic research but also the delivery of human bodies including genes.

[Slide 24] The last category is the merits and demerits of healthcare supported by ICT in Korea. I believe that Japan also has a similar healthcare system to Korea. **[Slide 25]** We have several challenges in our society for delivering good healthcare to the people. The number of people with chronic disease is increasing, and the concerns on wellness and prevention are rising. People demand proper assessment and good quality, as well as efficient healthcare delivery. Consumers are empowered, ICT is rapidly developing nationwide, and we all live in the aging society. These factors demand new ways of healthcare delivery. We all agree to that, but how can we achieve it?

[Slide 26] The government is always con-

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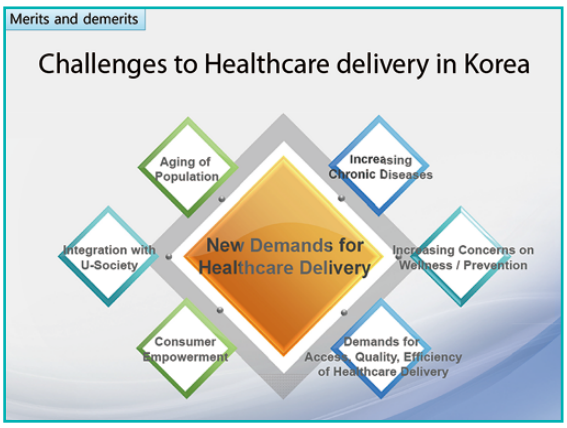

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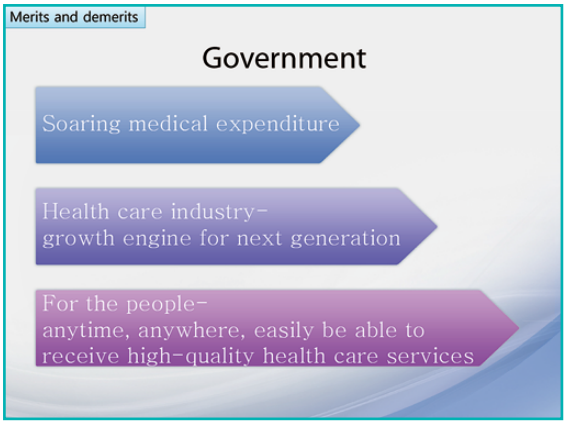

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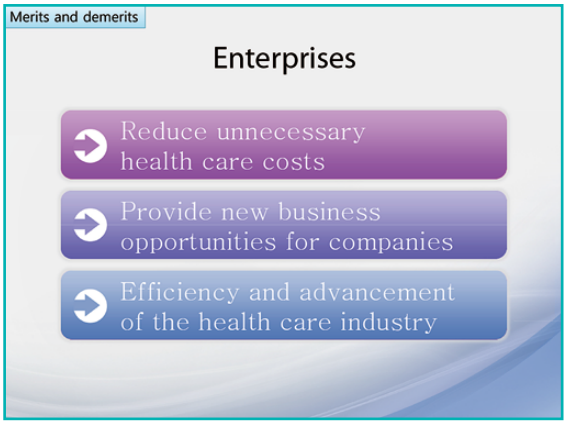

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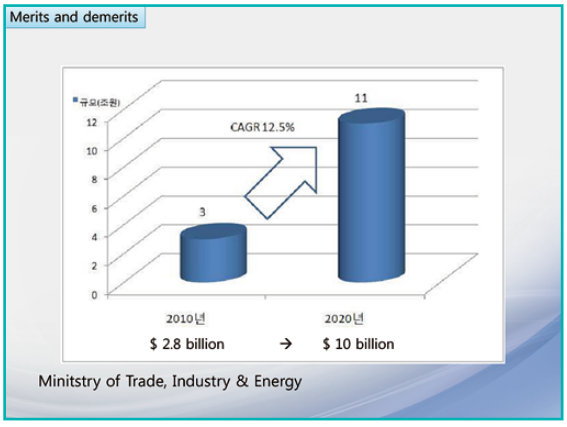
cerned about the soaring medical expenditure because it is ever increasing. They also care about the healthcare industry because it should be one of the major growth engine for next generation's society. The government tries to provide high-quality healthcare to the people anytime, anywhere, although it is very difficult to achieve.

[Slide 27] How about private enterprises? I believe that enterprises have now become the major stakeholders in ICT and health care fields in every nation. Enterprises say that the ICT introduction in our healthcare system will reduce the healthcare expenditure by reducing the indirect costs such as transportation and labor time. They also say that it will bring new business opportunities, increase efficiency, and advance the health care industry.

[Slide 28] According to the data of the Ministry of Trade, Industry and Energy, the cost of ICT in 2010 was about 3 billion USD, but it is estimated to increase to 10 billion USD in 2020.



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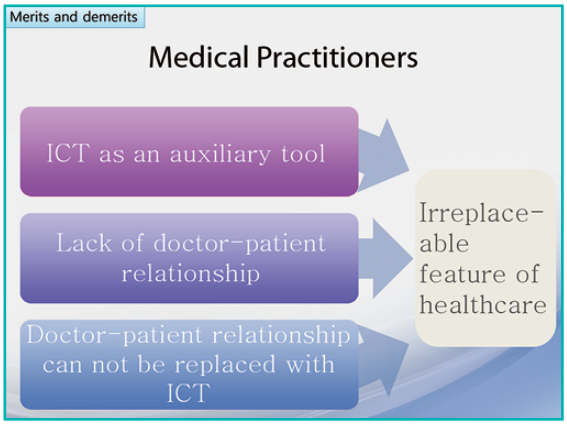

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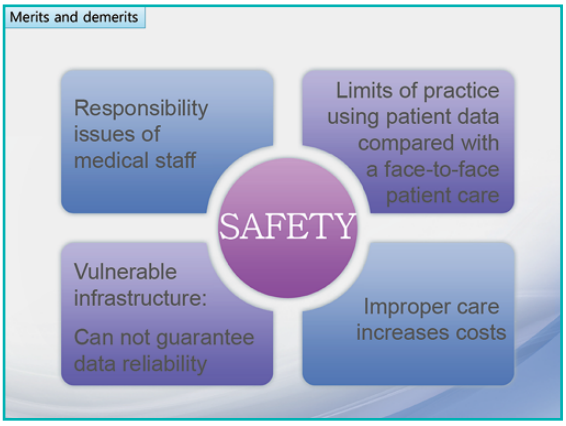

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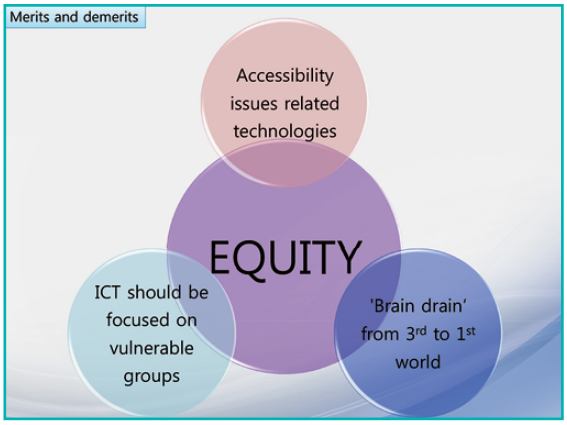

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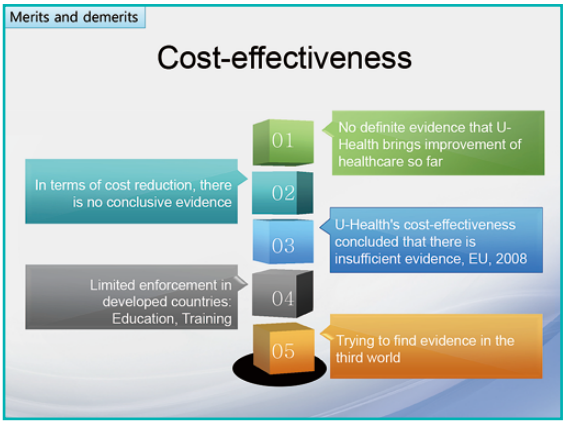

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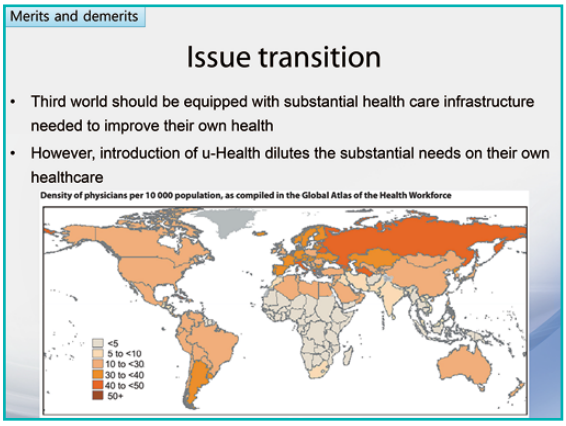
So, there is a 7 billion USD worth of market waiting for the enterprises, and they are well prepared to fill in this growing market. That is why the ICT development is now one of the most critical issue in Korea.

[Slide 29] However, medical practitioners believe that ICT should be regarded as an auxiliary tool, and that the excessive development of ICT can damage the doctor-patient relationship. The doctor-patient relationship is an irreplaceable feature of healthcare that cannot be replaced by ICT. **[Slide 30]** In addition, the patient safety should be the utmost importance. Medical practitioners and staff have certain professional responsibility. ICT itself is very vulnerable against hacking, for example. ICT may provide patient data, but face-to-face patient care is very important. The ICT-oriented healthcare can lead to improper services, which can increase costs, too. **[Slide 31]** We should also consider the issues of equity, such as technological accessibility or the care for vulnerable group. Another global concern is the 'brain drain' issue from the third to the first world. The excessive advancement of ICT in the first world could force the third world to stay in the low-level heath care.

[Slide 32] Countries around the world have carried out cost-effectiveness studies associated with the ICT implementation. There have been no definite evidence of its cost-effectiveness, and the study on health care cost in European countries concluded in 2008 that the evidence was insufficient. In the developed countries, limited enforcement in education and training is the limiting factors. **[Slide 33]** So, the ICT companies tried to find evidence in the third world, but the third world has serious transition issues. The



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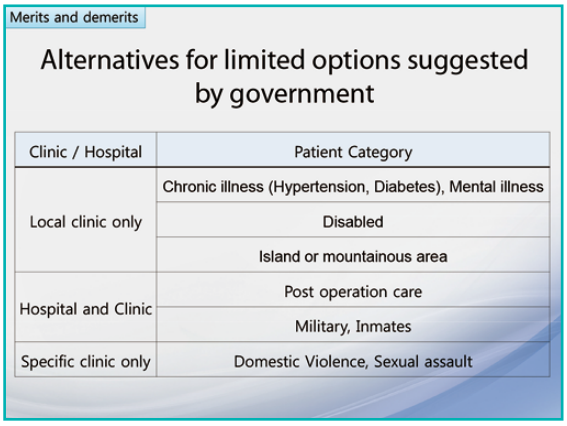

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third world requires substantial improvement in healthcare infrastructure, but the introduction of u-Health would dilute their own healthcare needs. So, they faced a completely different problem.

[Slide 34] In view of the situation in other countries, the Korean government proposed specific categories to start the ICT implementation. In their plan, they will start at local small clinics for patients with chronic illness or disabilities or those who live in remote areas. At hospitals and large clinics, they will start from the patients who require post-operation care and the people in special institutions such as the military. The government also proposed to work with specific cases involving crime at specific clinics, such as domestic violence or sexual assault.

[Slide 35] However, the Korean Medical Association (KMA) strongly opposed these ideas as the tele-medicine that the government is pursuing damages the fundamental aspect of health care, which requires face-to-face interaction between patient and physician. KMA is particularly against the current tele-medicine system because issues such as patient safety and legal liability were not assessed or examined during the preparation process.

KMA believes that patient safety, efficacy and legal liabilities related with tele-medicine are issues that cannot be compromised because it involves public health and the physician's professional rights. In particular, tele-medicine that allows the involvement of private companies such as health management service providers should never be permitted.

As you may know, healthcare endorsement is quite low in Korea compared to the quality of care provided. Roughly speaking, Korean medical doctors work 3 times more for 3 times less income when compared to the OECD averages. General people in Korea are very much satisfied with their current situation, and the Ministry of Health and Welfare is proud of establishing and managing this good health care system—but medical doctors have to take on all the burdens in Korea. So, in the future ICT issues in Korea, we will have to be wise enough to come up with a win-win situation for the government, patients, and medical practitioners such as ourselves.

Thank you very much—*Arigatou Gozaimashita*.