Future Directions for Next-Generation Hospital Information System

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History of HIS in South Korea

The hospital information system (HIS) in South Korea has a long history, which started in 1978. As the partial but nationwide medical reimbursement system began in 1977, many hospitals launched their first HIS in the 70s and 80s. This system had quite primitive functions for calculating the medical costs of treatment, but it was not able to book subsequent visits or operational scheduling. The real and operative computerized physician order entry (CPOE) system was first implemented by the Samsung Medical Center founded in 1994. When the Samsung Medical Center opened, it operated without any prescription slips and used a computerized system instead. Ten years later when Seoul National University Bundang Hospital opened in 2003, the real Electronic Medical Record (EMR) era began in South Korea. Within five years after the first Bundang hospital case, almost all large tertiary hospitals in South Korea had implemented EMR systems.

Almost ten years has passed since the establishment of the EMR system in South Korea. As all IT systems have limited durability, after 10 years of EMR implementation, almost all general hospitals are poised to adopt next-generation EMR systems. As building a new EMR system costs more than \$10 million for hospitals over 800 beds, there are many aspects that must be considered to avoid unnecessary spending just on the renewal of software components.

HIS has Focused Mainly on Data Management

Managing hospitals in good financial status is not an easy matter, especially in South Korea, where strict regulations limit the increase of medical cost. In South Korea, medical treatment is regarded as an essential public benefit that should be provided fairly to all citizens. For this reason, the Korean government has strictly controlled medical costs. The annual inflation rate of medical costs is around 1.3%; this is usually achieved through heated discussions between the government and the medical sector. Thus, the low profit medical environment has driven the hospital atmosphere into competition for increasing numbers of patient visits. This is a race not for best practice but for survival in a market with tight profit margins. The health policy has shown positive effects in terms of nationwide spending on health, especially in comparison to the high costs in many other countries. However, the squeezing health policy in South Korea has driven health organizations to pursue a path that is not promising for the best practice.

Quality Issue has Not Surfaced Yet

While engineers are managing EMR systems in hospitals, the main complaints they confront are related to speed issues. Sometimes privacy issues must be addressed urgently because the impact on society is so critical; such issues sometimes can lead to an erosion of faith in the whole medical system in the country. Or some security breaches embarrass IT engineers who have worked on the secure network or server systems.

However, among those urgent and serious impact issues,

the best practice should come first for the HIS regardless of all other demands. The real benefit which should be obtained through the usage of an IT system in healthcare is the quality of care. An IT system provides easy access to all clinical data relevant to clinicians' queries, and it easily provides a systematic business processes, which can benefit clinical practitioners' activities in many ways. However, the best practice issues are not yet recognized as key elements of EMR in the development of HIS.

Role of Government for the Healthy Ecology of HIS

The importance of the government's role in health IT should not be ignored. So far, the South Korean government has played the role of a moderator or regulator in the field of health IT. However, the role of government need to be reshaped to provide consistent support and to help foster the growth of the healthcare industry. For instance, in the medical standard domain, we might think that the most favorable role for the government is to actively provide standards for medical information. However, a more important role for the government in the medical standard field is to provide the ground for active and participatory discussion for delegates from multiple parties. Government should foster discussion groups to grow through understanding the decision rules and harmonizing methods for the benefit of all the participant parties. Then, the standard community will find the way to survive and spread efficiently implement its findings for future practice. The main role of government is to let them grow not to breed them.

In this aspect, it is important to recognize the effective and forward-thinking approach of the US government regarding healthcare policy. Through the three stages of meaningful use, it has tried to reform healthcare in the United States. That is one of the optimistic ways to reform healthcare organizations in a large country in which numerous stakeholders are involved in the healthcare arena. In January 2015, president Obama addressed the plan for healthcare in 2015. He outlined the proposed \$215 million investment in the Precision Medicine Initiative. One of the key elements in the plan is recognition of the importance of linking the genomic database and clinical systems which will be gathered through a huge volunteer cohort group.

Future Directions for Next-generation HIS

What should be the main goal for the next-generation EMR system? You can name any of them with ease. More specifically, if we put a weight on each topic, what will get the highest weight among the issues named so far? I would like to emphasize that medical error prevention should come first. As we have focused on the easy manipulation of data entry and handling, the next step we should take is the efficient use of stored data. In addition, the integration of data is one of the main functions IT system can provide easily. Through the integration of all clinical information that is relevant to a patient's current treatment, the new EMR system can provide an integrated access to doctors. Semantics will never be more important than it is at the present for next-generation HIS. The more we try to develop an advanced EMR system, the greater the emphasis will be on the semantics.

The easy access of health and clinical data will be another key feature for the next-generation HIS. Social network services (SNSs) have empowered people to use many kinds of data easily, including life logs and fitness data. Patients already have experience using all kinds of data to get healthier or to get more support from the community. The next step is for healthcare organizations. Patients will deliberately request information to find out the seriousness of clinical status and adjust their lives to get achieve more promising clinical outcomes. Healthcare providers need to be ready for the request for easy access, and in some sense, they need to be proactive in providing such an information infrastructure.

Lastly, government should play a supportive role. Like the office of the national coordinator for health information technology in the United States, the national coordination body is important in the healthcare domain. As there are many hurdles to overcome altogether and issues to negotiate, the role of coordination will reduce the cost for implementing HIS.

The Korean Society of Medical Informatics (KOSMI) as a representative academic body for academia and industry and Health Research Informatics (HIR) as a unique journal in the field of biomedical informatics will provide effective communication channels among diverse communities, which will pave a firm path toward the success of the next-generation HIS in the country.