

# Value-Based Health Technology Assessment and Health Informatics

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In 2012, the incidence rate of thyroid cancer in Korea ranked number one globally, with 88.6 women and 17.3 men per 100,000 population [1]. This is a 15-fold increase in just a decade. Experts were curious as to why Korea had such a high increase of cancer incidence, and they looked at previously known causes of cancer. Were there any radiation-related cancer risks such as a powerhouse in nuclear energy technology? Or were people experiencing extreme levels of stress?

However, the world was shocked when a research team in Korea released their study results in 2014. The study revealed that cancer screening and excessive treatments carried out at medical centers were the primary causes responsible for the high cancer incidence. Naturally, the solution was to reduce cancer screening itself; however, this sparked another debate among experts regarding whether cancer screening should be continued. Eventually, this debate came to a temporary end, when it was decided that lesions of a controversial size were not to be classified as cancer in biopsies.

As a result, the cancer incidence rate dropped dramatically as well as the resultant economic loss, because unnecessary diagnosis and surgery were no longer occurring. Socioeconomic costs would have been greater, considering direct and indirect costs—such as the psychological pain that patients or their family would have gone through and the cost of life-long medication that patients would have paid after surgery. Similar issues have been constantly raised in other areas,

including health functional foods, new surgical techniques, and new diagnostic methods applying genetic technology.

Then, what is the solution? One answer is health technology assessment, that is, measurement for validity by examining clinical safety and effectiveness of health intervention or technology. The key to this assessment is the thoroughness and soundness of the clinical data secured and assessed. Currently, the responsibility for this work is divided among the Ministry of Food and Drug Safety, the National Evidence-Based Healthcare Collaborating Agency, and the Health Insurance Review and Assessment Service.

While the Ministry of Food and Drug Safety passes on new health technology to the healthcare market after examining its scientific safety, the National Evidence-Based Healthcare Collaborating Agency takes another look at new health technologies that are related to medical procedures or surgeries. Technologies that pass this review can be used in the healthcare market (i.e., hospitals, medical centers, etc.). Technologies that fail this review cannot be used in hospitals or medical centers at all. The use of such technology cannot be approved even if a patient is willing to pay for the ensuing medical bill him/herself. This is from a humanistic perspective, which prevents the use of technology without validity on humans. On the contrary, those technologies with proven economic value are not only used in the healthcare market but are also covered by the health insurance. As a result, patients experience less burden, while the developers make economic gain as the technology is actively used in the market.

To ensure an ecosystem that promotes a virtuous cycle of technology, assessment agencies should constantly communicate the clinical data about patients with hospitals or medi-

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cal centers where the technology is actually being used. This is how real world data becomes real world evidence. For this reason, the fourth industrial revolution is expected to occur in the healthcare sector. Core infrastructure needs to be leveraged well in order for the fourth industrial revolution to unfold in the healthcare industry.

First, health and medical contents must be utilized. As the saying goes, nothing is complete until it is put in shape; therefore, a vast amount of healthcare big data accumulated in hospitals need to be used to create diverse utilization models. To this end, nationwide patient information in training and research hospitals must be converted into big data for the use of research and healthcare technology assessment.

Second, high-speed Internet must be used to deliver information to places where it is needed. Korea has the world's leading information network infrastructure, with high-speed Internet and research networks available in every corner of the country. Therefore, such Internet network technology must be used to connect hospitals to one another with the highest level of security for patient's safety and privacy.

Third, in today's world, finding a solution to various issues of the healthcare sector requires the help of artificial intelli-

gence technology. Nowadays, patients or their guardians ask doctors how much real world data is used in clinical decision making.

Ultimately, an adequate business model is necessary to ensure the sustainability of the aforementioned three elements. This means that all stakeholders and technology developers need to come together so that healthcare services are provided through a single platform. Social institutions, culture, law, diagnostic methods used by doctors, healthcare usage pattern of patients, and the national insurance system should all be considered in this process. Moreover, a social consensus needs to be made among diverse stakeholders in the healthcare sector, the industrial sector, as well as patients and consumers. Actions must be taken as soon as possible in order to bring about the fourth industrial revolution.

## Reference

1. National Cancer Center. Statistics from National Cancer Registry 2012 [Internet]. Goyang, Korea: National Cancer Center; 2015 [cited at 2017 Jul 30]. Available from: <http://ncc.re.kr/cancerStatsView.ncc?bbsnum=299&searchKey=total&searchValue=&pageNum=1>.