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National Healthcare Service and Its Big Data Analytics

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Healthcare service is provided by clinical professionals to treat disease and injury and to maintain excellent health and well-being through diagnosis, therapy and prevention. According to 'Health at a Glance 2017', most countries in the Organization for Economic Co-operation and Development (OECD) have universal healthcare coverage systems; their healthcare spending currently accounts for about 9% of GDP on average [1].

In Korea, the 2017 National Assembly Budget Office report stated that the country's current health expenditure (CHE) as a percentage of GDP was about 7.7%. However, it bears mentioning that Korea's CHE had increased much more than the average increase across the OECD over the same period since 2010 [2]. This trend will lead to increased healthcare disparities and stagnant incomes in Korean society. Several other governments are in similar situations, and many

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healthcare consulting firms are focused on the relationships between CHE and big data analytics to solve the financial problems related to national healthcare [3,4]. For example, a 2013 report by McKinsey & Company estimated that big data analytics could reduce annual healthcare spending 12% to 17% in the United States [5].

The Korean government also has a keen interest in understanding how their national healthcare system can be improved using big data analytics. Fortunately for them, the healthcare billing data of the entire nation is stored by the National Health Insurance Service (NHIS) and the Health Insurance Review and Assessment Service (HIRA).

Korean National Healthcare Data and Its Management for the 4th Industrial Revolution

All Koreans have the right to national universal healthcare. This was introduced with the 1977 National Health Insurance Act. The program covered by the legislation was rolled out to the general public in 1989. This provided universal health coverage to Korea, with the NHIS and the HIRA holding the healthcare data of the entire nation through billing information. The cohort data stored by the NHIS is deemed a key to improving healthcare via big data analytics because it represents medical information of over one million patients during the last decade as a sample indictor [6,7].

The Korean National Health and Nutrition Examination Survey (KNHANES) is a national surveillance system used to research the health status of Koreans. It covers informa-

tion across several categories, such as socioeconomic status, health-related behaviors, quality of life, healthcare utilization, anthropometric measurements, as well as biochemical and clinical profiles. Since 1998, the survey has been split into three components: a health interview, a health examination, and a nutrition survey. The KNHANES covers approximately 10,000 individuals each year, and it can be a fundamental resource for national healthcare analytics and big data [8].

The 4th industrial revolution has begun, and it has drastically altered the way in which data is analyzed and used. Standardized datasets and the practical uses of these datasets will become more vital to decision-making and operations in this new generation. Medicine and the biomedical sciences have produced massive amounts of healthcare data; moreover, several types of embedded sensor devices, such as the Apple Watch, Samsung Galaxy Gear, and Fitbit have provided personal healthcare data in recent years.

National healthcare big data analytics is the process which examines their various datasets in four major sectors: pharmaceutical research data, clinical data, payers' activity and cost data, as well as patients' behavior and survey data. The results of such analyses can have the following benefits: cut down on administrative costs; support clinical decision-making; decrease fraud, waste, and abuse; and improve patient wellness through better care coordination [9]. However, until recently, such data could not be properly leveraged due to a lack of standardization between different datasets as well as a lack of technology. For big data analytics in healthcare to succeed, several efficient data tools must be developed and their interfaces re-designed into a standardized platform [10].

Currently, healthcare data analytics plays a critical role in national healthcare. It is also one of the world's fastest growing industries; therefore, several medical consulting companies and corporations with medical consulting interests, such as IBM, SAS, and Truven Health Analytics have been trying to pre-emptively assert dominance in several areas of the healthcare analytics market [11]. They are introducing the latest technologies for clinical analysis, supply chain analysis, and various other sectors in healthcare. Cloud technology is one of the successful examples of technology to facilitate data sharing within and between organizations.

On the other hand, big data analytics in healthcare is still in its infancy in Korea even though the NHIS, HIRA and KNHANES are rich sources of data. Thus, the three main issues plaguing analytics are 'related standardization work, professional manpower training, and private information

sharing and its legal trouble' all of which remain out of the spotlight [12]. As a relative newcomer, the Korean government has to resolve these issues before healthcare big data analytics can truly begin, especially given concerns over patient privacy.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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