

Big data in COVID-19 surveillance system: A commentary

Sir,

Surveillance systems are public health eyes or fingers on the pulse of community health.^[1] These systems are as a cornerstone of decision-making on epidemics and infectious diseases where the prevalence and pandemics of recent infectious diseases such as the flu and COVID-19 have doubled the importance of using. From the World Health Organization's perspective, this type of systems is needed for on-time responding and evaluation due to continuous and systematic health information management;^[1] the surveillance systems pursue the following goals at the regional and national levels: identifying and providing proper care to patient; identifying, investigating, and controlling disease outbreaks; and preventing the spread of the disease.^[1] The traditional systems are time consuming, costly, and restricted to specific geographical areas.^[2] Therefore, monitoring, predicting the incidence, and the emergence of infectious diseases require reliable and up-to-date surveillance systems where it is possible via information technologies such as big data.^[3] Taiwan created big data for analysis where it aids case identification by generating real-time alerts during clinical visiting based on travel history and clinical symptoms.^[3] At present, a new generation of service systems based on big data is needed for the rapid management of infectious diseases and emerging pathogens. The roles that big data play in infectious disease service systems are as follows:

1. Deleting information gaps in current surveillance systems
2. Epidemiological prediction of diseases through identification of morbidity, mortality, and vulnerable populations; and evaluation of the usefulness interventions^[4]
3. Generation of vital statistics based on surveillance and epidemiological indicators
4. Effective prevention and formulation of epidemic control strategies
5. Promoting up-to-date, complete, and clear geographic information
6. Optimization in allocating limited resources of public health^[5]
7. Providing a framework for building different predicting models and exploring hidden relationships between mass data
8. Enhancing and improving surveillance systems, providing dynamic modeling of disease transmission and control beyond surveillance systems.

Today, big data are considered a new opportunity to enhance surveillance system in the management of pandemics such as COVID-19. The slowness and costly analysis of the surveillance system, as well as confinement to specific geographic areas, can be improved through big data streams such as electronic health records, social media, the Internet, smart mobile phones, and remote sensors. Therefore, despite the existence and use of traditional surveillance systems, internet-based user activity prediction models such as big data are needed. Big data implementation in surveillance systems requires a centralized system which receives data from various sources such as stores, pharmacies, social media, and electronic health records. This should happen with considering the confidentiality and non-digitalization of much of a person's health information. The personal characteristics of people including first name, last name, and address should be locked or not digitalized where each health information user could not access to these information. Moreover, as the important technology has led to a global marketing revolution, it will be able to predict the incidence, prevalence, pathogens, and hidden populations of pandemics such as COVID-19 for mutating on management of public health. One limitation of COVID-19 is data collecting. There are several challenges for data collecting such as price, time, and storage. The other limitations are trust, invalid source, and information management.

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