COVID-19 SERIES

Integrating travel history via big data analytics under universal healthcare framework for disease control and prevention in the COVID-19 pandemic

To the dear editor:

In this letter we reported Taiwan's experience of disease control and prevention in the COVID-19 pandemic by big data–driven universal healthcare.

Big data analytics has facilitated health care quality promotion by analyzing electronic medical records, sociodemographics, and environmental factors, to optimize treatment decisions [1–3]. Moreover, its roles in predicting and tracking emerging infectious diseases, including the coronavirus pandemic, have also been proposed [3,4]. In countries offering universal health care systems (UHS), claimed health care informatics of payers could serve as an abundant source of massive database because of universal coverage. This indicates that the intersection of public health policies and technology could bring about additional benefits of health care reform through integrated real-time data analytics [5].

Take Taiwan for example, cloud computing-based health care databases within the UHS have been part of its critical national infrastructure. Such platform has allowed health care providers to query travel history on a real-time basis, as well as manage the allocation of personal protective equipment. Collected data of beneficiaries (>99.5% of all residents) regarding medical records, laboratory data, images, and prescriptions from all health care providers during the past 24 years are retrievable [6]. As data analytics and cloud technology allow for both personalized medicine and public health policy-making, Taiwan authorities have been allowed to adopt low stringent level strategies as opposed to lockdown policies among other high-income countries [7]. Remarkably, the utilization of UHS databases may realize cost-effective and efficient solutions to epidemic prevention in the early outbreak.

After the severe acute respiratory syndrome outbreak in 2003, Taiwan Centers for Disease Control (TCDC) commenced transferring real-time infectious disease registry data to this monitoring system, and because 2016 real-time analytics were enabled via cloud computing, concatenation of intramural data on all severe influenza cases was practiced. Therefore, alerts were indicated before the official recognition of COVID-19 outbreak [3,4], where travel history databases were subsequently concatenated to trace the source. Inauguration of such travel history tracking system would involve data transfers as well as managerial issues including ownership and governance, where interdepartmental communication would be more efficient within a single-payer UHS. For instance, the tracking system in Taiwan was cooperated by the Immigration Agency and TCDC, where the traveling history of beneficiaries and their corresponding history of contact were retrievable with insurance or passport numbers. As the UHS provider, government also gave access of the above information to health care providers external to the universal insurance plan, including dental, esthetic, or physiotherapy clinics, as well as nursing home and blood donation sites, to reduce iatrogenic viral exposure and postponed care.

During the era of health care reform, we advocate for integrative systems that promote not only accessible health care services, but cost-effective tracking of potent factors for the emergence of diseases, so as to achieve pandemic management.

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