Letter to the Editor

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Health information systems amid COVID-19 outbreak: Lessons from China

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Dear Editor,

Information systems have played a critical role in responding to the outbreak of COVID-19, not only as platforms for efficient and effective communications but they have also fundamentally changed the dynamic of interactions between healthcare providers and consumers, and the way in which healthcare services are delivered. In Australia, two major initiatives were introduced (Duckett, 2020). The first was within the universal medical care program "Medicare". Telehealth services are now included in the Medicare fee schedule. Patients have quickly embraced the change, which allows them to use the Medicare fund to cover online consultations with medical practitioners. The second initiative was the COVIDSafe app, which assists contact tracing in the event a person is diagnosed with COVID-19. To date, more than six million Australians have downloaded this app.

Different countries have chosen different information strategies to cope with the COVID-19 outbreak due to social, economic and cultural differences. China is the world's most populous country and has used modern information technologies extensively in the battle against COVID-19 (see Zhuang et al., 2020). The applications cover a wide range of areas, ranging from patient education to support of medical care and public health services.

Case reports

Clusters of COVID-19 cases were first identified in Wuhan in December 2019. Prior to that, China had established a national online infectious disease reporting system after the outbreak of SARS in 2003 (Liu, 2003), which enables real-time gathering of case data to support decision-making of the government through its Centres for Disease Control system. Unfortunately, such a reporting system lacks capacity to capture unknown emerging infectious diseases. Medical practitioners and health facilities are obligated to report only those diseases already defined in the reporting list. The reporting system has no direct link to the medical records system and cannot extract data from it. The Wuhan Government started to trace COVID-19 (pneumonia with unknown causes at the time) on 30 January 2020. COVID-19 was officially included in the online reporting system (http://www.gov.cn/xinwen/2020-01/21/content_5471153.htm) 20 days later, after the coronavirus had been detected and identified as the pathogen. The inherent shortfall of the online reporting system has attracted serious criticism (Jia and Yang, 2020).

Telehealth

An electronic medical records system has been well developed in hospitals in China despite a lack of cross-facility sharing capacity. When Wuhan, the epicentre in China, was placed in complete lockdown on 24 January 2020, all of the other regions of China also raised the alarm and initiated public health emergency responses. Public hospitals were mobilised to prepare for a surge of patients. Because hospitals in Wuhan were already overwhelmed, the Government decided to build two new hospitals in a matter of weeks and sent tens of thousands of health workers to support Wuhan. The Government coordinated the deployment of health workers. Each supporting hospital was matched with one in the epicentre. Because the supporting hospitals had to manage local COVID-19 cases, only a small percentage of employees could be deployed. Selection of deployed staff had to be strategic and telehealth came to play a critical role to support the deployed medical team. Luckily, the one-to-one support arrangement made telehealth services relatively easier, especially between two hospitals with well-developed information systems that had good interoperability.

Integrated care

China's primary care system has been weak as a result of decades of market-driven reform (Liu and Legge, 2017). The low capacity of primary care was often blamed as the cause of the crisis of the overwhelmed hospital system. Although all diagnosed cases of COVID-19 were required to be hospitalised, including in the makeshift hospitals for minor conditions, community health centres in China were

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supposed to play an important role in educating consumers, mobilising communities and managing chronic diseases, although there is not a gatekeeping role in primary care. Unfortunately, information system development in community health services has fallen behind their hospital counterparts. Since 2009, the Chinese Government has attempted to revitalise primary care by encouraging hospitals to lead an integrated care network (Liu and Legge, 2017). Some hospitals have started to establish partnerships with community health centres, with a hope to channel more patients to primary care. Modern information technologies have been adopted as one of the most important instruments in developing the integrated care networks for the purpose of sharing information, initiating referral arrangements and providing specialist consultation support to primary care.

Consumer education

The Internet and social media have expanded the source of information dramatically. However, consumer education has not become easier. Credibility of information has been increasingly scrutinised by consumers (Hill et al., 2011). Trust is indeed critical. Consistent information with authenticity can encourage wide adoption of protective measures such as social distancing and wearing of face masks. Although China has well-established institutions in disease prevention and control, their initial communication with the public frustrated many, especially their overly cautious conclusion that "limited human-to-human transmission of COVID-19 could not be excluded." On 20 January, it was China's well-known pulmonologist, Dr Nanshan Zhong, who announced human-to-human spread of the disease. Since then, medical specialists rather than public health professionals have attracted increasing trust and attention from the public.

Contactless delivery of services

China has the world's largest and most sophisticated online sales and delivery system, which played a critical role in the battle against COVID-19. There is evidence that healthcare services have taken advantage of such a system to make innovations in services delivery. *WeChat*, for example, is a mobile app with social media functions similar to *WhatsApp*. However, it also has financial transaction functions if the account is linked with a Chinese national ID number. People have used *WeChat* to share health information, book appointments, seek advice from professionals and pay for services (Pan et al., 2018). The *WeChat* platform has become one of the most important sources of information in relation to COVID-19. Governmental agencies and healthcare facilities have used *WeChat* as an important instrument to reach out to their audiences. In the Chinese community overseas, *WeChat* groups were also organised to help minimise human contacts in purchase and delivery of groceries.

Management of population movement

Unlike in many other countries where people with illness symptoms were advised to stay at home, China advanced the requirement to another level. All residents were required to go through comprehensive health assessments and obtain a health code with green indicating *no risk,* yellow indicating *moderate risk* and red indicating *high risk* of COVID-19. Many residential communities denied access to the community to anyone without a green code if they were not living in a household in that community.

COVID-19 has resulted in serious damage to the economy and population health. It has also stimulated innovative ideas and the use of modern information technologies. It is important to note that there is no one-size-fits-all solution to the control of COVID-19. Countries can learn from each other.

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