Improving Public Health Through Strengthening Health Information System in Urban and Rural China: A Demonstration Project

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Due to a complex set of factors including aging population, environmental degradation, life style changes, health system deficiencies, China's public health improvement has been stagnant despite of its rapid economic development and recent health system reforms. To help improve health status and healthcare performance in China, which has global implications, both system innovation and technology innovation are called for. Since 2006, China Initiative at Harvard School of Public Health under the leadership of Dr. Yuanli Liu has been conducting high-impact programs in the areas of applied research studies, senior executive education and policy dialogues. These programs have helped inform China's policy making process and leadership capacity development for health system reforms. Based on our past track records and network of collaborators, we now propose to conduct both an evaluation and intervention study on meaningful use of health information system based on electronic health records (EHRs).

According to the President's Council of Advisors on Science and Technology, major benefits of health IT include: better healthcare through improved access to patient data, better monitoring of public health patterns and trends, and an enhanced ability to conduct clinical trials. While the potential of health IT for improving health and healthcare of the 1.3 billion Chinese people is huge and the Chinese government has included in its healthcare reform plan a provision on further strengthening its health information system (HIS), the implementation process is plagued with several major challenges including lack of standards and "Best Practice" models. Our proposed project essentially has two major objectives and is to be carried out in two sites - one urban site and one rural site.

1. **Conducting an evaluation study on HIS in Shanghai.** Shanghai has led China in adoption of EHR. There, in the past 5 years or so, an outstanding example of establishing and effectively using HIS has emerged in Minhang District, where 1.5 million EHRs are established for its residents, prescription order entry is computerized, data of the hospitals and clinics are linked, and a pay-for-performance system is instituted. However, despite of the increasing national and international attention Minhang has generated, there has been no vigorous evaluation study done to provide detailed analysis of the process and to assess the impact. We plan to fill the gaps by: a. analyzing how exactly Minhang has developed and utilized its HIS, both in terms of the district as a whole and variations among the 12 different community health centers within the district, b. using a difference-in-difference model to examine changes of a select set of public health indicators such as success rate of hypertension control and the extent, to which the changes can be attributed to HIS and meaningful use of EHR by pre-adoption and post-adoption comparison and by comparing Minhang's experiences to those of Zha Bei district, a "control" District in Shanghai.

2. **Conducting an intervention study on HIS in Sichuan Province**. The urban-rural disparities in China are well known. Health information system in many rural counties are weak, let alone adoption of EHRs. Naturally, a question may arise: can the "Minhang Model" be adopted in a rural setting? Therefore, the second component of proposed project is to conduct a demonstration project for rural China by helping establish, demonstrate meaningful use of and at the same time evaluate impact of an EHR-based HIS in Wenchuan County of Sichuan Province. We select Wenchuan as our intervention site, because Wenchuan is the epicenter of the devastating 2008 Earthquake, and HSPH China Initiative has been involved in advising on the re-building process of its healthcare system since 2009. Our pilot intervention study in Wenchuan will be informed by our evaluative study in Shanghai, and we plan to role out EHRs in a town-by-town manner ("natural" experiment), both for practical concerns as well as purposefully to create opportunities for impact evaluation.

In the short term, this project will produce a comprehensive understanding of China's health information system – its major progress and major issues at the national level as well as an in-depth case study on one of China's "Best

Practice" examples on HIS in Minhang District. Furthermore, this project will bring mobile technologies and international experiences to bear on piloting an EHR-based HIS in China's rural areas. Upon completion of this 1-year project, we will seek additional funding from a number of sources, especially exploring the US-China Healthcare Cooperation Program that was announced by President Obama and President Hu during the latter's 2010 state visit to promote cooperation in personnel training, medical information technology, rural healthcare, emergency response and management systems. Our long term vision is to establish one permanent base in urban Shanghai and another one in rural Sichuan, where multi-purpose and continuous collaborative field research studies between Harvard faculty and their Chinese counterparts can be effectively and efficiently facilitated, and training programs on field epidemiology, environmental and behavioral health, health system reforms etc can be carried out for our undergraduate and graduate students as well as post-doc fellows. All these continuous activities will be supported by a strengthened health information system to help inform evidence-based policies and health interventions for improving public health.