

中国-美国协作—移动医疗科技（MHEALTH）革命

CHINA-UNITED STATES COLLABORATION IN MOBILE HEALTH TECHNOLOGY (MHEALTH) REVOLUTION

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摘要：美国每年**2.5**兆美元医疗保健费用=美国有一个巨型承诺：缩小医疗服务差距--类似中国缩小城市/农村卫生的差距。美国医疗保健技术的非凡进展是中美合作的契机-能达到中美缩小（城乡）医疗服务差距共有目标。移动医疗科技革命适合缩小人口-健康中心距离，缩小（城乡）医疗服务差距，中美移动医疗科技正处于早期阶段，本文提出了中美共享移动医疗科技资源的计划/益处。

ABSTRACT: The United States with \$2.5 trillion in annual health care costs has a giant commitment to close the underserved to fully served care gap that is similar to the rural/urban health gap in China. Extraordinary progress in technology-enabled healthcare in the United States is now an opportunity for collaboration to achieve shared China/United States goals in the rural/urban health gap.

Geographical distance from population to health centers is an environment that is well served by the new revolutionary trend of Mobile Health (mHealth) as a resource for closing the rural/urban, or well served/underserved health care gap. mHealth now is in a stage of early use in both China and the United States. This paper presents a plan and benefits for China-United States shared resources in the technology of Mobile Health.

关键词：移动医疗科技MHealth中美医疗保健合作Disruptive Technology
(城乡) 医疗服务差距 供应推送/需求拉动

The delivery of quality, safe, and cost-efficient health care for underserved populations is a challenge in both China and the United States governments. The two governments have made a commitment the gap between the best of health care and what is received by the underserved populations. Over next three years China's State Council has made a commitment of ¥ 840 billion to improve the quality of health care in China with 12 - 5-year plan. The United States has made a similar commitment to improving health care with two acts, including the 2009 ARRA HITECH Act and the 2010 H.R. 3590 Patient Protection and Affordable Care Act. China's Ministry of Health and the United States' Health and Human Services, U.S. Department of Commerce and U.S. Trade Development Agency (USTDA) have issued a joint declaration of cooperation for progress in the delivery of health care (**Exhibit 1**). The USTDA has funded a project to these goals that include a visit by Chinese leaders to the largest conference in the United States in 2011 Health Information Management Systems Society (HIMSS) with over 30,000 attendees and 1000 exhibitors and 300 educational programs.¹

Sino-US cooperation in the use of mobile health (mHealth) technology to improve health care quality in the two countries must include a strong private sector and government collaboration. Government health care plays a leading role in the improvement of health care. This role is greater than almost all other economic sectors. Lessons from the leadership of the United States government in health care is relevant as the Chinese government commits funds for programs to reduce the urban-rural health care gap.

The revolution in information technology makes mobile medical technology or mHealth currently possible for the improvement in quality, safety, convenience and cost-effective health care and the use of technology to reduce unnecessary exposure of patients and doctors and reduce the energy required to transport patients and medical costs.

The United States has the world's largest economy with \$15 trillion (¥98 trillion) in GDP and China is now number two with \$5 trillion (¥32.6 trillion). It is anticipated that China will equal the US in size of GDP by 2019,² which means that China will experience some of the challenges in this expansion that the United States experienced in the decades of progress from the 1950s to the present. In the United States health care has increased from 6% in 1960³ to a forecasted over 20% of GDP in by 2020. With \$2.5 trillion in national health expenditures in 2010,⁴ this is equal in size to about 50% of the total GDP of China.

The U.S. currently spends \$2,500,000,000,000 on national health care expenditures. China can learn from the lessons learned in the U.S. from other industries, such as space, computers, semiconductors, Internet and pharmaceuticals, which the U.S. government has invested heavily in response to national needs.

Findings from this research promote Sino-US cooperation in health information

technology to achieve national objectives and to improve the inadequate reduction of the gap between urban and rural health care.

Mobile Health (mHealth)- Breakthrough Technology

In historical perspective, the “old” or prior state of medicine was in the doctor’s office. Even before that, there was a legend of the doctor with his black bag of medicines that travelled to see the patient at his home. “Mobile” implies medicine delivered at a distance from the doctor. Harvard professor Clayton Christensen describes a new paradigm, a new breakthrough technology to destroy the existing keys to success. This is an update of the famous observation by Josef Schumpeter of “creative destruction from without.” That is, a new source causes destruction of an existing source of economic activity. And so it is in health care, MHealth will not destroy but sharply change the best practices for a significant percentage of medical practice.

“Mobile,” activity across a geographical distance, powered by progress in the information technology revolution, enables the delivery of health care without the patient’s travel to the physician’s office. The example of cardiac care in **Exhibit 2** explains the process from a technology perspective. A patient with a cardio problem should be monitored by his physician to protect against a future serious medical outcome such as a stroke or heart attack. There are medical instruments for this monitoring such as a blood pressure meter, Oximeter, and ECG. Cardiac problems are called “chronic” that may continue for years – a long history of multiple monitoring in the best practice of medicine. The expense of this frequent monitoring is high and thus only rarely will a patient receive this life-saving medicine under the prior state of visit to the physician’s office.

The benefits in higher quality and lower cost from mHealth as in this example from **Exhibit 2** are large. As an example of benefits from mHealth, consider a large population monitored for cardiac problems. This can become a resource for medical research.

An important discovery of the conference with a number of world-class economists also as speakers was that the “Human Factor” was too partial a concept, and Professors Gruber and Marquis edited the procedures in the MIT Press book (1969) **FACTORS IN THE TRANSFER OF TECHNOLOGY**. In the concluding chapter of the proceedings, Professors and Gruber summarized the findings that included the flow model presented in **Exhibit 3** Gruber-Marquis Supply Push/Demand Pull Fusion in Invention and Diffusion of Technology. The research and lessons from this conference dated in the 1960s continues to be very relevant in the planning for the mHealth (Supply Push) and explicit goal to improve the health care of the billion rural population in China (Demand Pull) to be fused into invention and diffusion of the technology and practices to achieve the goal of improved health of this population cost-effectively given the magnitude of the population to be served.

Sino-US cooperation

mHealth provides a really great opportunity but also a complex of moving target. The United States government is now has a wide range of investment in health information technology summarized in **Exhibit 4**. In addition to this government investment, there are now a number of Integrated Health Systems (IHS) exemplars of innovation in the use of health information technology in our research base – there progress in benefits in quality of care and patient safety and cost effectiveness is impressive and their experience is a useful resource as China builds momentum in its goals for improvement in health care in the rural/urban gap – which the united states government calls the “underserved population.”

Then there has been a rapid increase in quantity and quality of MHealth vendor applications that are a resource for China. There are provider innovators in geographical coverage of patient needs such as The Clinic at Wal-Mart, CVS Pharmacy’s MinuteClinic and Walgreens’s Take Care Clinic. The list of resources in the United States is a challenge of priority and management and building and the process of transfer of technology in condition of high speed of change and massive discontinuity in innovation.

mHealth provides an ideal win-win opportunity for Sino-US cooperation to achieve national goals between the two countries.

¹ 2011 Annual HIMSS Conference & Exhibition. Available at: <http://www.ehrscope.com/2011-annual-himss-conference-exhibition>

² Save the Date: China VS US GDP. The Economist, 2010. Available at: http://www.economist.com/blogs/dailychart/2010/12/save_date

³ Centers for Medicare & Medicaid Services (2010) National Health Expenditures Summary and GDP: CALENDAR YEARS 2009 to 1960. Available at: https://www.cms.gov/nationalhealthexpenddata/02_nationalhealthaccountshistorical.asp

⁴ Centers for Medicare & Medicaid Services (2010) “National Health Expenditure Projections 2009-2019” Available at: <https://www.cms.gov/NationalHealthExpendData/downloads/NHEProjections2009to2019.pdf>