

Summary

Taiwan has a population of over 22 million and covers an area of 13,900 square miles. Technology-intensive industries make up over half of the economy. Taiwan began implementing its health information network in the 1980s and continues to invest in HIT today, perfecting existing systems and incorporating new applications. Leaders in Taiwan acknowledge that HIT not only helps to provide efficient and safe medical care but will also play a significant role in sustaining the economy's national health insurance system. Currently, all hospitals and most clinics are connected to the Bureau of National Health Insurance through (BNHI) a Virtual Private Network (VPN) for e-claim purposes. Additionally, all residents use health smart cards that contain limited EHRs.

HIT Adoption

1989	Government-initiated decision to establish a National Health Information Network (HIN)
1991–1993	Pilot HIN tested in Hsinchu medical care region
1994–1996	HIN plan extended to other regions in Taiwan
1999	Phase II of HIN begun with the following foci: bandwidth and VPN upgrades, local resources analysis, and web-based application and standards development.
2001	BNHI introduced smart cards

Health Information Network

In the 1990s the government of Taiwan built an island-wide information network consisting of four regional centers and a TCP/IP over-frame relay backbone. The relay connects the Department of Health, regional information centers, and BNHI. The network also includes telemedicine centers that function in collaboration with several university hospitals.

The first version of the health information network succeeded in supporting basic public health administration, hospital regulation, and cancer registries. The network faced bandwidth problems, however, as applications began to involve more multimedia. Additionally, systems were not always interoperable among different institutions. Finally, despite the system's existence only 13% of health insurance claims and almost no patient referrals were conducted electronically. As a result, in 1999 the government launched Phase II of its health information network plan, which included VPN connections and placed emphasis on privacy and security, EHRs, a health insurance smart card, and access to information for health professionals.

Smart Cards

In 2001, the BNHI began the process of replacing paper-based patient ID cards with smart cards in order to increase efficiency and reduce fraud and cost in the health system. The smart cards include the following patient information:

- **Cardholder's status.** Remarks for catastrophic diseases, number of visits and hospital admissions, use of NHI prevention programs, medical expenditure records, and amount of cost-sharing.
- **Medical service information.** Drug allergy history, and long-term prescriptions
- **Public health administration information.** Such as immunizations and instructions for organ donation

Additionally, the cards consolidate functions of four different vouchers, including the regular paper ID card, the Children's Health Handbook, the Prenatal Exam Handbook, and the Catastrophic Illness Certificate. Smart cards are convenient for both the card holders—as they condense material and information to keep track of and do not need to be renewed—and healthcare providers and medical institutions as they streamline previously time-consuming and costly processes and transactions and drastically reduce fraud.

Who Drives and Pays For HIT?

The government is the key driver of an integrated island-wide health information system in Taiwan, and is responsible for the creation (and funding) of Taiwan's successful health smart card. But hospitals, too, have played an important role in integrating IT into the health sector and generally cover the costs of their individual HIT systems.

Challenges

Interoperability	Some hospitals treat health and medical data as their exclusive property and are unwilling to share patient data with other hospitals.
Privacy	Medical data is sensitive and "proprietary." Many are concerned that de-identification is not sufficient to protect privacy as practice patterns, medication use, and outcome variations are all sensitive information.

Current Exemplars

Taipei Medical University — WanFang Hospital, Taipei	<ul style="list-style-type: none"> • Successfully implemented automatic notification of critical lab and examination results by sending SMS messages to physicians' mobile phones • Shortened information lag from 30 hours to 3 minutes • Captures 20,000 high-risk events per year through computerized reports and detection
National Taiwan University Hospital, Taipei	<ul style="list-style-type: none"> • Struggling with mainframe downsizing • Plan to replace the legacy system by developing • Successfully developed CPOE system • Plan to replace whole health information system in 2007
Chang-Gung Memorial Hospital, Chiayi	<ul style="list-style-type: none"> • Fully paperless and filmless EHR hospital from its launch stage in 2002

Healthcare Landscape

Expenditure

Taiwan spends around 6.2% of its GDP on healthcare and 3.7% on National Health Insurance (NHI).

Insurance

All 23 million residents in Taiwan are covered by the NHI, which includes medication and dental plans. The NHI covers 400 million outpatient visits and 28 million inpatients per year. Insurance is funded through employer contributions, government subsidy, and enrollee premiums. More than 93% of all physicians, hospitals, and clinics in Taiwan participate in the NHI.

Infrastructure

There are 16,742 clinics and 594 hospitals in Taiwan, all of which offer both Western and traditional Chinese medicine. Government Hospitals are comprised of medical centers and municipal hospitals, which focus on acute and long-term care, and city hospitals. Private hospitals consist of medical centers, regional hospitals, and local and small hospitals.