The impacts of smart cards on hospital information systems—An investigation of the first phase of the national health insurance smart card project in Taiwan

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Abstract

PURPOSE: To investigate the impacts of the first phase of Taiwan's Bureau of National Health Insurance (TBNHI) smart card project on existing hospital information systems. SETTING: TBNHI has launched a nationwide project for replacement of its paper-based health insurance cards by smart cards (or NHI-IC cards) since November 1999. The NHI-IC cards have been used since 1 July 2003, and they have fully replaced the paper-based cards since 1 January 2004. Hospitals must support the cards in order to provide medical services for insured patients. METHODS: We made a comprehensive study of the current phase of the NHI-IC card system, and conducted a questionnaire survey (from 1 October to 30 November, 2003) to investigate the impacts of NHI-IC cards on the existing hospital information systems. A questionnaire was distributed by mail to 479 hospitals, including 23 medical centers, 71 regional hospitals, and 355 district hospitals. The returned questionnaires were also collected by prepaid mail. RESULTS: The questionnaire return rates of the medical centers, regional hospitals and district hospitals were 39.1, 29.6 and 20.9%, respectively. In phase 1 of the project, the average number of card readers purchased per medical center, regional hospital, and district hospital were 202, 45 and 10, respectively. The average person-days for the enhancement of existing information systems of a medical center, regional hospital and district hospital were 175, 74 and 58, respectively. Three months after using the NHI-IC cards most hospitals (60.6%) experienced prolonged service time for their patients due to more interruptions caused mainly by: (1) impairment of the NHI-IC cards (31.2%), (2) failure in authentication of the SAMs (17.0%), (3) malfunction in card readers (15.3%) and (4) problems with interfaces between the card readers and hospital information systems (15.8%). The overall hospital satisfaction on the 5-point Likert scale was 2.86. Although most hospitals were OK with the project, there was about 22% dissatisfied and strongly dissatisfied, that is twice as many hospitals with satisfied (about 10%). CONCLUSIONS: Our recommendations for those who are planning to implement similar projects are: (1)

provide public-awareness programs or campaigns across the country for elucidating the smart card policy and educate the public on the proper usage and storage of the cards, (2) improve the quality of the NHI-IC cards, (3) conduct comprehensive tests in software and hardware components associated with NHI-IC cards before operating the systems and (4) perform further investigations in authentication approaches and develop tools that can quickly identify where and what the problems are.