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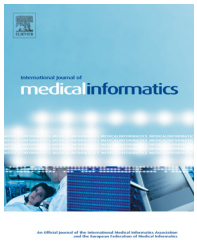

The trends in EMR and CPOE adoption in Japan under the national strategy

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ABSTRACT

Purpose: We evaluate the status of health information system (HIS) adoption (In this paper, "HIS" means electronic medical record system (EMR) and computerized provider order entry system (CPOE)). We also evaluate the affect of the policies of Japanese government.

Methods: The status of HIS adoption in Japan from 2002 to 2011 was investigated using reports from complete surveys of all medical institutions conducted by the Ministry of Health, Labour and Welfare (MHLW). HIS-related budgets invested by the Japanese government from 2000 to 2008 were surveyed mainly using literatures and administrative documents of the Japanese government (MHLW and Ministry of Economy, Trade and Industry).

Results: The rates of HIS adoption in Japan in 2011 were: 20.9% for the rate of EMR adoption in clinics, 20.1% for the rate of EMR adoption and 36.6% for the rate of CPOE adoption in hospitals. In hospitals, the rate of EMR and CPOE adoption were 51.5% and 78.6% in 822 large hospitals (400 or more beds), 27.3% and 52.1% in 1832 medium hospitals (200–399 beds), and 13.5% and 26.0% in 5951 small hospitals (less than 200 beds), respectively. Japan has a large number of medical institutions (99,547 clinics and 8605 hospitals) with a low rate of EMR adoption in clinics and a high rate of HIS adoption in hospitals. The national budget to expand HIS use was implemented for medium and large hospitals mainly. The policy target of New IT Reform Strategy was not achieved.

Conclusion: The rate of HIS adoption in Japanese medium and large hospitals is high compared to small hospitals and clinics, and this is attributable to the fact that the Japanese government placed the target for HIS adoption on key hospitals with a large number of beds and concentrated budget investment in those hospitals. Besides, legal approval of EMR and the introduction of Diagnostic Procedure Combination system facilitated EMR adoption. There is less financial support for small hospitals than medium and large hospitals. The low rate of EMR adoption in clinics stems from the facts that there was little subsidies or incentives in the national remuneration for medical services, lack of cooperation from medical associations, and a failed attempt to mandate computerization of medical accounting

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(medical billing). Giving financial incentives is an effective means of raising EMR adoption rate. For wide usage of HIS, more financial support and incentive may be necessary for small hospitals and clinics.

1. Introduction

Health information technology has the potential to improve the quality of medical care [1] and to reduce society's overall healthcare costs [2]. The adoption of health information systems (HIS; In this paper, "HIS" means electronic medical record system (EMR) and computerized provider order entry system (CPOE)) is a matter of concern for policymakers in different countries and HIS adoption is now being promoted as national policy mainly in advanced industrial nations [3,4].

In Japan, the Ministry of Health, Labour and Welfare (MHLW) fix medical fee and controls medical institutions via administrative direction on a universal health insurance system. In the 1980s, the computerization of medical billing had been used in some medical institutions, and next CPOE was introduced in medical institutions [5]. On the other hands, the EMR had not been legally accepted as official medical records for a long time, and hospitals had to prepare paper-based medical records in accordance with the law even if they had adopted EMR. In 1999 MHLW legally permitted use of EMR [6–8]. In 2001, MHLW published the "Grand Design" for Development of Information Systems in the Healthcare and Medical Fields (national policy document) [9] and set the policy target of increasing the adoption of electronic medical records (EMR) to at least 60% in hospitals with 400 or more beds and all clinics nationwide by the end of fiscal 2006 [10]. In 2003 Diagnostic Procedure Combination (DPC) system [11] of comprehensive payment of hospitalization medical expenses during the acute phase of a condition was introduced. DPC is the case-mix payment system that is similar to the Diagnosis Related Groups used in US. The submission of computerized medical record data (DPC format data) to the national government was requested as one of the requirement for getting approved as a DPC hospital.

However, a complete census conducted in October 2005 by the MHLW revealed low rates of EMR adoption: 19.0% ($n = 159$) in hospitals with 400 or more beds and 7.6% ($n = 7437$) in general clinics nationally. "The New IT Reform Strategy" [12] (national policy document) formulated by the Cabinet Secretariat's IT Strategic Headquarters in January 2006 targeted most medical facilities with 400 or more beds by fiscal 2008 and most medical facilities with 200 to 399 beds by fiscal 2010 for adoption of HIS. For small medical institutions the goal was established of expanding the use of low-cost EMR suited to exchange of medical information by fiscal 2010.

Thus far reports have been published on Japan's Health IT Policy and the status of its adoption [13–18], national and regional projects [14,19–21], and questionnaire surveys on the utilization of HIS at medical institutions [13,18,22–24]. Abraham et al. [14] reviewed the recent national policy, development and implementation of HIS. According to Yasunaga et al. [13], the percentage of institutions that had introduced EMR as of February 2007 was 10.0% (of sample size 1316) for hospitals and 10.1% (of sample size 1725) for clinics. Even the percentage for hospitals with 400 or more beds was just 31.2% (of sample size 456). These data were based on the survey that they performed. Takabayashi et al. [15] reported that the prevalence of EMR in Japan varies according to the size of the institution which is 62.5% in hospitals with at least 400 beds, 21.7% in hospital with 100–399 beds, 9.1% in hospitals with less than 99 beds, and 16.5% in clinics in 2009, using the data of a market research company. However, as far as the authors know, there are no reports on the status of HIS adoption based on the results of the latest complete census conducted by the national government in October 2011 and published in November 2012. In this study, we use this latest data.

It has passed over fiscal 2010 that is the achievement deadline of New IT Reform Strategy. Therefore, the accurate understanding of HIS adoption status is required for policy evaluation. In this paper, we will present the status of HIS adoption in Japan from 2002 to 2011, the financial support implemented by national government from 2000 to 2008, and the achievement status of the New IT Reform Strategy. Then, we evaluate affect of the policies of Japanese government.

2. Methods

2.1. *Data on the status of EMR and CPOE adoption in Japan*

2.1.1. *Use data*

In Japan, there is the official statistics performed by national government in accordance with the law. "Static Survey of Medical Institutions" that we used is one of them. Medical institutions are obliged by law to reply to the Static Survey of Medical Institutions, and so the response rate is 100% for each year on these complete censuses.

Data on less than 100,000 general clinics, excluding dental clinics, and about 9000 hospitals from the results of the last four Static Surveys of Medical Institutions conducted by the MHLW (data as of October 1 in 2002, 2005, 2008 and 2011) [25,26] were used as the source data for deriving the status and transition over time of EMR and CPOE adoption at medical institutions in Japan. The definition of medical institutions is as follows; a hospital is a medical institution with 20 or more beds, and a general clinic is that with 0–19 beds (excluding those providing dental care only). In this survey, the questionnaire is filled by the manager of the medical institutions, and it is submitted for MHLW.

This survey includes about 30 questions on base attributes such as hospital size, location, equipment, clinical specialties, and implementation of surgery and tests as well as the status