

THE EFFECT OF THE ELECTRONIC HEALTHCARE RECORD
ON PHYSICIAN BEHAVIOR:
A PROPENSITY SCORE WEIGHTED ANALYSIS

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By

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ACKNOWLEDGMENTS

In a real thesis, this section would contain acknowledgments such as, “This work was funded by National Science Foundation Grant Number AAA-00-00000 (Benjamin Franklin, Principal Investigator),” and “I would like to thank John Doe for helping me proofread my thesis and Mary Roe for drawing my graphs.”

The acknowledgments are included in the table of contents but do not have a chapter number. To achieve that, we declare them to be a `\pseudochapter` (which is defined only in `guthesis.sty`).

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PREFACE

If your thesis has a preface, this is where it goes. A preface is not an introduction, and most theses do not need them.

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CHAPTER 1

INTRODUCTION

The US spend 17.9% of GDP on health expenditure in 2013, according to the World Bank, and it is continuing to growth. Some scholars proposed that one way to reduce health care spending and improve health care efficiency is to adopt the Electronic Healthcare Record (EHR). The Obama Administration has prioritized the improvement of quality and efficiency of the health care system. President Obama signed the American Recovery and Reinvestment Act of 2009 which provides financial incentive for adoption and meaningful use of electronic health records. The adoption of EHR increased rapidly [CITATION NEEDED].

Given the increasing adoption of EHR, and the implementation of EHR incentive programs, the effect of electronic health care record on health outcomes are of interest. Empirically measured effect of adopting EHR on cost is still very limited, and the results are mixed.

CHAPTER 2

LITERATURE REVIEW

2.1 BACKGROUND

In 2009, the US Congress passed the American Recovery and Reinvestment Act (ARRA), which appropriates funds to promote the adoption and use of health information technology (HIT). The American Recovery and Reinvestment Act has set aside \$2 billion which will go towards programs developed by the National Coordinator and Secretary to help health care providers implement HIT and provide technical assistance through various regional centers (hhs).

The Centers for Medicare & Medicaid Services launched the Medicare and Medicaid Electronic Health Care Record (EHR) Incentive Programs after the passage of ARRA of 2009. These programs provide incentive payments to eligible professionals, eligible hospitals, and critical access hospitals (CAHs) as they adopt, implement, upgrade or demonstrate meaningful use of certified EHR technology. In order to receive the EHR stimulus money, the HITECH act (ARRA) requires eligible physicians to show "meaningful use" of an EHR system.

Take Medicare EHR incentive program as an example. Eligible physicians must attest yearly to demonstrating meaningful use to receive the EHR incentive and avoid a Medicare payment adjustment. In order to demonstrate meaningful use of 2014 Stage 1, eligible professionals must meet 13 required core objectives and five menu objectives from a list of 9. The core objectives includes recording selected patient

demographics, maintaining active medication list, protecting electronic health information, etc.. The menu objectives includes using certified EHR technology to identify patient-specific education resources, sending patient reminders, and implementing drug formulary checks, etc. (CMS, b).

2.2 EFFECT OF EHR ON HEALTH EXPENDITURE

Limited empirical studies estimated the potential net benefits that could arise from adopting health information technologies (HITs), including the EHR at the national level. The RAND Corporation estimated annual net savings to the health care sector from efficiency alone could be \$77 billion or more based surveys, publications, interviews, and an expert panel review. (RAND, 2005). Hillestad et, al. claimed that effective EHR implementation and networking could eventually save more than \$81 billion annually by improving health care efficiency and safety. Savings could be doubled by using health information technology to preventive care and chronic disease management (Hillestad et al., 2005). However, some other researchers do not find the positive cost-saving effect of EHR adoption on national health expenditure. For example, Adler-Milstein et al. found that ambulatory EHR adoption did not impact total cost, although it slowed ambulatory cost growth (Adler-Milstein et al., 2013b). Sidorov claimed that much of the literature on EHRs fails to support the primary rationales for using them, and it is unlikely that the U.S. health care bill will decline as a result of the EHR alone (Sidorov, 2006). There are also researchers suggest the adoption of EHR has a negative effect on cost-reduction (II et al., 2012).

EHR also provides a platform for predictive analysis, saving health care spending by allocating medical resources efficiently. Bates et al. proposed there are unprecedented opportunities to use big data, acquired from EHR, to reduce the costs of health

care in the United States (Bates et al., 2014). Roski et al. also pointed out big data has the potential to create significant value in health care by improving outcomes while lower cost (Roski et al., 2014). However, the integration of EHR into predictive analytics is still challenging. Roski et al. also claimed that big data’s success in creating value in the health care sector may require changes in current policies to balance the potential societal benefits of big-data approaches and the protection of patients’ confidentiality (Roski et al., 2014).

2.3 EFFECT OF EHR ON HEALTHCARE EFFICIENCY AND QUALITY

The effect of EHR on efficiency is mixed. A systematical literature review suggested that 92 percent of the recent articles on health information technology show measurable benefits emerging from the adoption of health information technology (Buntin et al., 2011). For example, a study found that hospital with more-advanced health IT had fewer complications, lower mortality, and lower costs than their counterparts (Amarasingham et al., 2009). Other suggest that simply adopting electronic health records is likely to be insufficient to drive substantial gains in quality or efficiency (DesRoches et al., 2010).

Time efficiency is one of the possible outcomes of EHR adoption. Physicians spent time on patients-interactions and documentation of clinical information. Clinicians hope that an EHR could increase the patient interaction time, which improves the quality of health care, while reducing documentation time (Leung et al., 2003). However, EHR is unlikely to reduce documentation time (Poissant et al., 2005) and the effect of EHR system adoption on time efficiency is mixed and varying among different institutions (Chaudhry et al., 2006).

Another important factor of healthcare efficiency and quality is the likelihood of follow-up health care appointments. Low "kept appointment" rates adversely affected continuity of care and led to inefficient clinic scheduling processes (Myers and Heffner, 2001). Although the CMS listed "Send reminders to patients per patient preference for preventive/follow-up care" as an objective in measuring meaningful use of EHR system (CMS, a), the evaluation of the effect of EHR on patient follow-up rate is limited.

Patient-centered education, which provided by EHR-based system, allows patients to understand their health better and make informed lifestyle adjustments. CMS requires eligible physicians to provide patient-specific education resources to more than 10 percent of all unique patients in order to obtain the EHR incentive program funding (hea). Very limited literature evaluated effect of EHR on patient-specific education resources utilization.

2.4 PHYSICIANS' FINANCIAL INCENTIVES ON EHR

On the micro level, EHR has a mixed effect on cost-saving of physician practices.

Some scholars claimed that the long-term return on adoption of EHR is positive. For example, Wang et al. estimated that a provider could gain \$86,400 net benefits from using an electronic medical record for a 5-year period, resulting in a positive financial return on investment to the health care organization (Wang et al., 2003). Bell and Thornton claimed that based on the size of a health system and the scope of implementation, benefits of HITs for large hospitals can range from \$37M to \$59M over a five-year period in addition to incentive payments (Bell and Thornton, 2011).

However, more researchers argued that physicians have insufficient financial incentive to implement EHR in the first place. Gans et al. surveyed a nationally represen-

tative sample of medical group practices and suggested that adoption of EHR is progressing slowly, at least in smaller practices (Gans et al., 2005). Jha et al. found a similar result that on the basis of responses from 63.1% of hospitals surveyed, only 1.5% of U.S. hospitals have a comprehensive electronic-records system (Jha et al., 2009). Adler-Milstein et al. found electronic health records will yield revenue gains for some practices and losses for many by using survey data from 49 community practices. Practices are encountering greater-than-expected barriers to adopting an EHR system (Adler-Milstein et al., 2013a).

2.5 CONTRIBUTION TO LITERATURE

Giving the increasing participation in the Medicare and Medicaid Electronic Health Records (EHR) Incentive Programs, and the increased policy interest in controlling health expenditures, the evaluation of the effect of EHR on physician behavior are of interest.

Although the number of health information technology evaluation studies is rapidly increasing, empirically measured behavior data are limited and inconclusive. Some research projected the potential benefit of adoption of EHR with data from surveys, publications, interviews, and expert panel reviews. However, there are limited research focus on empirical analysis of national wide data. Literature on outcome of adopting EHR, especially the effect of EHR on patient-specific health education prescription, is limited. This paper could contribute to the literature with a national-level perspective and evaluate the outcome of EHR adoption on health education, time spent with MD, and returned appointment rate.

Another major limitation of the literature is its generalization. Insufficient reporting of contextual and implementation factors makes it impossible to deter-

mine why most health IT implementations are successful but some are not. This paper will consider which factors may contribute to a better outcome of EHR adoption. It could help making government incentive programs more efficient by selecting proper physician practices.

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