

# Chapter XIV

## Health Information Technology Economic Evaluation

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### **ABSTRACT**

*This chapter describes a framework for conducting economic analyses of health information technologies (HIT). It explains the basic principles of healthcare economic analyses and the relationships between the costs and effectiveness of a health intervention, and then uses these principles to explain the types of data that need to be gathered in order to conduct a health information technology economic evaluation study. A current health information technology study is then used to illustrate the incorporation of the framework's economic analysis methods into an ongoing research project. Economic research in the field of health information technology is not yet well developed. This chapter is meant to educate researchers about the need for HIT economic analyses as well as provide a structured framework to assist them in conducting these analyses.*

## INTRODUCTION

In 2004, President George W. Bush established the Office of the National Health Information Technology Coordinator with the charge of developing a “health information technology infrastructure” that “reduces healthcare costs resulting from inefficiency, medical errors, inappropriate care and incomplete information” (Sidorov, 2006; White House, 2004). This charge came with the assertion that the adoption of electronic health record systems can, “reduce healthcare costs by up to 20 percent per year” (U.S. Department of Health and Human Services, 2007). The U.S. House of Representatives recently approved legislation that would provide \$40 million over five years to help physicians purchase health information technology products (Heavy, 2006). The stated goal is to provide funding that will enable the widespread adoption of electronic health records, which may in turn improve quality of care and reduce medical errors. One republican congresswoman was moved to say, “Realistically, the government’s not going to pay for this. The system’s going to do it ... because it creates system efficiencies that pays the system back” (Heavy, 2006). Yet despite the near unanimous optimism among policy makers surrounding these technologies, the precise nature of their value propositions and the best methods for measuring these expected medical cost reductions and health benefit increases remain unclear (Chaudhry et al., 2006; Girosi et al., 2005). Further, there are as yet no proposed methods for physicians, hospitals, or the government to determine whether or not they are actually receiving the financial returns they anticipate from their investments in health information technologies.

This chapter will present a conceptual framework for the economic evaluation of health information technologies. It will then describe how this framework can be applied to determine the types of economic data that should be collected in a health information technology economic evaluation study, and how those data should be analyzed.

## BACKGROUND

Much of the recent interest in health information technology by policy makers has been fueled by the introduction of application systems (i.e., computerized provider order entry and the electronic health record) that have shown potential for improving patient outcomes (Chaudhry et al., 2006). While various models have been developed that point to the potential benefits from these systems, the formal economic evaluation of these and other types of health information technologies is immature, and characterized by incomplete methodologies that are inconsistently applied. (Eisenstein, 2006; Kaushal et al., 2006; Kuperman & Gibson, 2003; Ohnsfeldt et al., 2005; Walker et al., 2005). We believe that these shortcomings stem from fundamental misconceptions among health information technology investigators regarding what should be evaluated and how evaluations should be conducted.

### Introduction to Health Economic Evaluation

Traditionally, most health information systems have been concerned with conventional business functions such as financial management (e.g., general ledger and accounts payable), resource scheduling (e.g., hospital rooms and medical equipment), inventory management (e.g., pharmaceuticals and surgical implants) and accounts receivable (e.g., billing for physician and hospital services). Attempts at health information technology economic evaluation have typically borrowed either general business models or models from other industries that have demonstrated competence in information technology evaluation (Frisse, 1999; Panko, 1999; Tuttle, 1999). However, these models do not account for the unique nature of the healthcare industry in which information technologies are playing a greater role in patient care and may even affect patient outcomes (Stead & Lorenzi, 1999; Tierney et al., 1994). In these situations,

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