

Project Title:	Value of Imaging-Related Information Technology
Principal Investigator:	Gazelle, G. Scott, M.D., M.P.H., Ph.D.
Organization:	Massachusetts General Hospital
Mechanism:	RFA: HS04-012: Demonstrating the Value of Health Information Technology (THQIT)
Grant Number:	R01 HS 014891
Project Period:	09/04 – 08/08, Including No-Cost Extension
AHRQ Funding Amount:	\$1,471,989
Summary Status as of:	August 2008, Conclusion of Grant

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve the quality and safety of medication management via the integration and utilization of medication management systems and technologies.

Business Goal: Knowledge Creation

Summary: Medical imaging informatics (MII) is responsible for a substantial portion of the total health care budget allocated to health information technology (IT). MII systems—usually comprising a combination of digital imaging systems, picture archiving and communication systems (PACS), radiology information systems, and voice recognition transcription technology—are now available from a number of commercial vendors. The commercial availability of MII systems makes IT in radiology somewhat unique compared with IT in most other sectors of health care. Nevertheless, a minority of radiology departments in U.S. hospitals have deployed comprehensive MII systems. MII systems have the potential to improve health care quality in at least four of the six focus areas described by the Institute of Medicine in its 2001 report *Crossing the Quality Chasm*; these include safety, effectiveness, efficiency, and timeliness. Deployment of a comprehensive MII system at Massachusetts General Hospital (MGH) began in 1995. The potential for cost savings was a deciding factor in the decision to proceed, and preliminary analysis suggested there was a substantial return on investment for these technologies. Widescale MII deployment at New York University (NYU) Medical Center began just prior to the start of data collection for this project which was to evaluate MII deployment at both MGH and NYU. The opportunity to study MII deployment at two large academic medical centers that went through the process almost a decade apart presented a unique opportunity to better understand the value of MII and to isolate the effects of MII from other secular trends in health care. The analysis identified the financial implications of deploying MII systems, including the costs and savings attributable to their use. The investigators also determined the effect of MII on health care quality and safety by examining outcomes such as process times, provider and capital utilization efficiency, throughput, and other metrics.

Specific Aims

- Determine the financial impact, including initial cost, savings, and rate of return, of the deployment of a comprehensive MII system in two large academic radiology departments. **(Achieved)**
- Determine the impact of MII on health care quality, focusing on dimensions of quality, including process times, duplicate studies, and efficiency of provider utilization as defined by the Institute of Medicine. **(Achieved)**

2008 Activities: Data collection was completed prior to 2008. In 2008, focus was shifted to generalizing project results to make a financial and clinical practice model describing MII deployment and then to projecting possible effects of implementing MII technology in other settings.

Impact and Findings: The payback period for the MII system deployed by Academic Medical Center (AMC) 1 in 1995 was 48.8 months, and the internal rate of return in the year of payback was 56 percent. While the savings on film realized by AMC1's deployment of the MII system positively contributed to the financial return, the payback period of the initial capital investment was not realized until the fifth year of operations (64.5 months), yielding an 18 percent internal rate of return. Alternatively, the net profitability of the MII volume, considered alone, yielded a 16 percent internal rate of return in just the 4th year of operations (54.2 months). The linear regression models of each of the four measures of productivity demonstrated a significant ($p < 0.0001$) relationship to the modeled extent of penetration of PACS at AMC1. No other terms were significant. None of the models for the mean times, nor the fraction of AMC2 exams reported within 3 days, demonstrated any significant relationship to the implementation of PACS at AMC2 or PACS at AMC1. Results demonstrate a strong business case for the use of MII systems in radiology departments and hospitals and show that the implementation and use of these systems is associated with measurable quality and efficiency improvements. These results should encourage institutions that have yet to implement these systems to do so, sooner rather than later.

Selected Outputs

This project has no outputs to date.

Grantee's Most Recent Self-Reported Quarterly Status (as of August 2008): This project is complete with all aims achieved.

Milestones: Progress is mostly on track.

Budget: On target.