Chapter 6.1
Operationalizing the Science:
Integrating Clinical Informatics into the Daily Operations of the Medical Center

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ABSTRACT

Healthcare IT (HIT) has failed to live up to its promise in the United States. HIT solutions and decisions need to be evidence based and standardized. Interventional informatics is ideally positioned to provide evidence based and standardized solutions in the enterprise (aka, the medical center) which includes all or some combination of hospital(s), hospital based-practices, enterprise owned offsite medical practices, faculty practice and a medical school. For purposes of this chapter, interventional informatics is defined as applied medical or clinical informatics with an emphasis on an active interventional role in the enterprise. A department of interventional informatics, which integrates the science of informatics into daily operations, should become a standard part of any 21st century medical center in the United States. The objectives of this chapter are to: review and summarize the promise and challenge of IT in healthcare; define healthcare IT; review the legacy of IT in healthcare; compare and contrast IT in healthcare with that of other industries; become familiar with evidence based IT: Medical informatics; differentiate medical informatics from

DOI: 10.4018/978-1-60960-561-2.ch601

IT in healthcare; distinguish medical, clinical, and interventional informatics; justify the need for operational departments of interventional informatics.

INTRODUCTION: THE PROMISE AND CHALLENGE OF INFORMATION TECHNOLOGY IN HEALTHCARE

The promise has always been that healthcare information technology (HIT) should be able to deliver rapid, relevant, and accurate information to clinical providers thereby providing greater efficiencies in patient care, facilitating excellence in patient care, and making improvements in patient safety possible (Bates & Gawande, 2003; Chaudhry et al., 2006; Millenson, 1997; Pizzi, 2007). Healthcare is an information intense industry (Stead, 1999) and by its very definition information technology "…specializes in the delivery and the management of information" (*IT Definition*, 2007). Not surprisingly HIT is frequently cited as the solution to all that ails healthcare (Coye, 2005; Institute of Medicine (U.S.) Committee on Improving the Patient Record, Dick, & Steen, 1991; Institute of Medicine (U.S.) Committee on Improving the Patient Record, Dick, Steen, & Detmer, 1997; Marchibroda & Gerber, 2003).

This belies a repeated inability of industry vendors to fully deliver on that promise as noted in a 1997 panel in Healthcare IT. In 1997 a panel of CEOs from Cerner, Eclipsys, HBOC and MedicaLogic noted only 60 percent of implementations of stable clinical products occurred on time and in budget, only 50 percent of available clinical function is used (Kuperman, Leavitt, McCall et al.,1997). There is general agreement that implementation problems stem from inability to integrate projects into existing workflow (Stead, 1999; Stead, Miller, Musen, & Hersh, 2000). This author and Ms. Kristin Myers have similarly noted that its process, people and workflow integration that are the key and not technology (Kannry, Mukani, & Myers, 2006; "Thinking About… Implementing the EMR," 2006).

At the same time there is general agreement that healthcare in the United States is in crisis whether it be due to the cost of healthcare, the lack of standardization and delivery of best practices, or issues of patient safety. Healthcare is an information intense domain (Kleinke, 2005) and clearly needs the efficiencies that IT can deliver. If information technology should be good at one task that task is managing information.

A frequent rejoinder by industry regarding the Internet around the turn of the century was that the Internet was providing information "just in time" which is defined as arriving just as needed (Strategos Inc.). For example, manufactured goods would arrive in the store based on information on sales, stock, and so on and thus reduce holding and storage costs (Wikipedia). In healthcare, where clinical information is a mission critical commodity, this could mean that when a test is ordered, the results of all previous tests of the same time are presented just in time to perhaps avoid re-ordering of the test. However, just in time information and applications never reached the shores of healthcare.

Few would disagree that IT in the rest of the world (ROW) seems to achieve efficiencies that HIT cannot. For purposes of this chapter, ROW is broadly defined as IT in any domain except healthcare meaning business, banking, industry, etc. A significant portion of this disparity between ROW IT and HIT can be traced to the beginning and evolution of healthcare IT. The earliest applications of information technology in healthcare were designed for support of financial transactions. In the later 1950s and early 1960s HIT began in earnest in response to a U.S. Government request to provide documentation for reimbursement. In the early 1990s, before the advent of managed care, sending just enough information to meet federal reimbursement requirements was good enough. Clinical information had little or no cost as tests could be re-ordered if lost or done at another