Chapter V

Moving Toward an e-Hospital

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ABSTRACT

Healthcare organizations, like other information intensive organizations, cannot ignore the rapid progression to a digital network economy. While some aspects of patient care must continue to be delivered locally, Internet technologies and "e-healthcare experiences" are likely to play an increasing role in the pre-delivery and post-delivery arenas. Creating the infrastructure to quickly take advantage of this paradigm shift, while adding value to the local delivery system is paramount to the long-term success of healthcare organizations. To achieve the level of data integration necessary to move to an e-hospital, the complicated web of patient data must flow automatically and instantaneously between information systems within and external to the organization. This chapter presents an overview of infrastructure issues and technologies that will enable hospitals to "plug into" the evolving e-health continuum.

INTRODUCTION

The typical hospital information system application architecture can be separated into systems that support: (1) patient care, (2) administrative and regulatory processes, and (3) decision-making and quality improvement (Mon and Nunn, 1999). At the foundation of these broad categories are the network architecture, the hardware components, and the connectivity software and data architectures that unite the e-hospital within and without the evolving digital network. Noting that e-healthcare is a vehicle of change, Lin and Umoh (2002) stated that the e-healthcare system would not only be a win-win concept for the providers and the patients, but also for other stakeholders in the system. Over the last few years, dozens of articles and a few books have been written on the benefits of e-healthcare (Kelly and Unsal, 2002; Siau, Hong, and Southard, 2002;

Walter and Tung, 2002; Goldstein, 2000). The e-hospital is only one, yet important, element of the e-healthcare system. This chapter takes stock of the state-of-the-art and examines critical infrastructure elements central to the realization of an e-hospital, a critical component of the e-health continuum. This would help the leading-edge practitioners in validating their work and provide practitioners moving towards an e-hospital environment some tips for their journey. There is also some food for thought for academics in terms of research agenda for the future.

The automation of the transactions surrounding a patient visit to the hospital and the transformation of the diagnostic, treatment, and other patient-centric observations into digital data is a prerequisite for e-health. Although most of the current e-health hype focuses on the pre-delivery and post-delivery aspects of healthcare, the core application systems and the niche applications that support the menagerie of hospital provider specialists surrounding the delivery of care to hospital patients will be explored in this chapter. Next, the technologies and standards that seem to be shaping the healthcare digital network will be given. The technologies and open standards that placed the Internet revolution into perpetual motion will allow hospitals to reap the same gains in productivity and quality being realized in other industries. Healthcare decision-makers must select products, vendors, and applications that incorporate Internet technologies for the e-hospital to be realized. Perhaps the most fundamental and essential building blocks of the e-hospital are the hardware components and the rich network connectivity media that allow humans and computers to communicate. The user-friendliness, reliability, and availability of the tools that patients and healthcare providers use to complete healthcare transactions and to manage and access health-related knowledge are paramount. A sampling of the variety of communication devices and the necessary physical and technological infrastructures will be offered, along with key issues. Finally, the challenges posed to the end-users in an e-hospital environment will be presented in this chapter. The hospital is part of a larger system. Perhaps the greatest challenge to the realization of e-health both inside and outside of the hospital walls is the psychological and socio-economical issues that will determine the overall benefits of a digital healthcare delivery system.

APPLICATION ARCHITECTURE SUPPORTING THE ENTERPRISE BUSINESS PROCESSES

This will be discussed in terms of patient admission process, communication of patient admission data, supporting diagnostic and therapeutic sciences, and the point-of-care data entry.

Patient Admission Process

Hospital administration and registration systems are used to "register" patients into the hospital. It is the first point where the potential for drastic reductions in per-transaction costs could be realized via e-commerce. It is estimated that in the US it costs $8 per claim for providers to carry out the check-in, verifying eligibility, and billing. In aggregate, some $250 billion is spent annually on medical claims paperwork in the United

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