

The healthcare IT landscape

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The United States spends over \$2.6 trillion annually on healthcare. This amount represents approximately 18% of the gross domestic product (GDP), a percentage that has doubled in the last 30 years and is the highest of any country in the world [11]. Over 75% of these costs are due to the management of chronic diseases, which currently affects 45% of the U.S. population. By 2023, it is expected that costs to manage chronic diseases alone will rise to \$4.2 trillion [3]. Many look to information technology to help reduce costs, increase efficiency, broaden access to healthcare, and improve the health of the population.

Meanwhile, recent years have seen a dramatic shift in the nature of computing with the advent of smartphones and tablet computers; the latest surveys estimate that over 50% of Americans have smartphones [10]. This wide-spread availability of a powerful mobile computing platform, with a rich interface and a variety of built-in sensors, has created a boom in mobile health (mHealth) applications like RunKeeper and Fooducate [9]; mHealth application downloads increased from 124 million in 2011 to 247 million in 2012 [8]. These mHealth apps and devices are becoming more prevalent due in part to the rising cost of healthcare and their suitability for managing chronic diseases, particularly in the aging population [5, 6], and in prevention and wellness programs [1].

Smartphones and tablets are rapidly moving into the clinical workplace as well. A recent estimate indicates that as many as 62% of doctors use mobile tablets [4]. Although some hospitals embrace smartphones and tablets by distributing them to their staff [7], a 2012 survey found that 85% of hospitals allow their clinicians to bring their own device to work [2].

Furthermore, universal connectivity (cellular, wireless, and home broadband) has enabled a tremendous variety of services to move to the “cloud.” Services like Dropbox and Google Drive make it easy for individuals to store, manipulate, and share content on cloud servers located in distant data centers. Services like Amazon S3 and Google App Engine make it easy for developers to build scalable computational backends without installing or managing their own infrastructure. These trends are pushing more individuals and enterprises to push an increasing fraction of their computing into Internet-connected servers run by other organizations – raising important questions about security and privacy.

Finally, recent years have seen rapid developments in smart, miniaturized, low-power, adaptive and self-calibrating instrumentation, enabling the emergence of mobile devices for monitoring and managing individual health conditions; examples range from wearable devices that measure physical activity (such as the BodyMedia armband) to Wi-Fi enabled bathroom scales (such as those from Withings or Fitbit) to stick-on ECG patches to monitor heart conditions (such as those from Corventis) to implanted insulin pumps (such as one from Medtronic). Most are wireless, able to upload data to a smartphone or to a cloud server for analysis and access by both the individual and caregivers.

The dynamic healthcare ecosystem and rapid technology evolution lead to new challenges in securing tomorrow's healthcare information infrastructure. More on that in the [next post](#)!

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