

The Current Situation

In 2009, Congress committed to supporting the adoption and meaningful use of electronic health records.... since that time, the adoption of EHRs has accelerated rapidly, but research has repeatedly demonstrated that adoption has not been consistent across all physicians.

—Dawn Heisey-Grove, MPH and Vaishali Patel, PhD, *ONC Data Brief No 21, 2014*¹

Given current EHR adoption levels and provider survey data, I assume that many, if not most, healthcare provider readers of this book are using EHRs, may well be frustrated with them in one respect or another and are seeking advice or “wisdom” to help alleviate those frustrations or chose a better EHR in the future. I hope this book will help, but first, some perspective on where we’ve been and where we are today.

As we’ve said, healthcare informatics serves healthcare delivery—the translation of medical knowledge into the care of actual patients. As a result, its key components are:

- **Electronic medical records** created and used by licensed professionals
- **Personal health records** created and managed by patients
- **Health information exchange** used to share digital information

The term **electronic health record** means the merger of all available health data about patients into one integrated record. It is important to recognize that, given today’s mobile, wearable and wireless technologies, a new source of this data can be the patients themselves. Major companies such as Apple, Samsung and Microsoft increasingly see health and fitness devices as an important adjunct to their ubiquitous smartphones and mobile devices and have introduced wearable devices to collect health and activity related data. They may also see aggregation of diverse patient-generated data as a business opportunity. This is a main purpose of software hubs like Apple’s HealthKit, Samsung’s Health Board and the Microsoft Health mobile applications (apps). Other companies are offering novel sensing

¹<http://www.healthit.gov/sites/default/files/oncatabrief-physician-ehr-adoption-motivators-2014.pdf>.

technologies with the objective of making health and fitness data collection as ubiquitous, easy and multidimensional as possible. What to do with all this new data is still an open issue that we'll discuss later on.

No matter what the source, creating an integrated and comprehensive patient record requires **health information exchange**. It is a critical tool for achieving coordinated care among the many providers who may be seeing the same multi-chronic disease patients. It can empower patients to access and even contribute to their records, and it can make health data accessible for so-called "secondary uses" such as research on both population and public health.

Health information exchange requires core technologies to assure **privacy** and **security** of health data and to establish **trust** that the data is being shared as intended. All of this is governed by the Health Insurance Portability and Accountability Act of 1996 (HIPAA), a strict law with severe penalties, including jail time. Increasingly, objections are being raised to the difficulties this law has created in obtaining health data for important research purposes.²

Historically, health information exchange has required **standards** so that data is represented in a consistent way in the diverse systems involved and can more easily and accurately be meaningfully combined. As we'll see, these standards are a large and diverse part of health informatics and attempt to define the way data is represented, packaged and communicated for exchange. As they have evolved over time they have grown increasingly complex. Some would argue too complex. How best to overcome this complexity is a current, and I believe critically important, issue we will discuss in some detail later on.

First, of course, there must be digital data to share and for decades, obtaining it had been a virtually insurmountable problem. As I write, it is clear that the federal government's Health Information Technology for Economic and Clinical Health (HITECH) program has led to an explosion of EHR adoption. As recently as 2008–09, according to twin papers in the *New England Journal of Medicine*, only some 4 percent of physicians and 1.5 percent of non-federal hospitals (the United States Department of Veterans Affairs (VA) and U.S. Military Health System have long had electronic records) had a *clinically significant* EHR.^{3, 4} While one recent report argues the current adoption levels would have been achieved without HITECH (albeit a couple of years later),⁵ these levels are reportedly now around 70 percent for eligible providers and above 90 percent for hospitals, a huge increase that I believe was directly, and likely in large part, the result of HITECH. Moreover, as of the most recent November 2014 report by the Office of the National Coordinator for Health IT (ONC), the federal agency established to implement HITECH, some 337,861 Medicare-eligible and 166,670 Medicaid-eligible health professionals (refer to the glossary for an explanation of eligible professionals) and

²<http://issues.org/25-4/detmer/>.

³<http://www.nejm.org/doi/full/10.1056/NEJMsa0802005>.

⁴<http://www.nejm.org/doi/full/10.1056/NEJMsa0900592>.

⁵<http://www.nber.org/papers/w20553>.

some 4,789 hospitals had registered for the Meaningful Use program to encourage EHR adoption. This is over 95 percent of both groups which can then be reimbursed for the cost (perhaps more of it or less depending on how much they actually spend) of implementing an EHR if it qualifies and is used according to the rules of the program.⁶

Many are surprised to hear that, when this program was announced in 2004 and despite decades of failed efforts, some experts pushed back saying that we would end up deploying a panoply of noninteroperable systems and by doing so would, in essence, create a further barrier to information exchange. It is certainly correct that we've ended up deploying many different EHR systems. A visit to the ONC dashboard site reveals that there are around 700 different systems that providers have reported adopting.⁷ Only around 30 of these are "primary" vendors with at least 1,500 installations, but even that is a large number considering that each vendor typically represents clinical data in their own, often unique and typically proprietary, way.

As a result, interoperability—the ability of diverse systems to share data—has risen to the level of public, national debate. Providers who have adopted EHRs are complaining that they can't share data.⁸ Policy papers are being published to suggest how we should proceed.⁹ Congress is complaining about the lack of interoperability and laws mandating it have been introduced.¹⁰ Of greater interest to this discussion, interesting and arguably more facile and less expensive new technologies are now being promoted and taken seriously as a means to achieve interoperability.

Given all of this, I believe health informatics is now at a "tipping point" from which it will succeed or fail to achieve the lofty goals envisioned by thought leaders for decades. Getting past the interoperability barrier is arguably the key challenge now before us; but it is followed closely by how to usefully aggregate and analyze vast new quantities of digital health data. Your interest in informatics at this point in time is well placed and important. A more educated population of care providers and others in the healthcare domain is essential to gaining momentum and to moving us in the right direction.

We begin with some essential background on U.S. healthcare.

⁶http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/May2014_SummaryReport.pdf.

⁷<http://dashboard.healthit.gov/quickstats/pages/FIG-Vendors-of-EHRs-to-Participating-Professionals-2014.html>.

⁸<http://www.nytimes.com/2014/10/01/business/digital-medical-records-become-common-but-sharing-remains-challenging.html>.

⁹http://healthit.gov/sites/default/files/ptp13-700hhs_white.pdf.

¹⁰<https://www.congress.gov/bill/113th-congress/house-bill/4015>.

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