

Health Information Technology in the United States: The Information Base for Progress

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Executive Summary



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The Institute for Health Policy (IHP) at Massachusetts General Hospital (MGH) and Partners Health System is dedicated to conducting world-class research on the central health care issues of our time. The mission of the IHP is to improve the health and health care of the American people through conducting health policy and health services research, translating new healthcare knowledge into practice, informing and influencing public policy, and training scholars and practitioners of health policy.

Health information technology (HIT) refers to the use of a variety of electronic methods for managing information about the health and medical care of individuals and groups of patients. If health care organizations and systems invest more in health information technology, these investments have the potential to advance health care quality. HIT can improve care processes so that patients with acute and chronic conditions receive recommended care, diminishing disparities in treatment and reducing medical errors.

Nevertheless, the adoption of HIT has been slow, because formidable barriers still exist: the initial high costs of investing in health information technology, the ongoing maintenance required in all information systems, and short-term loss of productivity because staff need to adapt to new systems. Many worry that if HIT follows adoption patterns of other new medical technologies, these advances may have limited reach, disadvantaging underserved and vulnerable patient populations and increasing or perpetuating disparities in access to and quality of care.

These and other concerns have spurred public and private efforts to increase the pace of and reduce disparities in HIT diffusion. The efforts include formulating national plans for dissemination, catalyzing the development of standards to encourage interoperability, and promoting public-private partnerships to develop HIT infrastructures at the local and regional levels.

Estimating EHR Adoption

Perhaps the most important type of health information technology is the electronic health record (EHR), which electronically collects, stores, and organizes health information about individual patients, facilitates communication between clinicians about patient issues, supports improved clinical decision-making, and facilitates the management of groups of patients by health care organizations. Creating an information base on the state of EHR adoption is a high priority for efforts to track the dissemination of HIT generally, understand barriers to adoption, and for future policy development in this field. Of particular importance in this regard is the collection of data on variation in EHR adoption by provider specialty and geography and illustrations of successful adoption strategies.

This report evaluates current information on the state of EHR adoption in the U.S. health care system. One of the report's most important recommendations is to develop more refined and widely-accepted definitions of what EHRs are, and to improve the collection of survey data on EHR adoption among solo physicians, group practices and hospitals. The report reviews 36 existing data sources, including ongoing national surveys and one-time or regional studies, and recommends a coordinated, systematic national approach to measuring EHR diffusion and implementation that builds on this experience. The report summarizes existing information on the following topics, and recommends approaches to improving what is known on these subjects:

- What is the current level of EHR adoption among key provider groups, especially, physicians in small groups or solo practice, large physician groups and hospitals?
- What predicts whether or not a physician or hospital will adopt an EHR?
- Where are the gaps in adoption? How much does adoption depend on location, organization type, specialty, involvement with vulnerable populations and EHR capabilities?

- How can precise, timely data on EHR adoption best be collected?

After one year of examination of dozens of studies and surveys, our key findings include:

- Adoption is not occurring as rapidly as hoped.
- There is considerable uncertainty about the existence and size of any gaps in the availability of EHRs to physicians who serve vulnerable populations compared to physicians who are less involved in the care of these groups.
- Approaches to measuring the adoption of EHRs could be greatly improved through developing a standardized, widely accepted definition of an EHR and of the adoption process, and through using generally accepted survey methodologies in collecting data on EHR adoption.

Chapter One

Chapter 1 summarizes the basic structure of the report and lays out the measurement challenges for better understanding the extent and patterns of EHR adoption. It briefly reviews the content areas addressed in the report and what is now known about the state of EHR adoption among physicians, group practices and hospitals. This chapter also begins to outline the methodological and technical shortcomings of existing data. In addition, the chapter describes the research efforts that went into this report, delineating the research team, the Expert Consensus Panel, and the technical working groups.

Chapter Two

Chapter 2 defines key terms related to the measurement of EHR adoption by first reviewing existing definitions of EHRs and the meaning of the term “adoption.” The chapter examines how to further develop the content of EHR adoption surveys by better identifying what should be measured. The chapter includes recommended definitions of key terms to be used in new and existing surveys.

Key Findings

- To be defined as an EHR, an electronic approach to collecting, storing and manipulating patient data must be able to accomplish at least four tasks: collection of patient health information and data, results management, order entry management, and decision support.
- The process of EHR adoption consists of three steps: acquisition, installation and use.
- Reflecting these definitions, EHR adoption surveys should ideally collect the following information about EHR adoption: the capabilities of the adopted EHR system, the acquisition, installation, and use of the system; barriers and incentives to EHR adoption; and practice and market characteristics.
- Several existing surveys including the National Ambulatory Medical Care Survey (NAMCS) and the Medical Group Management Association (MGMA) survey contain useful items on EHR adoption; however, new content must be explored to meet the goal of developing reliable, timely adoption data for policy development and to assess the needs of physicians and hospitals serving vulnerable populations.
- Because of differences between the hospital and ambulatory settings, specific, dedicated surveys for each of these sectors will be required to track the adoption of EHRs.

- Asking physicians about EHR use at the point of care is likely to yield reliable data on their adoption of EHRs. Moreover, researchers can assume that if a physician in a solo or small group reports using a function, then the practice has both acquired and installed the function. This assumption may not hold for larger group practices and hospitals, where EHRs may be fully installed and used in some parts of an organization but not in others. To ensure that researchers could infer acquisition and installation from use, the study would require a sufficient number of respondents distributed across all units of a hospital or large group.
- Hospital EHR adoption surveys should focus at both the departmental level and at the hospital-wide level.
- Interoperability will be a key issue going forward, has not been well studied and is an area that is ripe for content development. As EHR adoption becomes more widespread, the following areas will be critical to examine:
 - exchange of information between hospitals and admitting physicians;
 - exchange of information between hospitals within a community;
 - exchange of information between or among physicians and physician groups within a community;
 - exchange of information between patients and hospitals (such as availability of patient portals that enable access to personal health records);
 - exchange of information between patients and physician offices beyond lab results, e-mail and appointment scheduling;
 - exchange of information between health plans and patients; and
 - exchange of information among hospitals, physicians, pharmacies, nursing homes, and home health care providers.

Chapter 3

Chapter 3 assesses the quality of existing surveys and their data and estimates current levels of adoption based on surveys deemed to be of high quality. We included all extant surveys of EHR adoption. Of the 36 surveys, we were able to gather enough information to rate the quality of both the methodology and the content of 22 surveys.

Key Findings

- Only 10 surveys received a high rating for methodology. The methodological ratings were based on the survey's accuracy in representing the population in question, the proportion of those surveyed who returned questionnaires, the questionnaire development process, and sample size.
- The survey content ratings were based on whether the survey looked at the following issues: whether the practice had an EHR, the nature of the EHR capabilities, measures of incentives for EHR adoption, measures of barriers to EHR adoption, and the ability to identify disparities in adoption among different vulnerable populations. No survey was rated high in all five content areas. Only three physician or physician group surveys and one hospital survey were rated as having high quality content in at least three of five content areas.
- Only two surveys achieved a high quality rating for both methodology and at least three of five content areas.
- Based on the high quality data on EHR adoption, we estimate that anywhere from 17 percent to 24 percent of physicians in ambulatory care settings use

EHRs to some extent. Our best estimate, based on the most recent data, is that the proportion of physicians with access to EHRs in 2005 was closer to 24 percent than to 17 percent.

- Between 4 percent and 24 percent of hospitals have adopted computerized physician order entry (CPOE), the best proxy in existing surveys for EHR adoption in these settings. Our best estimate is that as of 2005, the proportion of hospitals with functioning CPOE systems was closer to 4 percent than 24 percent, possibly as low as 5 percent.
- Very little information is available on EHR adoption among stakeholders that disproportionately serve vulnerable populations, such as community health centers, public hospitals and other providers who serve this group of patients.

Chapter 4

Chapter 4 examines trends in EHR use among health care providers serving vulnerable populations. Relying on advice from our expert consensus panel, we define vulnerable populations as members of racial and ethnic minorities and low-income groups.

Key Findings

- Surveying traditional safety net providers such as public hospitals and community health centers (CHCs) is too narrow to capture the experiences of vulnerable populations in a nationally representative way. The vast majority of free and low cost care provided is rendered by facilities that are not deemed safety net institutions. Thus, researchers will also need to focus on providers who serve large numbers of patients from designated subpopulations.
- The most recently available data show that 8.6 percent of the nation's approximately 1,000 CHCs have a full EHR and an additional 15.9 percent report having a partial EHR system. When the definition is narrowed, only 9.3 percent of CHCs report having a form of an EHR.
- Data from the 2005 NAMCS suggests that the proportion of physicians with our Expert Consensus Panel's definition of an EHR varies by some patient and payer characteristics. Providers who derive a smaller proportion of their practice revenue from Medicaid are more likely to report using such EHRs than providers with a larger share of Medicaid patients.
- Physician EHR adoption did not depend on the demographics within the counties in which physicians practice or the per capita income of county residents. EHR adoption by physicians did not vary by percent of county population that is non-Hispanic white and per capita income for the county.
- Developing data that allows accurate determination of EHR adoption among providers who serve vulnerable populations will require complex sampling designs.
- Strategies to identify providers who disproportionately serve these patients can be developed by using provider self-report of patient panel composition, linking provider IDs to Medicare claims data, or using discharge or payer-mix data to determine patient panel characteristics.

Chapter 5

Chapter 5 reviews options for assessing the impact of policy changes on EHR use by physicians and hospitals. The report reviews policy interventions that might influence EHR adoption and then examines the types of policy questions that decision-makers might want answered regarding the consequences of these actions. Building from this base of policy options and policy questions, we complete this review with a discussion of quantitative and qualitative methods that might be employed in evaluating experience with policy options for the purpose of answering policy-relevant questions.

Key Findings

- Four factors drive EHR adoption: financial incentives and barriers, laws and regulations, the state of the technology, and organization influences.
- Financial barriers include the high cost of EHR systems and providers' uncertainty about the return on investment. Providers still question the business case for EHR adoption.
- Legal barriers to adoption include concerns about newly created potential legal liabilities and concern over the actual or perceived legal burden of compliance with regulations regarding privacy and other factors.
- Technology-related barriers include concerns about ease of use and obsolescence of particular EHRs.
- Organizational barriers can include small size of practice or hospital, payer mix, level of integration of the care system and organizational leadership.
- Policies to spur adoption can be financial, legal, technological or organizational in focus. It is likely that a combination of incentives targeting all of these areas will be necessary to prompt adoption.
- Evaluations of policy interventions should examine both whether the policy works and why, addressing both the outcome of the intervention and the process.

Chapter 6

In Chapter 6 we recommend general methodological guidelines for applying best survey practices to the measurement of EHR adoption in the United States.

Key Findings

- Defining who to survey is critical. Our core interest is in whether EHRs have been adopted—acquired, installed, and used—in the patient-provider encounter. In the short term, preferred respondents consist of physicians and hospitals. However, consumers also have a valuable perspective that should be solicited in future data collection efforts.
- The American Medical Association and American Hospital Association databases provide the best samples to survey physicians and hospitals.
- Group practice and hospital EHR adoption surveys may have to be approached in more than one phase, with initial surveys to identify appropriate respondents followed by a second phase of surveys to gather data from those respondents. It's also likely that critical information will need to be elicited from more than one knowledgeable respondent within a practice or organization.
- We cannot rely exclusively on existing surveys to assess EHR acquisition, installation, and use, and key functionalities fully. There will need to be a concerted effort to collect new content and data to understand the state of adoption.

- NAMCS could serve as a useful framework for additional data collection efforts on physician practices and groups, through content or sample expansions. An annual survey, it provides information at both physician and physician practice level and is linked to patient-encounter information. NAMCS already includes content on EHR adoption.
- While it might be possible to add new content to the 2007 NAMCS survey, major content or method changes are unlikely until 2008, given the need for testing and development, Office of Management & Budget clearance, and the time to publish preliminary and final estimates.
- Further analyses will be necessary to determine whether current NAMCS data is sufficient to understand access to EHRs in practices serving vulnerable populations and whether, working in collaboration with the National Center for Health Statistics, needed estimates will be available in a suitable time frame for the Office of the National Coordinator and the Expert Consensus Panel.

Chapter 7

Chapter 7 makes recommendations for improving existing, ongoing national surveys and for new survey efforts, where needed. It includes specific recommendations for surveying providers who serve vulnerable populations and for studying both the effect of EHRs on the provision of care and the use of EHRs to efficiently capture quality data.

Key Findings

- Building on NAMCS and the National Hospital Ambulatory Care Survey (NHAMCS) to study the rate of EHR adoption offers the possibility of using high quality surveys with excellent response rates. However, the lack of timeliness of these data may limit somewhat the value of relying on these existing, ongoing national surveys, particularly in the first and second years of the monitoring effort.
- NHAMCS survey would require significant design changes to include the inpatient environment.
- Policy-makers should consider conducting independent surveys of physicians and group practices to produce more complete and timely data on issues critical to policy development. Ideally, any such additional data collection efforts would be closely coordinated with and complementary to the NAMCS and NHAMCS.
- New survey efforts should have samples sizes that are sufficient to detect variations within subgroups with margins of error of approximately +/- 3 percentage points
- New surveys of physician group practices should start with a national random sample of physicians or build off an existing physician survey to create a sample of groups. Researchers could design a survey module for practice managers that includes questions on size of practice, region, multi or single specialty, multi- or single-site location, and market integration.
- Researchers designing new hospital survey efforts should consider partnering with the AHA.
- Identifying providers that disproportionately care for vulnerable populations will likely require a multi-pronged approach. Investigators should consider directly querying providers about characteristics of their patients, using Medicare claims data to identify racial composition.

- To clearly understand if differential rates of EHR adoption are contributing to disparities in health care, further research is needed to reliably identify providers serving vulnerable populations.

Conclusion

If, as many predict, the advent of HIT and EHRs constitute a revolutionary change in the organization of health care delivery and the practice of medicine, tracking the adoption of these technologies and understanding their impact are vital to effective policy development. Interested stakeholders have a valuable foundation to build on, consisting of public and private surveys of providers conducted by various agencies and groups. These existing data collection efforts should be supported and continued. However, to provide the information that policy-makers need, and especially, to avoid recapitulating past inequities associated with the introduction of new technologies, new data collection initiatives are necessary and must be supported.

In future reports, we hope to reflect what has been learned from a new wave of investigations that will keep stakeholders fully informed of what the HIT revolution means for our changing health care system.

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