Introduction and Commentary for Special Issue on Health Information Technology

Rainu Kaushal and David Blumenthal

In 2009, as part of the so-called Stimulus Act, the federal government made a large investment in health information technology (health IT), designating up to \$30 billion in incentive payments to providers to adopt and “meaningfully use” certified electronic health record (EHR) systems. The EHR Incentive Program’s inclusion in this legislation—also known as the American Recovery and Reinvestment Act (ARRA)—was apt (111th Congress of the United States 2009). Not only could health IT funding stimulate economic activity but it could also help modernize the health care system, lay the foundation for new health care delivery and payment models, and promote a learning health care environment.

Four years on, the results of the so-called Meaningful Use Program have been impressive. According to the Center for Medicare and Medicaid Services, as of July 2013 more than 80 percent of hospitals and almost 60 percent of providers had received a payment from the Medicare and Medicaid EHR Incentive programs indicating that they had met requirements for adoption and/or “meaningful use” of health IT (Centers for Medicare and Medicaid Services 2013). In contrast, back in 2008, two well-regarded studies put national EHR adoption at only about 9 percent of hospitals and 17 percent of providers (DesRoches et al. 2008; Jha et al. 2009).

Despite this huge growth or perhaps because of it, a lot of questions still remain about health IT’s capabilities and impact on the health care system. To what extent are providers truly using EHRs and its key functions? What are health IT’s effects on quality, efficiency, and patient safety? And what are the organizational, environmental, and financial factors that mediate its effects? A lot of debate still persists on these topics, which is healthy, but too often informed by anecdotal reports rather than scientific evidence.

This new issue of *Health Services Research* adds significantly to the literature on this important topic. It includes several high-quality studies that focus on different topics, different sectors, different time periods (both before and after the start of the Meaningful Use program), and different outcomes. Yet taken together, the studies offer an important gauge of the status of health IT adoption and use in the United States and the factors influencing that picture. From the papers in this issue you can learn more about the latest evidence on providers' adoption of health IT systems and functions; better understand the factors that affect providers' health IT adoption; and better assess the effects of health IT on health care quality and efficiency.

Related to adoption, Audet, Squires, and Doty (2013) found that adoption of health IT by primary care physicians grew substantially from 2009 to 2012 (from 46 to 69 percent), as did their use of various health IT functions. A majority of providers are using core functions such as e-prescribing, electronic ordering of labs, and certain types of clinical decision support, but only about a third use health information exchange and offer patients access to data. Adoption gaps (the "digital divide") between large and small practices persist, but assistance programs or care delivery reform projects that provide organizational, technical, and/or financial resources offer promising ways to address those gaps. The authors thus recommend that extra attention be focused on programs that offer technical assistance to providers, such as the Regional Extension Center program.

Wright et al. (2013) delve into the data on various meaningful use measures, and they too find evidence of strong provider use of core health IT functionality. On many "core set" (i.e., required) measures, such as conducting CPOE and capturing demographic data, providers often far exceeded the thresholds required for Stage 1 of meaningful use. Of concern, the authors noted that a large number of providers claimed exclusions from meaningful use measures—90 percent claiming one or more exclusions, and 57 percent claiming two or more exclusions. Some of the most common exclusions included those for sharing electronic copies of health information with patients and for the public health reporting measures.

IT tools can play critical roles for public health departments—both state and local—and yet as the previous study suggested, there are still gaps in public health IT. Vest and Issel (2013) look at this topic from the perspective of

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Address correspondence to Rainu Kaushal, M.D., M.P.H., Weill Cornell Medical College, 1300 York Ave., New York, NY 10065; e-mail: rak2007@med.cornell.edu. David Blumenthal, M.D., M.P.P., is with The Commonwealth Fund, New York, NY.

the local health departments, documenting serious gaps in their ability to gather, provide, and receive data from state health agencies. Only 34 percent of the local health departments they studied could exchange immunization data, while 70 percent could exchange vital records and 82 percent could exchange data on reportable conditions. The authors suggest some potential solutions, including the sharing of IT resources or services across local health departments at a regional level and enterprise IT solutions that integrate the state with the local health department.

It is well known that nursing homes lag ambulatory providers and hospitals in adoption of health IT and HIE, but there is still a dearth of research on this sector. This is an important deficit given the significant role nursing homes play in the health care system and the number of care transitions they handle. Abramson et al. (2013) find promising levels of health IT and HIE adoption among New York nursing homes. About half of those surveyed had at least a partially operational EHR system. One fifth had had a fully operational system, and more than half participated in HIE. However, most nursing homes used EHRs for administrative rather than clinical functions, and only a minority used computerized physician order entry or clinical decision support. Financial barriers, including start-up costs and lack of fiscal incentives, curtailed adoption and usage.

An additional three articles explore the effects of EHRs on the quality and efficiency of care. Graetz et al. (2013) explore whether the impact of an integrated EHR on measures of care coordination varies for primary care teams depending on level of team cohesion. Among more cohesive teams, EHRs were associated with better performance on all three measures, whereas among less cohesive teams, EHRs had no such association with improved care coordination. The authors suggest that more cohesive teams could create a better informal learning environment, helping them to better use the EHR and share best practices.

One of the oft-cited concerns by providers in implementing EHRs is the short-term loss of productivity while they implement the EHR. Fleming et al. (2013) look at that topic by researching the operational and financial experience of a practice implementing a new EHR system. While their study validates the perception of reduced productivity, it offers promising evidence that the reduction is short-lived. Within the first 6 months, expenses grew and productivity declined. However, after 12 months, practices recovered on nearly all these measures, allowing them to get close to or match pre-implementation performance.

Importantly, King et al. (2013) found that three-quarters of providers reported that EHRs enhanced patient care, and the numbers were especially strong for providers who had used EHRs for two or more years and for providers using EHRs that met the meaningful use criteria. A majority of physicians reported that EHRs helped them access patient information remotely, alerted them to medication errors, and enabled them to view critical lab values. They were less likely to report benefits related to exchange and use of structured laboratory data and use of EHRs to communicate with patients. The authors theorize that over time providers might derive more benefits from EHRs as they integrate them into their workflow and develop mastery of more advanced functionalities.

As several of these studies note, technical assistance is a key ingredient to helping small practices adopt EHRs. Lynch et al. (2013) assess the progress of those 62 Regional Extension Centers (RECs) funded under the Stimulus Act to offer technical assistance, especially to small practices, community health centers, and rural and public hospitals. As of June 2013 the REC program had served more than 130,000 providers, well in excess of its target of 100,000 providers. This number included 44 percent of the nation's primary care providers, 83 percent of the nation's health centers, and 78 percent of the nation's critical access hospitals. Among providers in small practices enrolled in the RECs, 84 percent were live with an EHR, as were 92 percent of health centers. Importantly, the RECs are well positioned to continue assisting practices, including supporting them to participate in new care delivery and payment reform programs.

Across all these studies, some significant themes begin to emerge:

- There is strong growth in health IT adoption, especially core health IT functions, including documentation, electronic ordering, and e-prescribing.
- Adoption of more advanced tools—like health information exchange and patient engagement—is less prevalent but growing and will likely grow even further in the coming years under incentives in Stage 2 of the EHR Incentive Program.
- There is growing evidence that health IT has positive effects on quality and patient safety with temporary negative effects on the efficiency of health care delivery.
- The effects of health IT are notably influenced by various organizational, environmental, and financial factors—especially the availability of technical assistance.

While these studies offer promising glimpses into the adoption and use of health IT, more research is still needed into the effects of health IT on measures of health care quality and cost, the role of health IT in new models of health care delivery, and the adoption and effects of newer forms of health IT. Some questions of interest include the following: How much will adoption and use of HIE and patient portals grow under Stage 2 Meaningful Use, and will they have a positive impact on processes and outcomes? How well will EHR-enabled providers perform in new care coordination projects like patient-centered medical homes and accountable care organizations, with or without REC assistance? How efficient are practices several years after EHR adoption?

In summary, the assembled studies provide critical evidence regarding health IT adoption and use. The promise of health IT is still very much alive and, with appropriate research elucidating critical success factors, we can implement changes to maximize the potential value of health information technology.

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