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By Arthur L. Kellermann and Spencer S. Jones

## ANALYSIS & COMMENTARY

# What It Will Take To Achieve The As-Yet-Unfulfilled Promises Of Health Information Technology

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**ABSTRACT** A team of RAND Corporation researchers projected in 2005 that rapid adoption of health information technology (IT) could save the United States more than \$81 billion annually. Seven years later the empirical data on the technology's impact on health care efficiency and safety are mixed, and annual health care expenditures in the United States have grown by \$800 billion. In our view, the disappointing performance of health IT to date can be largely attributed to several factors: sluggish adoption of health IT systems, coupled with the choice of systems that are neither interoperable nor easy to use; and the failure of health care providers and institutions to reengineer care processes to reap the full benefits of health IT. We believe that the original promise of health IT can be met if the systems are redesigned to address these flaws by creating more-standardized systems that are easier to use, are truly interoperable, and afford patients more access to and control over their health data. Providers must do their part by reengineering care processes to take full advantage of efficiencies offered by health IT, in the context of redesigned payment models that favor value over volume.

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In 2005 a team of RAND Corporation researchers led by Richard Hillestad analyzed the potential benefits of widespread adoption of health information technology (IT) across the US health care system. Using sophisticated modeling, they projected that the potential efficiency and safety savings of health IT adoption could ultimately save more than \$81 billion annually.<sup>1</sup>

Not surprisingly, this analysis was enthusiastically embraced by the information technology industry. Although the findings were consistent with those of other researchers,<sup>2</sup> not everyone agreed with the RAND researchers' estimates. The Hillestad article and three accompanying perspectives, all critical of the RAND team's assumptions or analysis, appeared in *Health Affairs* in 2005.<sup>3-5</sup> A subsequent Congressional Budget Office analysis asserted that RAND's team had overestimated the likely benefits of widespread

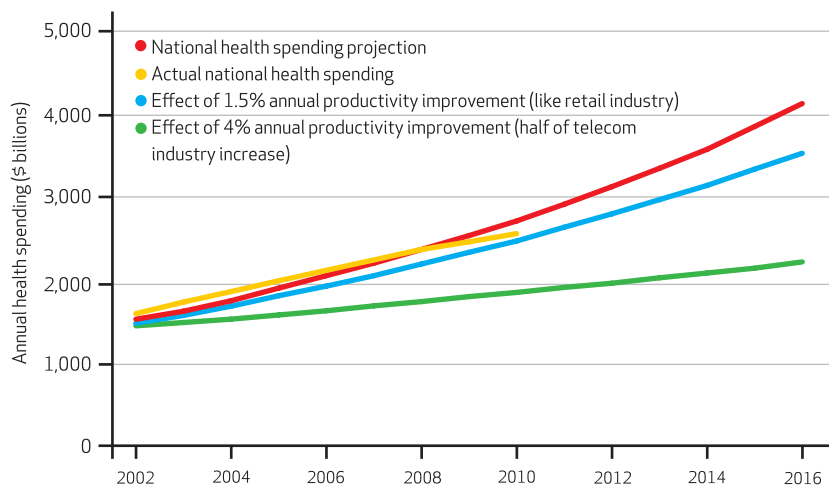
adoption of health IT.<sup>6</sup> Despite, or perhaps because of, the ensuing controversy, the RAND health IT study continues to be widely cited.

Seven years later, critics of the RAND team's analysis can claim a measure of vindication. Although the use of health IT has increased,<sup>7,8</sup> the quality and efficiency of patient care are only marginally better.<sup>9</sup> Research on the effectiveness of health IT has yielded mixed results.<sup>10</sup> Worse yet, annual aggregate expenditures on health care in the United States have grown from approximately \$2 trillion in 2005 to roughly \$2.8 trillion today. Although this rate of growth is better than the RAND team's baseline scenario, it falls short of the rosy future that health IT's supporters hoped for (Exhibit 1).<sup>10</sup>

If the critics of the RAND study are right, does this mean that Hillestad and his colleagues were wrong? Not necessarily. We show why the 2005 projections fell short and what changes are

## EXHIBIT 1

Possible Improved Productivity Effects Of Health Information Technology On Future National Health Spending, 2002-16



**SOURCES** (1) Hillestad R, et al. Can electronic medical record systems transform health care? (Note 1 in text). (2) CMS. National Health Expenditure Accounts [Internet]. Baltimore (MD): CMS; 2010 [cited 6 Dec 2012]. Available from: <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/tables.pdf>.

needed to realize health IT's potential.

First, for the sake of context, it needs to be noted that the researchers attached the following caveats to their analysis early in their article: "Here we summarize the methodologies we used to estimate the current adoption of [electronic medical record] systems and the potential savings, costs, and health and safety benefits. We use the word *potential* to mean 'assuming that interconnected and interoperable [electronic medical record] systems are adopted widely and used effectively.' Thus, our estimates of potential savings are not predictions of what will happen but of what could happen with HIT and appropriate changes in health care."<sup>1(p1104)</sup>

In our view, health IT's failure to quickly deliver on its promise is not due to its lack of potential but to shortcomings in the design and implementation of health IT systems. As a result, we believe that the anticipated productivity gains of health IT are being hindered by the sluggish pace of adoption, the reluctance of many clinicians to invest the considerable time and effort required to master difficult-to-use technology, and the failure of many health care systems to implement the process changes required to fully realize health IT's potential.

To develop each of these points, we examined how fully the assumptions on which Hillestad's analysis is based have been realized.

## Examining Assumptions

**ARE MODERN HEALTH IT SYSTEMS INTERCONNECTED AND INTEROPERABLE?** The answer to this question, quite clearly, is no. The health IT systems that currently dominate the market are not designed to talk to each other.<sup>11</sup> Moreover, until now, health care providers have had little incentive to acquire or develop interoperable health IT systems.<sup>12</sup> As a result, the current generation of electronic health records functions less as "ATM cards," allowing a patient or provider to access needed health information anywhere at any time, than as "frequent flier cards" intended to enforce brand loyalty to a particular health care system.

Large, integrated delivery systems such as the Department of Veterans Affairs and Kaiser Permanente provide enterprisewide electronic health records, but the information stored in those records is essentially useless if the patient seeks out-of-network care. Interoperability can be a problem even when two organizations acquire the same health IT system from the same vendor. In short order, the degree of local customization becomes so extensive that the systems cannot communicate with each other without costly interfaces.<sup>13</sup> The lack of progress on interoperability is so stark that it has led some to speculate that major health IT vendors are opposed to interoperability.<sup>14,15</sup>

**ARE MODERN HEALTH IT SYSTEMS WIDELY ADOPTED?** The answer here is no as well. Health IT systems are being used in the United States more widely than ever before. However, adoption still lags that in Western Europe<sup>16</sup> and is well below the 90 percent threshold specified by the RAND team. The most recent data available suggest that approximately 40 percent of US physicians and 27 percent of hospitals are using at least a "basic" electronic health record.<sup>7,8</sup> There is also a marked disparity in uptake between small and large physician groups, with small groups citing cost (notwithstanding financial incentives), fears of rapid obsolescence, and uncertainty about future regulatory environment as reasons to delay their adoption of health IT.<sup>17,18</sup>

There is convincing evidence that federal incentives have accelerated the adoption of health IT by hospitals. However, most of the action is concentrated among facilities that were already planning to implement or upgrade their health IT systems. Federal incentives have not yet closed the health IT gap between small, rural, and nonteaching hospitals and larger, urban, and academic ones.<sup>8</sup>

Uptake of health IT by patients is even worse. Surveys suggest that more than 90 percent of patients believe that they should have full access to their medical records.<sup>19</sup> Yet few take advantage

of the opportunity when offered. One study found that only 42 percent of eligible patients signed up to access their records; among those who did, fewer than half viewed their personal health record more than once over the next two years.<sup>20</sup>

Experience with diffusion of information technology in other industries demonstrates that IT's value increases in direct proportion to the number of people using it. This so-called network effect was apparent in the past (for example, the telephone) and recently reaffirmed by the rapid proliferation of social media applications. Uptake of health IT in the United States has a long way to go to achieve the critical mass required to fully realize its potential.

**ARE MODERN HEALTH IT SYSTEMS USED EFFECTIVELY?** Again, the answer is no. Considering the theoretical benefits of health IT, it is remarkable how few fans it has among health care professionals.<sup>21</sup> The lack of enthusiasm might be attributed, in part, to the sobering results of studies showing that in many cases health IT has failed to deliver promised gains in productivity and patient safety.<sup>10,22</sup> An even more plausible cause for providers' lack of enthusiasm is that few health IT vendors make products that are easy to use.<sup>13</sup> As a result, many doctors and nurses complain that health IT systems slow them down.<sup>23</sup>

If market forces were allowed to work, doctors might drive vendors to produce more usable products. But it is currently difficult, if not impossible, for providers to get comparative data on the usability of competing health IT systems.<sup>24</sup> Instead of demanding product transparency or insisting that health IT vendors create more user-friendly technology, many large health care systems have rushed to adopt existing systems to qualify for time-limited incentives. As a result, their clinicians must read thick user manuals, attend tedious classes, and accept periodic tutoring from "change champions" to master the various steps required to enter and retrieve data.

Some exceptions prove this rule. One of most successful health IT systems in use today is the Department of Veterans Affairs' Veterans Health Information Systems and Technology Architecture, which actively engaged clinicians in its development process.<sup>25</sup> Health IT is widely credited with helping transform the Department of Veterans Affairs into one of our nation's highest-performing health care systems.<sup>26-28</sup>

Similar success stories exist at private institutions that developed "homegrown" systems. For example, Intermountain Healthcare spent several decades developing its clinical information system. Instead of implementing health IT in a "big bang," Intermountain employed an

incremental approach to devise and test functionalities among small subsets of motivated clinicians. This gave Intermountain's clinicians the opportunity to work with its IT staff to rapidly make improvements to their health IT systems.<sup>29</sup> This iterative process has enabled Intermountain to build on health IT to achieve impressive gains in quality and patient outcomes at a significantly lower cost than most health care systems in the United States have achieved.<sup>30</sup>

Favorable experiences such as these highlight the importance of engaging doctors and other health care providers early in the health IT development process. However, this approach is not widely embraced by commercial vendors.<sup>13</sup> Also, although "homegrown" health IT systems afford many advantages, most health care organizations lack the in-house technical expertise and resources to develop and maintain them. As a result, commercial health IT systems are beginning to dominate the marketplace.<sup>31</sup>

Unfortunately, major commercial vendors have not made usability a priority.<sup>13</sup> Some experts fear that the federal government's health IT incentive program might inadvertently exacerbate the problem by encouraging providers to purchase hard-to-use systems that will be costly to replace at a later date.<sup>31</sup>

There are positive signals that future stages of the federal health IT incentive program will include usability requirements.<sup>32</sup> Hopefully, vendors will not wait until they are compelled to act. Farsighted companies will do more than simply meeting the minimum usability requirements laid out in the federal regulations. The most visionary among them will use lessons learned by consumer-oriented IT companies to craft health IT systems that make the work of physicians and nurses both easier and safer to perform. The first ones to do this are likely to be rewarded by a grateful marketplace.

**HAS APPROPRIATE CHANGE IN HEALTH CARE BEEN MADE?** Sadly, the answer here is no. For much of modern history, fee-for-service reimbursement has given health care providers little reason to boost efficiency. In fact, recent reports suggest that under current payment models, health IT adoption could be associated with boosting hospital charges.<sup>33</sup>

Until fee-for-service payment, which inherently incentivizes "do more, bill more medicine," has been phased out, health care providers will have little incentive to use health IT in ways that reduce costs instead of increasing them. At its best, health IT adoption and improvement of care delivery are symbiotic activities. Implementing health IT without changing the underlying incentives or delivery processes is unlikely to produce the desired effects on cost, quality,

or outcomes. Likewise, many innovative models of care that emphasize collaboration, coordination, and accountability cannot be implemented without robust health IT. The experience of the manufacturing, banking, and telecommunications sectors, which adopted information technology well before the health care sector, demonstrates that IT's value is maximized when it is coupled with complementary organizational characteristics, such as incentive systems that reward team performance. Even then, organizations must invest additional time and resources to redesign their processes to reap substantial gains in productivity.<sup>34</sup>

### Changes Are Needed

Going forward, America needs a simple but powerful vision to guide further investments in health IT. At a minimum, health IT systems should be required to meet the three essential criteria described below.

**INTEROPERABILITY** Health data stored in one health IT system should be readily retrievable by others, subject to patient consent. Federal programs, such as the Direct Project, offer a secure and standards-based way for health care providers to transport clinical information. This initiative, launched in March 2010 as part of the Nationwide Health Information Network, enables health care providers to send encrypted information directly to known, trusted recipients over the Internet. But this project's protocols alone will not be enough. For true interoperability, standardization must be achieved across three dimensions: how messages are sent and received, the structure and format of information, and terms used within these messages. The Direct Project provides standards for the first of these three dimensions only. However, the second stage of the federal health IT incentive program, slated to begin in 2014, will require both vendors and providers to adopt common data standards for all three of the dimensions necessary to achieve interoperability.<sup>35</sup>

Although the federal initiatives needed to achieve higher levels of interoperability are still in a nascent state, they are already triggering resistance from providers and vendors.<sup>36</sup> Both of these groups must look beyond their short-term interests for the good of the nation and the long-term sustainability of the health care industry.

**PATIENT-CENTEREDNESS** Today, people can go online and quickly access and manage their personal financial information. With a few clicks of a mouse, people can move their money and even transfer entire accounts from one institution to another. This is not possible with the majority of electronic health records, but things are starting

to change.

The federal Blue Button initiative—available to veterans, uniformed service members, and Medicare beneficiaries as well as through certain private-sector companies that have signed on, including UnitedHealthcare and Aetna—allows program beneficiaries or health plan members a way to “Blue Button” or download their personal health data.<sup>37</sup> Like the Direct Project protocols, Blue Button is only one piece of the puzzle. It falls short of giving patients personal control over their electronic health information because it does not allow them to send their medical records in a standard, computable format to a selected health care provider. However, the government has recently taken preliminary steps to encourage health IT vendors to add functionality that would allow patients to view, download, and transmit their electronic records to a third party. In 2014, view, download, and transmit functionality will be required to qualify for federal incentives.<sup>38</sup>

For the United States to achieve a truly competitive health care marketplace, the locus of control for electronic health information must shift to the patient instead of remaining in the hands of an individual provider.

**EASE OF USE** Health IT systems should facilitate the work of clinicians, not hinder it. User interfaces should be similar enough that a clinician working in one health system can intuitively discern how to use another without extensive retraining. For example, car makers offer a wide variety of makes and models, but important controls are consistent enough to enable a customer to drive any vehicle off a rental lot without instruction. Health IT should be no different.

Easy-to-use health IT systems will not only reduce the burden on providers and patients, but they will also be safer. Recently, the Institute of Medicine recommended that the Department of Health and Human Services require mandatory reporting by health IT vendors and voluntary, nonpunitive reporting by providers to identify health IT-associated adverse events and unsafe conditions.<sup>39</sup> Establishing national reporting and monitoring mechanisms would quickly increase our understanding of best practices for safe health IT implementation and use.

### Conclusion

Fully interoperable, patient-centered, and easy-to-use systems are necessary but insufficient to unlock the potential of health IT. Ultimately, there is only so much that the government and vendors can do. Providers must do their part by reengineering existing processes of care to take full advantage of the efficiencies offered by



health IT. This revamping of health care delivery is unlikely to happen before payment models are realigned to favor value over volume.

The optimistic predictions of Hillestad and colleagues in their 2005 analysis of the potential benefits of health IT have not yet come to pass.

This is not because of shortcomings in their analysis but rather because of shortcomings in the design, implementation, and use of health IT in the United States. When the preconditions these authors posited are finally realized, the benefits they predicted will be realized as well. ■

The authors gratefully acknowledge Sandra Petitjean for her assistance in creating Exhibit 1.

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## ABOUT THE AUTHORS: ARTHUR L. KELLERMANN & SPENCER S. JONES



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In this month's *Health Affairs*, Arthur Kellermann and Spencer Jones of the RAND Corporation look back at a 2005 *Health Affairs* article by Richard Hillestad and other RAND researchers that projected that rapid adoption of health information technology (IT) could save the United States more than \$81 billion annually. Noting that this promise hasn't been achieved, Kellermann and Jones attribute the lack of success to several main factors: sluggish adoption of health IT systems, coupled with the choice of systems that are neither interoperable nor easy to use; and the failure of health care providers and institutions to reengineer care processes to reap the full benefits of health IT.

The authors argue that the

original promise could be achieved if systems were easier to use and truly interoperable, and if patients had more access to and control over their health data. But providers still need to reengineer care processes to take full advantage of the resulting efficiencies, in the context of redesigned payment models that favor value over volume.

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