

HITECH Spurs EHR Vendor Competition and Innovation, Resulting in Increased Adoption

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The Health Information Technology for Economic and Clinical Health (HITECH) Act was enacted by Congress in 2009 to promote the adoption and meaningful use of certified electronic health record (EHR) technology.¹ A number of factors contributed to the particularly low adoption rates among providers in small practices prior to HITECH, including limited access to capital, lack of perceived benefits, and hesitation to adopt significant work flow changes.^{2,4} Establishing different programmatic tactics was required to address these various barriers to adoption.⁵

HITECH authorizes significant financial incentives to offset EHR adoption costs for eligible healthcare providers if they demonstrate “meaningful use” of certified EHR technology. Regional Extension Centers (RECs) were created to disseminate best practices and technical assistance for small office practices, critical access hospitals, and other providers in rural areas.⁶ A health information technology (HIT) certification program was established to assess EHR vendor compliance with certification criteria and standards, to provide assurance to eligible providers that such products could support Meaningful Use (MU) measures.⁷

The HITECH Act required a substantial and multifaceted approach to implementation. Furthermore, the relatively short time between the law’s passage and the deadline for program implementation added significant challenges.⁸ The impact of these combined issues on providers and EHR vendors created uncertainties and risks for both.⁹ For example, prior to the final rule for MU measures, all parties had uncertainty about what types of standard functionality would be required to meet MU, how eligible professionals could qualify for MU, what EHR vendors needed to do to become certified, and what the certification criteria and process would be.¹⁰

Many have noted the myriad challenges associated with implementing HITECH. Potential problematic questions^{11,12} raised include: would financial incentives be enough to prompt providers to adopt EHRs¹³; should the federal govern-

ABSTRACT

The Health Information Technology for Economic and Clinical Health (HITECH) Act was enacted to increase electronic health record (EHR) adoption by providers and hospitals. Experts expressed skepticism about whether the program would indeed hasten adoption and could be implemented in time for the initial reporting period. Could EHR vendors meet the certification requirements, and could the industry innovate to meet small-practice needs? This study, in addition to documenting increased provider adoption, provides the first evidence of increased competitiveness and innovation in the EHR industry spurred by HITECH. For example, the number of EHR vendors certified for e-prescribing with Surescripts increased from 96 to 229 over the program’s first 3 years. We also find that prescribers in small practices increasingly adopted lower-cost, Web-based e-prescribing and EHR applications at significantly higher rates (15%-35%) than did large practices (3%-4%), which generally have more human and capital resources to make significant investments. These findings suggest that EHR vendors were highly responsive to HITECH requirements and have been adapting their strategies to meet nuanced market needs, providing reason to be optimistic about the Programs’ future.

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ment push for more stringent and faster compliance with standards¹⁴; would the federal government directly or indirectly pick “winners” and “losers” in the EHR industry^{15,16}; and would the EHR industry consolidate or expand to meet different provider market needs?

Early evidence suggests that HITECH is addressing these challenges: CMS had paid \$9 billion to more than 177,000 eligible professionals and hospitals as of December 2012.¹⁷ Given this significant uptake, important questions remain about the impact of HITECH on competitiveness and innovation in the EHR market. For example, a decreasing number of EHR vendors with certified products over the long term could indicate that certain aspects of the certification process are too challenging or costly, or that market forces are naturally leading to consolidation; alternatively, an increase in the number of EHR vendors with certified products could indicate increased competition, greater alignment with market needs, and evidence that the certification process is providing value to both vendors and purchasers.

To understand the EHR market and the implications of HITECH, we investigated several key measures prior to and during HITECH’s implementation, including: 1) the number of providers who have adopted EHR; 2) the number of certified EHR vendors; 3) market concentration ratio among the top 10 EHR vendors; 4) type of technology adopted by physician market segments; and 5) whether there is a difference in market focus by vendor, using vendor technology type as a predictor.

METHODOLOGY

Data Source

The study data were obtained from the Surescripts network, which electronically connects and certifies systems used by prescribers, pharmacies, payers, and pharmacy benefit managers. The network connects more than 40 payers and pharmacy benefit managers, more than 62,000 community pharmacies, and roughly 490,000 prescribers using more than 250 e-prescribing and EHR systems representing over 400 applications.

E-prescriptions generated by a provider using a “Surescripts-certified” system are processed by Surescripts and routed electronically to a community pharmacy. Surescripts estimated that, as of the end of 2012, more than 50% of all eligible prescriptions in the

Take-Away Points

Our study addresses questions about how the Health Information Technology for Economic and Clinical Health (HITECH) program has affected innovation and competition in the electronic health record (EHR) market. We provide the first empirical evidence that demonstrates:

- The HITECH Certification Program has driven fundamental market changes that increase the likelihood that physician use of HIT as a clinical tool will become a central component of medical practice.
- Proliferation of EHR vendors under HITECH has spurred increased competition and business model innovation.
- Innovation has improved the match between physician market needs and industry offerings.

United States were electronically routed through its network.^{18,19}

Others have validated the use of Surescripts data to track EHR adoption.²⁰ We tested the credibility of using Surescripts data for this study by comparing EHR and e-prescribing vendors certified on the Surescripts network against a list of vendors certified by the Office of the National Coordinator (ONC).²¹ First, we used a VLOOKUP function in Microsoft Excel to find exact matches of vendor names provided by Surescripts and Data.Gov; second, we manually reviewed the unmatched vendors and searched ONC’s Certified Health IT Products List website for instances in which the vendor’s product classification was “Modular EHR” and used a Surescripts-certified vendor for e-prescribing.²² We were able to find a positive Surescripts vendor match for 97.3% of ONC-certified vendors, as outlined in the **Table**.

Observation Periods

We measured the number of active prescribers and Surescripts-certified vendors on the Surescripts’ network during the first quarter of each year on a longitudinal basis using data from 2008 to 2012. We calculated the number of vendors as those with active prescribers in any measurement period, as this is best proxy for the number of active vendors in the marketplace at any one time. A prescriber is characterized as “active” if he or she has written and routed at least 1 prescription electronically in a 30-day period.

Study Variables

To determine industry competitiveness, we conducted 2 calculations during each measurement period: collective market share of vendors (grouped by 10) by share of active prescribers; and the Herfindahl-Hirschman Index (HHI), which provides insight into industry competitiveness and is used by the Federal Trade Commission (FTC) for the

■ **Table.** Surescripts Vendor Data Matched to ONC Certified Vendors (as of Q1 2012)

Total ONC-certified vendors	396
Number of inpatient-only EHR vendors (exclude)	13
Number of non-e-prescribing vendors (exclude)	9
Number of applicable ONC-certified vendors	374
Number of positive matches (ONC-certified matched to Surescripts-certified)	364
Match Rate	97.3%
ONC indicates Office of the National Coordinator.	

purpose of measuring market concentration in antitrust cases. We calculated HHI index by determining market share of each EHR vendor, as established by share of active prescribers.

To assess innovation occurring in the market and industry, we measured the type of EHR technology—as defined in dichotomous terms as either Web-based or traditional software—adopted by different market segments (defined here as physician practice size). We chose these 2 measures because Web-based technology tends to allow for more rapid technology innovation and deployment and more flexible business models than traditional software. Because we could not positively identify all vendor applications by type, we categorized applications into either 1) Web-based, 2) traditional software, or 3) unclear. We present a range of results based on possible variations of inclusion and exclusion in the “unclear” category. In addition, we matched Surescripts provider data to data from SK&A, the large healthcare information solutions firm, to obtain and verify practice-size information. We categorized EHR providers by the sizes of the practices they serve. For the purpose of tracking EHR application type by practice size, these sizes were defined as small (1-5 providers), medium (6-25 providers), and large (more than 25 providers).

RESULTS

Early data indicate that a substantial number of EHR vendors have successfully completed the ONC certification process—396 as of September 2012, each of which had at least 1 eligible professional who has successfully attested to MU requirements.²

Figure 1 shows that the number of certified vendors on the Surescripts network increased by 133 from the first quarter of 2009 (when HITECH became law) to the first quarter of 2012, from 96 to 229. Notably, the number of new vendor entrants in the industry increased each year, with 58 entering between 2011 and 2012; this is more than the total number of vendors, 52, in 2007. (Also of note

is that several of the Surescripts-certified vendors partner with and provide e-prescribing services to many ONC-certified vendors, which explains the difference in vendor numbers between Figure 1 and Table 1.)

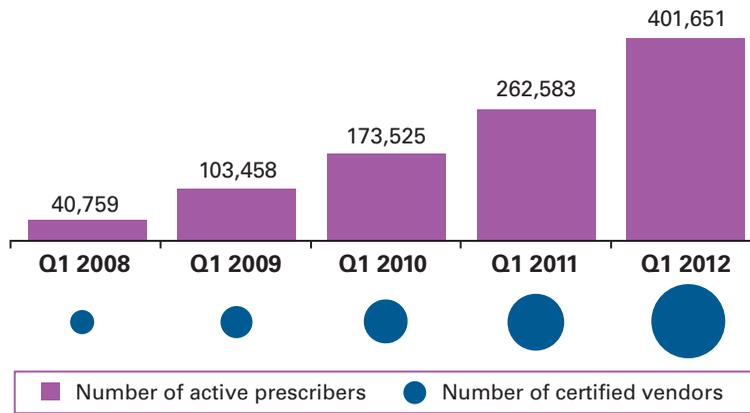
Prescriber adoption increased at a rapid pace as well in the 3-year period following HITECH, from 40,759 in early 2008 to 401,651 in early 2012, reflecting a compound annual growth rate of 58%. The number of new adopters increased each year, from approximately 70,000 in the year immediately following HITECH’s adoption to nearly 140,000 between Q1 2011 and Q1 2012. Reflecting the rapid growth, 74% of active e-prescribers on the Surescripts network as of the first quarter in 2012 had adopted EHRs post HITECH.

Among the top 10 vendors (as measured by market share) during this same 3-year period, the average number of active e-prescribers per vendor increased from 7864 in 2009 to 31,120 in the first quarter of 2012; the average vendor’s e-prescriber base increased from 1078 users to 1754 during that time (**Figure 2**). A top-10 vendor in early 2012 was 75 times larger than the average vendor, up from 27 times the size of the average vendor in early 2009.

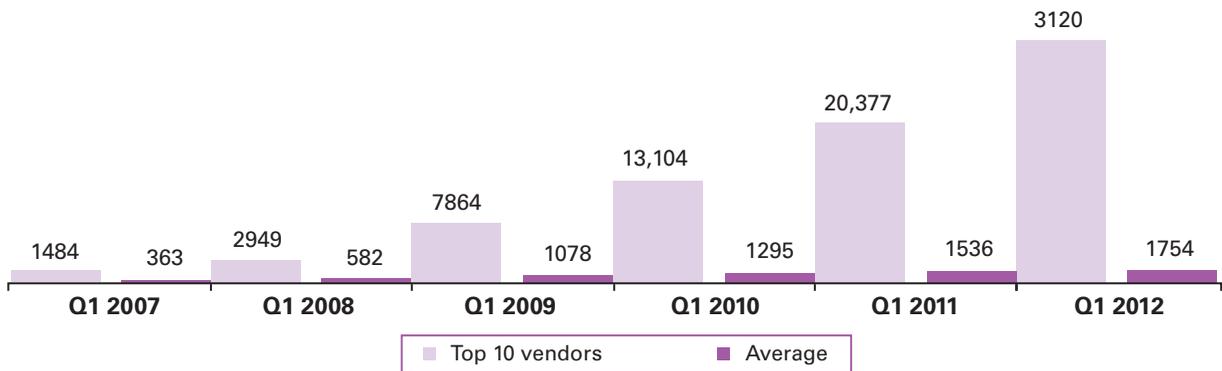
Despite the top 10 vendors’ faster growth rate, however, they did not collectively gain market share: the top 10 EHR/e-prescribing vendors had 72.4% market share in Q1 2008, 76.0% in 2009, and 77.5% in Q1 2012—relatively stable growth (**Figure 3**). The HHI index for the EHR/e-prescribing industry increased from 814 in Q1 2008 to 1022 in Q1 2009 before decreasing again to 876 in Q1 2012. Based on the definition provided by the FTC, this suggests that the EHR industry remained a “highly competitive” industry throughout the study period.

We have seen evolution in the types of HIT providers have adopted. In early 2008, the majority of providers (59%) across practice settings had chosen stand-alone e-prescribing systems. By early 2009 (when HITECH was signed into law), the numbers had changed significantly, with the majority (54%) of providers choosing EHRs.²⁵

■ **Figure 1.** Count of Active Prescribers and Certified E-Prescribing Vendors



■ **Figure 2.** Number of Active E-Prescribers Among Top 10 Vendors Versus Average Vendor



Among providers who adopted an EHR in 2008, very few (3.6%-6.2%) opted for Web-based EHRs. Adoption of Web-based EHRs was highest among small office providers (6.0%-11.7%) and lowest among providers working in large practices (1.8%-2.9%), as noted in **Figure 4**. The overall prevalence of Web-based EHRs increased to between 9.9% and 19.5% among providers who adopted in 2011. Web-based EHRs were most popular with small office practice providers, with between 15.0% and 34.5% of this cohort selecting Web-based applications in 2011. During the same period, providers in medium and large practices increasingly selected traditional software-based EHRs.

Limitations

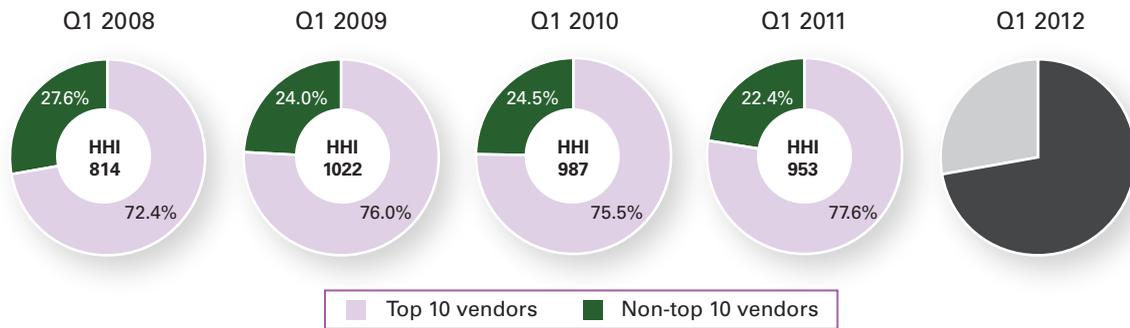
There are several limitations to our study. First, the comparison of EHR vendors was based on measuring EHR and e-prescribing vendors with at least 1 active prescriber on the Surescripts network and at least 1 eligible professional who successfully attested for the EHR incentive program. While we believe this type of comparison is

the most valid way to compare data between Surescripts and ONC/CMS, it is possible that a comparison of all vendors certified by each organization (regardless of whether they have demonstrated market viability) may yield different results.

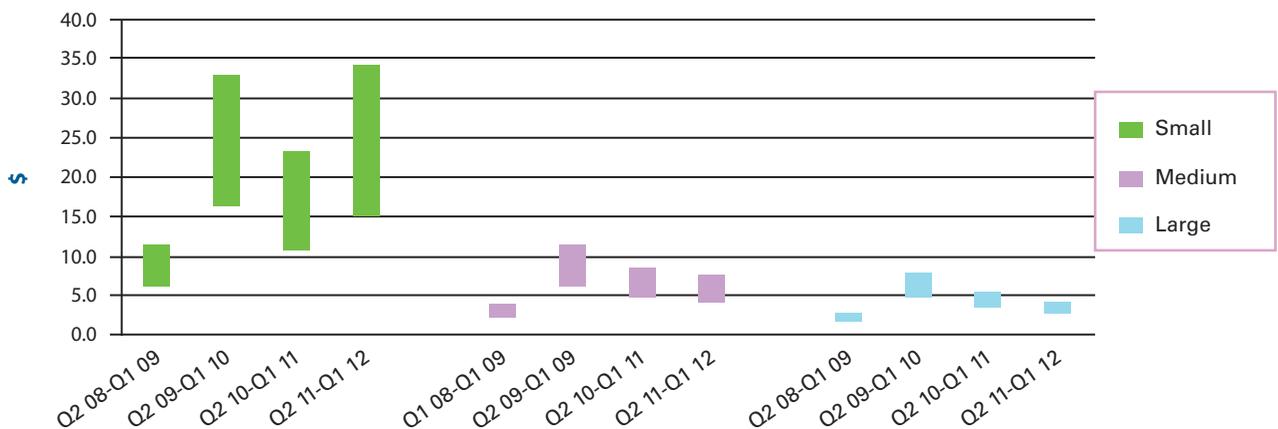
Second, we had a limited ability to positively identify applications as either Web-based or traditional software; while (Surescripts) certifies vendors and applications, we do not collect information during the certification process as to whether the technology is Web-based or software. During the course of our study, between 42% and 49% of new physician users each year selected an application we were unable to positively identify here as either Web-based or traditional. While we are confident in the remaining data as representative of market trends, our findings as presented in Figure 4 should therefore be considered directional only at this point.

Third, because this study uses e-prescribing data from the Surescripts network, it is important to note that our visibility to EHR users is limited to providers who not

■ **Figure 3.** Market Share of Active E-Prescribers: Top 10 Vendors Versus Others



■ **Figure 4.** Percent of Newly Registered EHRs That Were Web-Based, by Practice Size, 2008-2011



only adopt an EHR but also e-prescribe through SureScripts. While the majority of providers nationwide were actively e-prescribing through SureScripts as of the study period, it is possible that our study may underrepresent certain market segments or EHR vendors.

Finally, our study should be considered within the broader context and timeline of implementation of the HITECH Act and MU stages. We have reviewed industry and market data through the first quarter of 2012, which provides insight only through the very beginning of MU Stage I. Given the more rigorous technical interoperability requirements moving forward, our data and findings should be viewed as representative only of early-stage progress.

DISCUSSION

Policy makers enacted HITECH to spur physician adoption of HIT, believing it a significant step towards facilitating increased care coordination, improving outcomes, and empowering providers and patients by giving them access to more information. HITECH authorized a

multipronged approach to support this effort, including financial incentives, the establishment of a certification program, funding for health information exchanges, regional extension centers to provide education and support services, and grants to advance test specific use cases for HIT, such as to improve care coordination. These provisions, designed to remove barriers to adoption, also created an initial environment of uncertainty among providers and EHR vendors.

Despite that uncertainty, however, the results from this study suggest that HITECH is driving fundamental market and industry changes that we believe increase the likelihood that physician use of EHRs will become a central component of how medicine is practiced. For example, the proliferation of EHR vendors since HITECH was enacted in 2009—from 96 to more than 229 as of early 2012—suggests that the legislation has spurred increased competition among these vendors. During the same time, we have seen business-model innovation from EHR vendors to attract small office practices; this seems to be resonating in the marketplace, as evidenced by the proportion (15%-35%) of small office prescribers now adopting Web-

based applications. In addition, as the final barometer of success, the number of prescribers using an EHR to e-prescribe increased close to 300%, from 103,458 to 401,651, in the 3 years between HITECH's enactment and the end of the study period.

We believe there have been 3 key components to HITECH's success in driving substantial industry and market changes thus far. First, the Act provides financial incentives for providers, which puts the market (not the federal government) in the position of determining which vendors most effectively meet provider needs. Additionally, we believe these financial incentives created a catalyst for the EHR industry to compete for market segments that were previously economically unappealing.^{26,27} New market segments attracted private capital and increased competition, which spurred industry business model innovation that appears to be resonating with small practices.²⁸

Second, the Act called for a certification process for EHR vendors, which reduced provider uncertainty by establishing an unbiased validation service to ensure that certain functionality is available. Equally important, ONC was able to quickly determine the certification criteria and implement them within a very short time frame by establishing a novel public-private approach that leveraged existing expertise within the federal government (National Institute of Standards and Technology) with private entities possessing HIT certification expertise.

Third, the Act requires providers to meaningfully use certified EHR technology. By staging the requirements to meet MU, CMS has set the expectation that providers must commit to the continued use of EHR technology over a period of years. While debates continue over the measurement thresholds and programmatic timelines, the basic premise of MU requires that both sides—physician market and EHR industry—work together to improve care delivery.

CONCLUSION

We believe it is premature to judge HITECH's overall impact since its numerous programs will continue to evolve and shape the healthcare landscape for many years. This study documents, for the first time, that in addition to provider adoption, there is change occurring in the EHR industry that has matched the pace of market changes. Tracking market behavior and EHR vendor activity over time may provide clues about the program's lasting impact. We are encouraged by its findings and therefore hopeful that as HITECH's programs continue,

we will see the market continue to respond to greater demands for interoperability and patient engagement.

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