

Evolving Vendor Market for HITECH-Certified Ambulatory EHR Products

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The Health Information Technology for Economic and Clinical Health (HITECH) provisions of the American Recovery and Reinvestment Act of 2009 set ambitious goals for using health information technology (HIT) to improve healthcare delivery. Critical first steps for success involve rapid nationwide adoption of electronic health records (EHRs) and electronic health information exchange to support delivery improvements. In previous work, we examined critical drivers of adoption and exchange, finding that some of these drivers were not directly under HITECH or government control.¹ In this study, we examine in more depth the evolution of one such driver: the availability of vendor products offering EHRs to eligible professionals, especially in office-based practice. (Other drivers of adoption are affordability, practice integration, and provider attitudes.)

Availability is particularly relevant to ambulatory care. Before HITECH, use of EHRs in office-based practice was much less developed than in the inpatient environment; products serving smaller office-based practices were particularly limited in both number and functionality.^{2,3} While the percentage of office-based physicians making any use of an EHR has risen over time,⁴ adoption rates are uneven, with uptake substantially lower for certified products that meet uniform nationwide standards. The HITECH objective was to combine such standards with meaningful use incentives and regional extension center support for high-priority providers to accelerate development of a strong vendor market with certified EHR products suitable to ambulatory and inpatient settings.

STUDY QUESTIONS AND METHODS

This study sought to further our understanding of the industry, which is evolving to meet the demand for HITECH-relevant ambulatory EHRs. It addressed 3 questions:

1. How has the vendor market for ambulatory products evolved with the implementation of HITECH?
2. What role do vendors play in the market, and how do they function currently?
3. How will the market evolve in the future, and what tools do policy makers have to shape it?

Because the vendor market is relatively new, there is not a well-developed, peer-reviewed literature on the industry and many available sources are proprietary. To begin

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Background: The ambitious goals of the Health Information Technology for Economic and Clinical Health (HITECH) Act require rapid development and certification of new ambulatory electronic health record (EHR) products.

Objectives: To examine where the vendor market for EHR products stands now and the policy issues emerging from the market's evolution.

Study Design: Descriptive study with policy analysis.

Methods: We had 3 main sources of information: (1) documents describing this evolving market, which is not well represented in peer-reviewed literature; (2) operational data on certified ambulatory EHR products and their use by Medicare-eligible professionals attesting for meaningful use payments from January 2011 to October 2012; and (3) telephone interviews with 10 vendors that account for 57% of the market.

Results: Those attesting for Medicare meaningful use payments used ambulatory EHRs from 353 different vendors, although 16 firms accounted for 75% of the market. The Herfindahl-Hirschman Index showed the ambulatory EHR market to be highly competitive, particularly for practices of 50 or fewer professionals. The interviewed vendors and the external analysts agreed that stage 1 requirements set a relatively low bar for market entry, but that likely will change as requirements get more demanding.

Conclusions: The HITECH Act met its initial goals to motivate growth of diverse ambulatory EHR products. A market shakeout may emerge, though current data reveal no signs of it. Policy makers can influence the shape and value of such a shakeout, and the extent of disruption, through their approach to certification and "usability" and "interoperability" strategies and requirements.

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Take-Away Points

This study examines the evolving vendor market for ambulatory electronic health records (EHRs) as implementation of the Health Information Technology for Economic and Clinical Health Act proceeds. It analyzes:

- The market share of Medicare-eligible attesting providers and the extent of competition across the 353 ambulatory EHR vendors.
- How ambulatory EHR vendors handle product distribution and pricing, implementation and maintenance support, and support for a meaningful use attestation.
- The policy issues that arise with the rapid growth of ambulatory EHR products.

filling this gap, we used available information to answer these 3 questions. Three main sources of information were used:

- Documents, including available industry reports and information on company websites (the “grey literature”).
- Operational data that federal agencies have developed in the context of certifying vendor products and reviewing applications from eligible professionals for meaningful use payments.
- Telephone interviews with 10 diverse vendors in the ambulatory EHR market in March and April 2012.

Lacking an established sample frame, we used information in the trade press to identify a mix of vendors active in the ambulatory market that were diverse in company origins (hospital industry versus others), age, target market, and product design features as reflected in trade publications. Before finalizing our recommendations, we discussed them with Office of the National Coordinator staff, including high-level leadership familiar with the industry. Interviews were guided by a semistructured protocol covering topics relating to market position, marketing and provider support, certification, meaningful use requirements, interaction with federal programs, and future directions and issues. We asked to speak for 45 minutes with each firm’s most senior executive(s) who had strategic and operational oversight of product development, sales, and provider support of certified electronic medical record product(s). To encourage cooperation, we assured interviewees that their comments would be confidential and not reported by firm. We also elicited the cooperation of the Healthcare Information and Management Systems Society Electronic Health Record Association, which then encouraged its members to respond. (The Electronic Health Record Association had no role in choosing interviewees or topics covered and played no role in the analysis.) Interviews were conducted in March and April 2012; 10 of 11 solicited vendors responded. Our lead author conducted each interview, and

a research associate participated in the call, taking detailed notes to support analysis.

Table 1 shows selected characteristics of the vendors we interviewed. While most were relatively large, their gross revenues ranged from the low millions to billions, sometimes including revenue from a parent company. Most currently are publicly traded, sometimes as subsidiaries of larger parent companies such as General Electric and Quest

Diagnostics. Epic, founded in 1979, remains a private, employee-held company. e-MDs is privately held, as is Practice Fusion, a start-up firm founded with capital from Silicon Valley entrepreneurs. The origins of the 10 vendors also differ. Some were founded by clinicians for ambulatory uses (Greenway, e-MDs), and others added EHRs to existing product lines that tend to emphasize practice management products (athenahealth, NextGen, Cerner) or HIT in support of laboratory testing (MedPlus). Vendors also differed in the emphases of their marketing (see the Company Public Tag Line column, Table 1).

Given their small number, interviewees obviously did not represent all vendors; however, they did represent a sizable share of the market (57% of all eligible professionals receiving stage 1 payments by October 2012). Interviewee responses also reflected the vendor perspective and should be understood in this context. We relied on vendor reports to describe the way the industry functions but applied a critical eye in assessing the policy implications.

MARKET EVOLUTION AND CURRENT STRUCTURE

Market Scope

The market for ambulatory EHR products is potentially quite large. Frost and Sullivan estimated that the US market was likely to double, from \$1.3 billion to an estimated \$2.6 billion in revenue between 2009 and 2012, peaking at \$3 billion in 2013 before falling off as saturation occurred.⁵ These are large numbers. Customers for ambulatory products are diverse, including not only new practices but also those looking to replace existing systems with new certified options that better position them to meet increasingly stringent meaningful use requirements in HITECH stages 2 and 3.⁶ One analysis found that 35% of practices considering acquisitions were replacing their existing products (vs buying new ones), with replacement particularly likely in larger practices.⁷

Evolving Vendor Market for EHR Products

■ **Table 1.** Profile of Selected Vendors in the Electronic Health Record Market

Vendors	Type of Business	Origins	Company Public Tag Line	2011 HIT Revenue
Allscripts	Public (1999)	Incorporated in 1986	“Connected Community of Health” and “One Network, One Platform, One Patient”	\$1.4 billion
athenahealth, Inc	Publicly traded	Formed in 1977 after purchase of a birthing center led to the development of a medical billing product; in 2006, athenahealth developed an EMR and offered it for general purchase in 2010	“An EMR that gives you more money and more control with the industry’s only meaningful use incentive guarantee”	\$324 million
Cerner	Publicly traded	Founded in Kansas City in 1979 by several individuals formerly with Arthur Andersen; firm went public in 1986 with \$17 million in revenue	“Cerner’s mission is to contribute to the systematic improvement in healthcare delivery and the health of communities”	\$2.2 billion
e-MDs	Privately held	Physician- and programmer-led firm formed in 1996	“Rediscover the joy of practicing medicine” with “integrated affordable solutions”	Not posted by HCI or on company website
Epic	Private, employee owned	Founded in 1977	“Small Client Base, Huge Client Impact”	\$1.2 billion
GE Centricity	GE Centricity is part of GE Healthcare, a global publicly traded firm	GE was founded in 1878; GE Healthcare IT was founded in 2007 from heritage companies and later acquisitions	“Transformative Medical Technology and Services”	Not reported; company website indicates \$142 billion for parent and \$18 billion for GE Healthcare overall (2011)
Greenway	Publicly traded	Formed in 1998 in Georgia by providers	“Innovative Information Solutions that Improve Healthcare”	\$89.8 million
MedPlus	Subsidiary of publicly traded Quest Diagnostics, a company formed around diagnostic testing	Began the Health Information Technology Subsidiary of Quest Diagnostics in 1991	“Efficient systems designed for physicians” and “Health Information Technology Systems for Better Patient Care”	Not reported by HCI; company website shows \$7.5 billion in 2011 for parent Quest Diagnostics
NextGen	Wholly owned subsidiary of Quality Systems Inc, a publicly traded firm	ClinTec was formed in 1994 to convert paper to electronic records; Quality Systems Inc purchased ClinTec in 2006 and merged with Micromed (a practice management software firm) in 2007; NextGen was founded in 2000 as a merger of these 2 acquisitions	“Building Long Lasting Partners”	\$353 million (from NextGen website; figure appears to be for Quality Systems Inc, with NextGen accounting for 75% of the total)
Practice Fusion	Private, investor owned	Founded in 2005 with venture capital from multiple Silicon Valley firms	“Free, Web based, secure, Live in 5 ^o , Pocket \$44k”	Not posted by HCI or company

EMR indicates electronic medical record; GE, General Electric; HCI, Healthcare Informatics; HIT, health information technology.
 Source: Author’s construction, based on information publicly available on each firm’s website as of April 2012. Unless otherwise noted, 2011 HIT revenue is from Healthcare Informatics (August 2012) and reflects figures self-reported by individual firms (<http://www.healthcare-informatics.com/hci100/about-hci-100>).

Market Growth

As intended, HITECH appears to have contributed to a rapid growth in the vendor market for certified ambulatory products. Almost 800 vendors had such products in late 2012, including 666 with ambulatory products only and 129 that also

had inpatient products.⁸ Some products predated HITECH and were adapted, as needed, to meet its requirements; others were new products from both new and established vendors.

Table 2 shows the vendors used by eligible professionals who attested by October 31, 2012, that they successfully met

Table 2. Distribution of Eligible Providers Attesting With Medicare for Meaningful Use Incentive Payments by Vendor Used, All and Primary Care, January 2011 to October 2012^a

Vendors	All Eligible Providers			Primary Care ^b		
	Frequency	Percent	Cumulative Percent	Frequency	Percent	Cumulative Percent
Epic Systems Corporation	20,108	19.9	19.9	9494	22.2	22.2
Allscripts	11,635	11.5	31.4	5751	13.5	35.7
eClinicalWorks	8872	8.8	40.2	4936	11.6	47.3
NextGen Healthcare	7113	7.1	47.3	3202	7.5	54.8
GE Healthcare	6208	6.2	53.5	3092	7.2	62.0
Greenway Medical Technologies, Inc	2933	2.9	56.4	1453	3.4	65.4
athenahealth, Inc	2757	2.7	59.1	1424	3.3	68.7
Practice Fusion	2754	2.7	61.8	1217	2.8	71.5
McKesson	2084	2.1	63.9	1209	2.8	74.3
Community Computer Service, Inc	2050	2.0	65.9	993	2.3	76.6
e-MDs, Inc	1981	2.0	67.9	1467	3.4	80.0
Sage	1907	1.9	69.8	804	1.9	81.9
Eyefinity/OfficeMate	1817	1.8	71.6	0.0	0.0	81.9
AmazingCharts.com, Inc	1161	1.2	72.8	866	2.0	83.9
BioMedix Vascular Solutions	1160	1.1	73.9	0.0	0.0	83.9
Compulink	1155	1.1	75.0	0.0	0.0	83.9
All other (100-500 attestations)	19,627	19.5 (n = 66)	94.5	3705	8.7 (n = 16)	92.6
All other (under 100 attestations)	5565	5.5 (n = 271)	100.0	3102	7.3 (n = 227)	99.9
All vendors	100,887	100 (n = 353)		42,715	100 (n = 256)	

GE indicates General Electric.

^aPercentages are rounded to the tenth place, yielding a total percentage slightly below 100.

^bAs used here, primary care is defined to include general practice, family practice, geriatrics, internal medicine, pediatrics, obstetrics/gynecology, and adolescent medicine. (The last 3 specialties are less commonly used in Medicare.) Data are from all 50 states, the District of Columbia, and Puerto Rico.

Source: Office of the National Coordinator and Mathematica analysis of Centers for Medicare & Medicaid Services attestation data provided by the Office of the National Coordinator. Attestation data are based on 100,887 of 107,907 professionals; the exclusions attested without using a complete electronic health record, or with multiple complete electronic health records.

stage 1 meaningful use requirements for Medicare. These data show a broad market, with 353 vendors selling certified complete products used by at least 1 eligible attesting provider. (The analysis was restricted to eligible professionals attesting for Medicare payments who used 1 vendor with 1 complete EHR. These included 93% of those attesting under Medicare [100,877 of 107,907 eligible professionals who qualify for Medicare and Medicaid must decide which program to use]. We cite Medicare figures because they are collected centrally and are more current and complete.) The number of vendors continues to grow, although at a slower rate than in 2011 (data not shown). Although there are many vendors, 16 firms account for 75% of the market. They include relatively established hospital vendors (Allscripts, CCS, and Sage) and newer vendors based mainly in the ambulatory market (eClinicalWorks, NextGen, and Greenway). Some (eg, athenahealth, Practice Fusion) offered products on a widespread basis only after HITECH was

enacted, reflective of significant market entry coinciding with HITECH. However, most vendors showed only a small reach to date (271 had fewer than 100 attestations; 127 of these had 10 or fewer attestations).

Market Concentration and Competitiveness

The Herfindahl-Hirschman Index is a commonly accepted measure of market concentration.⁹ (This index is calculated by summing the squares of the market share of each firm in an industry. The maximum score is 10,000. Markets with between 1500 and 2500 are considered to be moderately concentrated; those with higher scores are considered to be highly concentrated.) On this metric, the vendor market for ambulatory products was relatively competitive, with low concentration nationwide and across market sectors (Table 3). The main exception involved the largest practices (≥51 professionals). Other analyses also show greater diversity in vendor mix among

Table 3. Variation in Vendor Use, Medicare Attestations, and Market Concentration by Physician Specialty and Practice Size, January 2011 to October 2012

Characteristics	Vendors Used ^a	Medicare Attestations ^b	Herfindahl-Hirschman Index ^c
Overall	353	100,887	750
Specialty			
Primary care	256	42,715	988
Specialty care	281	46,932	820
Practice size			
Solo	254	6726	387
2-5 providers	261	11,861	377
6-10 providers	174	6534	598
11-50 providers	167	10,790	670
≥51 providers	101	22,161	2497
Multiple groups	292	38,152	892

^aUnique vendors with at least 1 successful meaningful use attestation. Because vendors can serve multiple specialties and practice sizes, the totals do not equal to the overall total.

^bThe total number of attestations exceed the totals by specialty or practice size because not all attesting professionals could be linked to the Medicare Provider Enrollment, Chain, and Ownership System data that were the source of specialty and practice size information.

^cMarket concentration as measured by the Herfindahl-Hirschman Index. Lower scores reflect more competitive markets. Markets between 1500 and 2500 are considered moderately concentrated, with higher scores considered highly concentrated.

Source: Office of the National Coordinator Analysis of Centers for Medicare & Medicaid Services attestation data linked to Medicare Provider Enrollment, Chain, and Ownership System, 2012.

the smallest practices (1-3 professionals) than among the largest (≥11 clinicians).¹⁰ Although the market may consolidate,¹¹ these data provide no evidence that this consolidation has begun, as the index reported here was relatively unchanged from that calculated at the end of 2011 (data not shown).

Specialization

Industry reviews highlight the relevance of particular vendors to different sized practices.¹² The attestation data show most large vendors used by practices across the size spectrum. Epic users are almost all professionals in the largest practices or multiple practice settings. Conversely, half or more of Practice Fusion, Eyefinity, Compulink, Biomedix, and Amazing Charts users are in the smallest settings (≤5 professionals; data not shown).

Studies show higher rates of attestation among primary care professionals than specialists.¹³ Our analysis showed somewhat more dispersion in vendors used by specialists than by primary care physicians (Tables 2 and 3). However, there were no striking differences in the vendor mix by individual specialty (data not presented). (Eyefinity/OfficeMate and Biomedix Vascular Solutions are exceptions.) Thus, both our analysis and industry sources suggest that most of the largest vendors aim to satisfy a wide audience.¹⁴

VENDOR ROLES AND FUNCTIONS

Product Distribution and Pricing

All of the vendors with whom we spoke were actively soliciting new business. They commonly used a variety of sales

channels, varying the emphasis with their target market. One vendor relied almost exclusively on online marketing and social media to attract large numbers of new but small practices. Another relied heavily on word of mouth to attract large-scale customers best positioned to take advantage of its product. Another vendor, part of a parent firm with other lines of health business, solicited new business from its existing clients using other firm products.

Most of the vendors had relationships with multiple regional extension centers funded by HITECH to assist high-priority providers.¹ Some of their clients also worked with a center. Vendors differed in the number of regional extension centers with which they worked and the conditions of the work, often reflecting differences in vendor marketing strategies. Some said they were motivated to pursue such arrangements as a possible source of new business. However, they generally were disappointed because extension centers produced limited new business.

Most vendors priced their products on a license or subscription basis, with monthly fees covering the specified services. One vendor linked payments to revenues generated, mirroring its pricing for existing practice management products. Another charged nothing, instead relying on advertising revenue, which a practice could remove for a monthly payment.

Some built incentives into the pricing. For example, one company ran demonstration projects in multiple states (now nationwide), offering vendor-financed grants/donations to reduce the product price. Two others offered some form of guarantee that practices would get their money back if they were

not successful in obtaining meaningful use payments. One of them limited such incentives to Medicaid practices, linking payments to initial adoption but not to meaningful use. The other included practices regardless of whether they were at-testing for Medicaid or Medicare.

Implementation and Maintenance Support

Implementation of EHRs requires practices to secure access to any hardware and complementary software the EHR product requires, train practice staff in product use, integrate EHR functionalities into practice work flow, and use the product to improve care for individual patients and the practice population overall. To access meaningful use payments, practices also must generate and submit metrics demonstrating compliance with requirements.

Vendors support practices in implementation in various ways. Self-designated full-service companies offer “high-touch, high-service support” for installation and ongoing maintenance, including considerable face-to-face training. Such vendors typically charge a fixed amount per month (usually several hundred dollars or more) that varies with the intensity of service and what it includes (eg, upgrades). In doing so, some vendors offer a relatively standardized product that builds on their experience. Others provide (for a price) more flexibility by tailoring the product. Vendors also may stretch out or shrink the implementation time frame to accommodate practices and minimize any disruption.

Some vendors structure their products with features they believe make them more operationally or financially feasible for small practices. An example is the design of products that maintain centralized back-end support “in the cloud.” This arrangement limits the amount of hardware individual practices must purchase and maintain, potentially lowering their fixed costs and avoiding the need to hire technical staff. Some vendors encourage a relatively standardized set of processes across practices to help practices convert to meaningful use and better learn from one another. To ease the demands further, a vendor may take on practice functions (such as faxing clinical orders or requests not yet possible to exchange through the EHR) to free up office staff. One particularly aggressive new vendor is marketing a fully online product as “free, Web-based, secure, live in 5[®] [minutes], pocket \$44K.”¹⁵ Practices desiring more support can hire vendor-trained third-party consultant networks.

In positioning their products, vendors appear to recognize affiliations that may exist among or between practices and larger health systems. Some vendors offer an “integrated solution,” in which a single product can be adapted to meet different needs. Others offer product lines that provide users with a choice of product sophistication and financial obligations

while supporting a shared infrastructure. If a vendor has a base product oriented toward large practices or systems, it also may offer simpler products that integrate with those of the base and allow connectivity with affiliates.

Support for Meaningful Use Attestation

All of the vendors we interviewed said they support providers seeking to meet meaningful use requirements. Such support includes training through workshops, practice-based trainings, conferences, and online classrooms. Some try to keep training costs down by relying more heavily on webinars versus face-to-face training, while others believe that this strategy is problematic in the long run because it may not generate necessary and fundamental changes in work flow. At least 1 vendor trains staff from its larger provider entities to help with implementation in smaller affiliates that have adopted a simplified version of its product that is interoperable with the larger entity. Some vendors embed meaningful use dashboards in their software, providing direct help with attestation, or set financial guarantees for a return of funds if attestation is unsuccessful. Others say they fear such strategies could detract from installing and using the EHR correctly. A recent survey of physicians found that satisfaction and reported usability of EHR functionalities were enhanced when the physicians were involved in vendor selection and received more training; however, 49% of physicians reported either no or only 1 to 3 days of training.¹⁶

Vendor Perceptions of Meaningful Use

Not surprisingly, the vendors with whom we spoke tended to tout their practices’ successes in adopting workable EHRs, meeting meaningful use requirements, and obtaining payments. They saw incentives as an impetus driving provider adoption, but not necessarily the most critical one, noting that the decision to adopt can be emotional for some providers. One interviewee characterized the decision to adopt EHRs as moving from a debate over “I do or don’t want to do it” to accepting the change and focusing on “how it will affect my work flow.” Practices’ decisions involve trade-offs between risks and rewards. Incentive payments are decisive in pushing some practices past the tipping point. From the vendors’ perspective, practices whose leaderships support adoption and engage clinicians in the effort are more likely to succeed.

Vendors said practices differed in how much weight they gave to healthcare delivery reform when deciding to adopt an electronic system. Vendors perceived that such reform generally was more important for larger systems that view it as a strategic essential. Smaller practices may be motivated more by defensive considerations and a desire to retain patients. Vendors stressed that data aggregation and other electronic-

enabled functionalities are tools for payment and delivery reform, but no substitute for awareness and control of the care being delivered. They said that there is still “an uphill march to value ... we’re not there yet.”

Vendors said that, among stage 1 requirements, newer functionalities not part of current practice pose the most difficult challenges in supporting products that meet meaningful use requirements. For example, linkage to public health registries is challenging because many agencies lack the interfaces to receive such data. Developing means for patient engagement (eg, patient portals, clinical summaries) also is an issue because appropriate tools still are being identified and developed. Such functionalities likely will be increasingly important in later stages of meaningful use. Vendors said some meaningful use requirements lacked specificity and noted inconsistencies in the technical specifications for electronic performance metrics used for attestation as an emerging issue as the number of providers seeking attestation grows.¹⁷

EMERGING ISSUES

Our analysis suggests that HITECH met its initial goals of motivating the growth of a vendor community with products geared to the ambulatory market. Indicators show a highly competitive market in which products appear diverse. Strategies varied even among the small subset of vendors interviewed; they are experimenting with innovative features such as hosted technologies or simplified systems that aim to make it more feasible for small practices to adopt EHRs and use them meaningfully. While it is too soon to judge the merits of particular innovations, they represent what policy makers hoped might emerge through HITECH.

The vendors we interviewed and the external analysts agreed that stage 1 requirements set a relatively low bar for market entry.¹⁸ Looking to the future, the fundamental questions relate to how this market will evolve as requirements for products become increasingly demanding under stages 2 and 3 meaningful use, what the emerging issues will be, and what levers policy makers will have available to encourage evolution of this market to meet policy goals. Stage 2, effective in 2014, emphasizes improving care as patients make transitions across the system. Products meeting stage 2 requirements must embed technology and tools to support exchange of information across providers, patient download of information, and other modifications that support the enhanced emphasis around transitions in care.¹⁹ Stage 3 requirements are expected to emphasize such features further.²⁰ Products certified for stage 1 still can be marketed, but professionals seeking to move from stage 1 to stage 2 must ensure that their systems support the expanded requirements in the latter.

Competition With Market Shakeout?

Some believe increasingly demanding product requirements under HITECH will mean a market shakeout, resulting in greater market concentration as entry costs rise. Vendors we interviewed agreed this was possible; they were less convinced that a shakeout would come through vendor consolidation to concentrate business because of the complexity in transitioning professionals from one system to another. While trade reports show new EHR adopters to be very price sensitive and interested in newer and smaller market competitors, performance and reputation weigh heavily on product selection in the replacement market.²¹ These contrasting dynamics are consistent with a future that includes both considerable competition from new entrants challenging established vendors and a shakeout among vendors that fail to deliver.

From a policy perspective, consolidation might not be bad and could even be desirable. There currently are many products but most have very little market share. There are regulatory costs to certifying so many products, and behavioral economics suggests that extensive choice could actually impede, not promote, choice.²²

But consolidation also could be highly disruptive for practices using products that are discontinued or not upgraded. Vendors we interviewed said switching products was likely to be as disruptive for a practice as initial adoption, even though some stage 2 requirements aim to make transitions easier by limiting the need to re-enter historical data.⁷ From the information available, we were not able to assess whether vendors were structuring products to make migration harder. If providers are dissatisfied with the products they select initially and cannot transition easily to a better product, their reactions could be damaging to HITECH’s goals. The extent of disruption obviously will vary with the number of providers affected by any change in the market.

Winners and Losers: Balancing Innovation With Oversight

If there is a shakeout in the market, federal requirements and the handling of regulatory oversight are likely to influence vendor survival. Our interviews suggest that the form of certification requirements, handling of efforts to regulate the “usability” of vendor products, and the approach to interoperability each have the potential to shape the market and affect the competitive position of products with different features.

Form of Certification Requirements. While vendors might not necessarily welcome a host of new competitors, those we interviewed were concerned about overly prescriptive requirements for product certification particularly, they implied, if the requirements impeded their ability to pursue designs that distinguish them in the marketplace. They distinguished between

setting public goals and specifying how they should achieve those goals. For example, one vendor said that its use of web-based products allows frequent product updates, which provides value to users. However, this policy might not continue if standards limit the frequency of updates and require each update to be approved. Another vendor perceived requiring providers to test for drug-drug interactions as different from requiring vendors to include that capacity within their certified EHR products. Because the form of the requirements is likely to create winners and losers, policy makers should be careful to establish requirements whose focus is on encouraging change that is supportive of policy goals (eg, improving care).

Approach to Usability Concerns. Policy makers have been debating how far to regulate the usability of products and their potential effects on patient safety, as highlighted in a recent Institute of Medicine report on health information technology and patient safety that included a dissenting view calling for the regulation of health information technology products by the US Food and Drug Administration as Class III medical devices.²³ Many vendors we interviewed thought that the usability issue was a red herring raised by providers uncomfortable with the transition to health information technology. They argued that paper records have their own limitations, that physicians are highly educated and should be sufficiently well positioned to protect themselves, and that the usability issue is best left to the market. They said that, given a rapidly evolving set of technologies, government lacks the ability to look ahead to market needs. One interviewee noted that if the same policies had applied to communications, “We’d never have gotten the iPhone.” Vendors said they support a “culture of safety” but want a nonpunitive, multistakeholder approach.²⁴

However, regulation also has benefits in terms of encouraging well-tested and supported products, which must be weighed against a potential adverse impact on innovation. A new and permanent certification program has been established. Effective October 2012, the American National Standards Institute will oversee the process, and certification and testing will be considered separate functions. Policy makers likely want to understand how recent changes are affecting usability as they debate whether additional requirements are needed or how to structure them.

Interoperability Strategy. Given the pace of technological change, considerable debate exists over how best to envision ideal future systems.²⁵ There is interest in encouraging technology that challenges existing practices (so-called “disruptive technologies”). (For analysis of the distinction between sustaining and disruptive technologies, and their market effects, see *The Innovator’s Dilemma* by Christensen.²⁶) However, the ability to support such innovation could be lim-

ited without a common means of generating interoperability, allowing data to flow across diverse providers, the patients they serve, and organizations within their communities with a stake in either individual or population health. Interoperability is important to initiatives to reshape the healthcare system, whether through medical homes, accountable care organizations, bundled payment, integrated care, or other means to enhance patient-centered care and coordination across providers and settings to achieve better outcomes at lower costs. But many barriers exist.²⁷

HITECH originally envisioned exchange of information as a geographically based and open “public good,” but many states—like regional health information systems historically—have found it challenging to develop a sound business model to finance and support such exchange, which today remains highly limited and geographically specific.^{1,28} In the absence of strong geographically based systems for exchange, EHR vendors say they are being asked to develop client-specific solutions or work-arounds, particularly for providers common to a set of patients. Connectivity solutions are a new source of revenue, so vendors that can provide them may have an interest in promoting this strategy versus more public and open exchange platforms. However, vendor- and provider-specific solutions are expensive and inherently favor vendors with a large installed base upon which to spread fixed costs and a market share capable of enhancing the value of platform-limited exchange.

Allowing vendors and the private market to guide the form of exchange could create inequities, especially across markets that vary in concentration and for providers and patients with different characteristics. Such vendor exchange may also favor more established and larger vendors over relatively new and potentially innovative new entrants whose business models were not developed to support such exchange. If stage 2 requirements for common tools to support broad-based exchange do not support broad-based interoperability consistent with policy goals, policy makers may need to consider other means for making this feasible across the diversity of ambulatory products and practice settings.

CONCLUSIONS

Our analysis suggests that HITECH met its initial goals of motivating the growth of a vendor market offering products geared to the ambulatory market. Indicators show a highly competitive market with diverse products and some innovation. While it is too soon to judge the merits of particular innovations, a diverse and competitive market is what policy makers hoped might emerge through HITECH.

Looking to the future, the current size of the vendor market appears to leave room for market consolidation, especially if it

does not affect large numbers of providers. In a market environment, public policy is likely to influence the characteristics of vendors who win and lose. Vendor interviews suggest that the way policy makers approach balancing goals of innovation and regulatory oversight on certification, product usability, and interoperability will influence the future shape of the market.

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