Developments in Health Information Technologies

March 20, 2014

Introduction

Healthcare technology is a diverse and highly dynamic sector

- This presentation gives some insights on industry characteristics and dynamics that may that may be of relevance to issues of competition
- The views expressed are my own

There are three key areas of consideration

- A brief history of HIT and HIE adoption in US healthcare
- Market drivers of HIT and HIE
- Recent changes and trends in HIT and HIE

Healthcare Technology
Not to be confused with healthcare.gov or health insurance exchanges

While healthcare -- especially American health care -- is highly technologically advanced, that has traditionally been limited to diagnostic and treatment devices, NOT information technologies

Health information technology (HIT) vs health information exchange (HIE)

- HIT typically refers to electronic health records (EHRs) and other clinician-facing applications for documentation, order entry, and point-of-care decision support
- HIE refers to technologies that securely allow distinct HIT instances (usually EHRs) to securely share information with each other

Up until 5 years ago, the US healthcare system had notably under-invested in EHR and HIE technologies compared both to other sectors and other countries

- Misaligned economic incentives created textbook "public goods" problem
- Those who needed to make the investment (providers and payers) could not keep enough of the return to create a positive ROI

Fragmentation on the supply- and demand-side of healthcare delivery also led to non-standardized technology development

- Not like other industries where concentration of supply (e.g., retail department stores, banks, pre-internet air travel) or concentration of demand (e.g., cable TV, post-internet air travel) could drive technology standardization and adoption

Changing market climate has improved incentives for adoption of HIT and HIE

Demand for healthcare   **_Supply of healthcare_**

Past

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Patients  →  Payers  ⤏  Providers
                            ↓
                         Vendors
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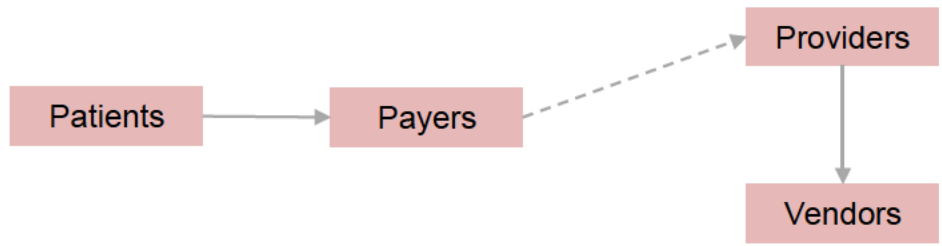
1. Providers expected to bear most if not all cost of EHRs

2. Providers have limited ability recoup benefits from investment – no pricing power, quality not a differentiator in market

3. Payers have little ability to measure quality, and no ability to prevent "free riding" of other payers

4. Patients have little incentive to care about cost and quality; little access to price/performance information


Present

```
Patients  →  Payers      Providers
                            ↓
                         Vendors
```
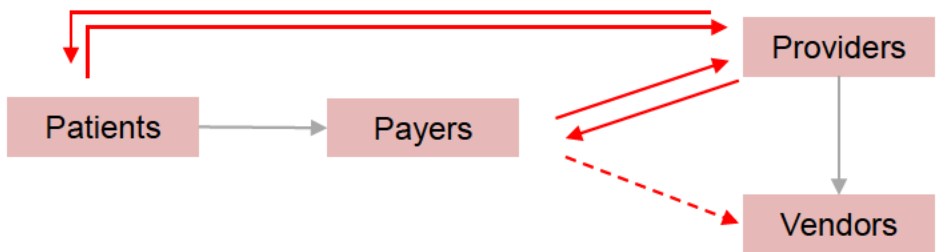
1. MU shares cost of EHR deployment with providers

2. Value-based purchasing allows providers a pathway to recoup some benefit from HIT/HIE

3. CMS/ONC certification drives some standardization among vendors

4. Patients are increasingly price and quality sensitive

HIT and HIE Begin to Take Off

The passage of HITECH and the Meaningful Use program inspired what is arguably the most rapid growth in information technology adoption in any industrial sector in recent history
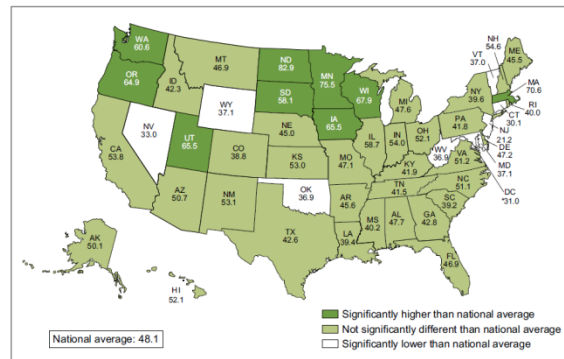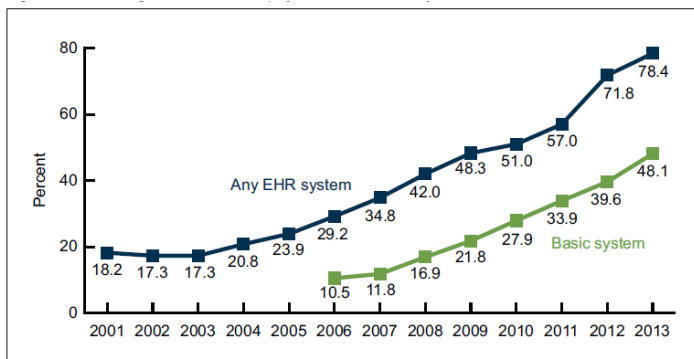
Meaningful Use isn't the only driver, however:

Demand-side drivers

- Meaningful Use incentives
- Value-based purchasing
- Market expectations about standards of care
- Younger provider expectations about use of technology
- Consumer expectations about transparency and use of technology

Supply-side drivers

- EHR certification requirements – common denominator important in a fragmented industry
- Technology advancements in cloud services, mobile, broadband, storage, patient-matching capability, etc

MU Stage 1 has been an overwhelming success in breaking the stalemate of under-investment in information technology

- May be a victim of its own success, however, as enthusiasm may be waning for later stages of MU that will be difficult to align with competing heterogeneous and dynamic market requirements

- Active industry conversation about appropriate role of government: purchaser versus regulator

EHR vendor market

Prior to meaningful use, EHR use was largely the domain of hospitals, large ambulatory practices, and very energetic small practices

Little to no industry pressure to standardize features and functions or interoperability across vendor systems

The ONC Certification process supporting Meaningful Use changed that dynamic

- Set floor on capabilities, features, and functions
- Created pathway for growth in capabilities: EHR core functions, decision support and analytics, interoperability

While the imposition of standards would be expected to shrink supply, this was more than offset in Stage 1 by the large amount of money injected into the market

- Many small EHR vendors sprung up leveraging newly emerging cloud capabilities and large surge in demand from MU
- The more rigorous standards associated with MU Stage 2, as well as user demands for comprehensive service delivery, do now appear to be rationalizing the EHR market

EHR Market Trends

Inpatient EHR Market Characteristics

% market share of hospital MU attestations
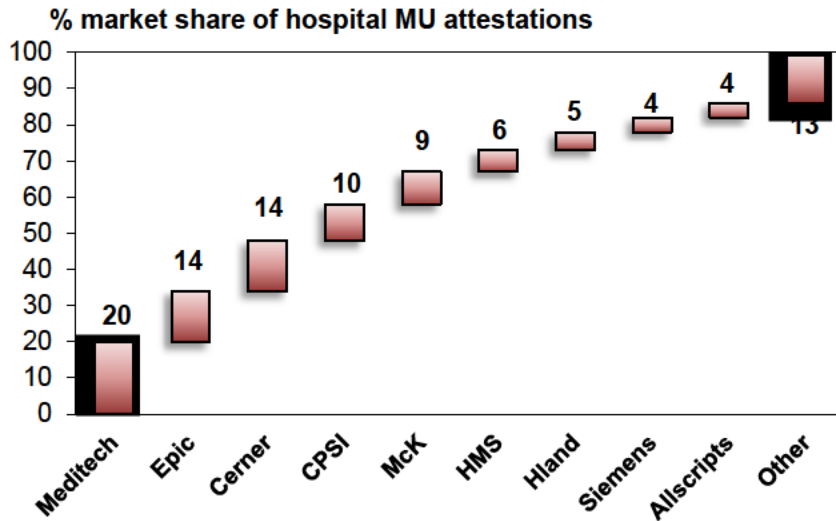
- **Hospitals attesting through Jan 2014: 4,093**
  - 82% of all hospitals
- **Top 4 vendors = 58% of attestations**
- **Number of certified vendors**
  - 2011 Edition: 370 complete, 830 modular
  - 2014 Edition: 26 complete, 401 modular

Ambulatory EHR Market Characteristics

% market share of physician MU attestations
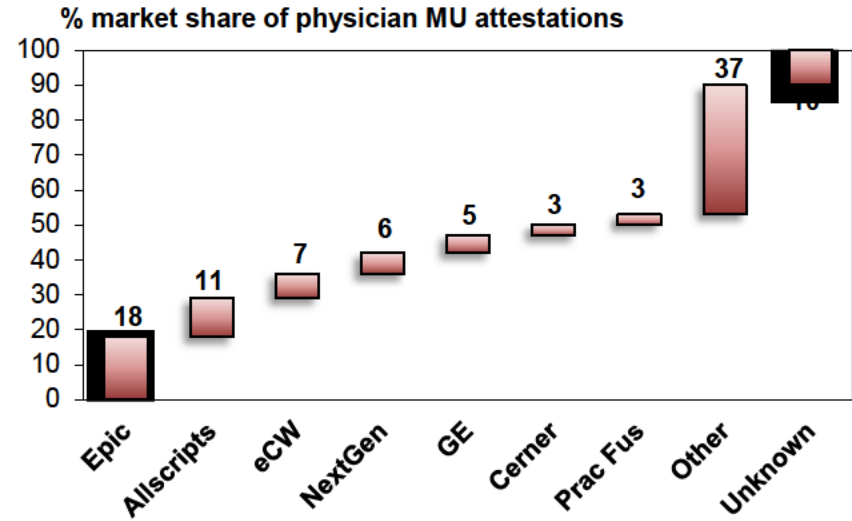
- **Physicians attesting through Jan 2014: 265,889**
  - 48% of all ambulatory physicians
- **Top 4 vendors = 42% of attestations**
- **Number of certified vendors**
  - 2011 Edition: 1932 complete, 1805 modular
  - 2014 Edition: 150 complete, 352 modular

Interoperability Trends

There has been much more success to date in vertical interoperability rather than horizontal interoperability

Vertical interoperability: integrating different types of clinical transactions or functions

- EHR systems connect relatively easily with Surescripts, labs, radiology systems, and medical devices

Horizontal interoperability: integrating sources of the same type of clinical transactions or functions

- Surescripts has created horizontal interoperability across major pharmacies
  - Downside has been pricing structure that has been a barrier to hospital access to medication history
- Lab market is highly fragmented and no industry actor has emerged to dominate or standardize this market
  - Large commercial labs make up ~25% of market, with remainder provided by hospital labs
- Most difficult to achieve has been EHRs communicating with each other
  - Lack of user demand for cross-EHR interoperability
  - EHR vendors trying to create stickiness in their products

HIE is maturing…

HIE 1.0 ➡ hie 2.0

HIE 1.0

- Focused on "the noun"
- Trying to solve "market failures"
- Usually CDR-based
- Multi-entity governance, but often driven by third-party entities
- Strived to solve wide variety of rich use cases through comprehensive interoperability
- Complex legal, business, and technical requirements to support rich array of use cases
- Tried to tackle policy issues to enable business practices and technology solutions

hie 2.0

- Focused on "the verb"
- Demand-driven -- trying to meet market needs
- Multi-layer exchange
- More tactically focused to meet immediate interoperability needs
- Led by any organization that has business need and ability to marshal financial, technical, and organizational resources
- Designed to fit within existing legal, business, and technical constraints – technology out ahead of policy in some areas

HIE emerging as a multi-layered set of somewhat discrete functions

𝕳𝕴𝕰 1.0

hie 2.0

Complexity →

Clinical Data Repository-based functions

Direct messaging
- Can largely exist in paper-based consent paradigm
- Consistent with current workflows
- Provider-centric – no need for patient matching
- No centralized store of patient information
- Required for MU Stage 2

Point-to-point query & retrieve
- Likely to require additional consent considerations
- Requires patient-matching
- Higher level of authentication and assurance
- Introduces new workflows
- MU process has not yet set standards or requirements

Record aggregation and data normalization
- Requires data and process normalization across legal entities
- Requires novel business and legal arrangements
- Usually introduces HIE (middleware) technology vendors
- Requires integration in EHR applications and workflows to be successful
- MU process has not yet set standards or requirements

National, state- and regional-collaborative HIEs

All 2014+ certified EHR vendors and associated HISPs

Vendor-driven networks

IDNs and "Private HIEs"

As market matures, HIE users are becoming increasingly discriminating buyers of HIE services

Independent actors	IPA/PHO	Accountable care entities	IDN	
			Enterprise Integration & Management	**B2B transactions**
		Population, Risk, and Financial Management	Population, Risk, and Financial Management	• Risk contracting • Business alignment
		Measurement & Reporting & CDS	Measurement & Reporting & CDS	• Team-based care • Population mgmt • Utilization mgmt
	Case/care management	Case/care management	Case/care management	**Retail transactions**
Unsolicited encounters	Unsolicited encounters	Unsolicited encounters	Unsolicited encounters	• Case facilitation • Continuity of care
Message & document delivery	Message & document delivery	Message & document delivery	Message & document delivery	
EHR functions	EHR functions	EHR functions	EHR functions	

Increasing business and clinical consolidation

Direct Messaging and HISPs

Direct Standard has made available to a large share of the market the technical capability to securely transmit information across vendor systems

- Still need a market infrastructure or ecosystem of business functions to establish trust in exchange

Requires Health Information Service Providers (HISPs) to create trust communities for sharing information

- Agreed upon rules of eligibility and exchange
- Assign Direct email addresses and security credentials

HISP market is evolving rapidly – wide variety of market models

- Vendor affiliation: EHR vendor that is bundling HISP business functions natively or with a partner (e.g., eCW, Cerner, athenahealth, Allscripts, Greenway)
- Business/clinical affiliation: Independent HISPs that connect participants with common business or clinical goals (e.g., Surescripts, Inpriva, MedAllies, Mass HIway, NHHIO)

Heterogeneity of HISP models is slowing adoption because HISP-HISP exchange is still embryonic

- Currently requires each HISP-HISP pair to negotiate technical and legal/business parameters
- DirectTrust and NATE are collaborative participation efforts to scale exchange among HISPs through agreement on common policies and legal arrangements, and accreditation of policies and procedures
- Some DirectTrust participants are refusing to exchange with HISPs that do not belong to DirectTrust

Query & Retrieve

Vendor-driven networks are starting to enable query & retrieve capabilities

- Patient-matching and consent management processes and functions

- Point-to-point

- Data-holding entities decide how to respond to requests

Single-vendor networks

- Epic and eCW each connect their own customers with their own proprietary networks – also allow connection to other vendors, though uptake is lower

- These vendors have sufficiently high market penetration that connecting within their own networks offers high value in many markets

Cross-vendor networks

- Commonwell is consortium of Allscripts, athenahealth, Cerner, Greenway, and McKesson who are implementing query & retrieve among their systems

Collaborative or state-led HIEs

- Mass HIway and NHHIO creating statewide services to facilitate point-to-point query & retrieve

Record Aggregation and Data Normalization

Value-based purchasing initiatives (ACO, PCMH, hospital readmission penalties, etc) are driving creation of enterprise-level HIE activities ("private HIEs")

**Usually driven by IDN or hospital spearheading technological enablement of a value-based purchasing model**

- Building rich functionality in HIE platform to perform functions essential for risk management for value-based purchasing

- More nimble because do not have same collective action constraints as state- and regional-level collaborative HIE efforts

  - Designed to solve focused business needs

  - Sustainability not a barrier to progress (yet) – often funded by hospital/IDN

  - Building to fit within constraints of law and business practice

Risk-based public and private contracts driving creation of robust but narrowly focused HIEs at the boundaries of risk arrangements

- Difficult to effectively identify and manage risk without HIE and analytics capabilities

- Strategy is increasingly to enable these capabilities for a small set of close risk-sharing partners to constrain HIE scope and implementation complexity

- Value-based purchasing incents providers to encourage patients to stay "in network" to minimize "leakage" and maximize value of HIE

HIE is emerging as a multi-layered set of often-competing HIE functions
Massachusetts Illustrative Example

Mass Hiway
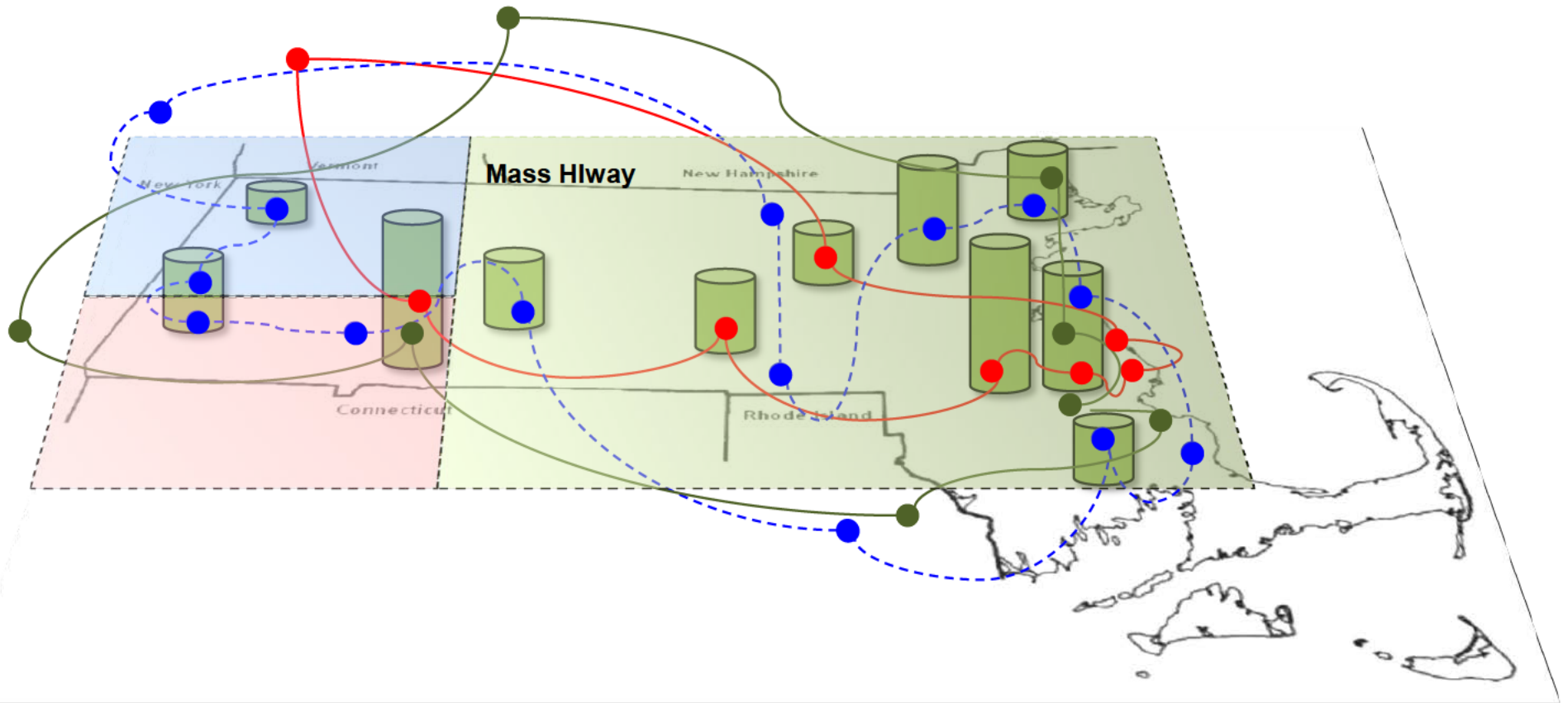
Summary

HIT and HIE landscape is highly varied and dynamic

Fragmentation of health care delivery market hindered technology adoption and standardization in the past

However, Meaningful Use and other market environment changes have jump-started demand for comprehensive EHRs and practical and effective HIE

In such a heterogeneous and dynamic market, there is active competition for the <u>models</u> for delivering HIE, not just for the products and services alone

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