Healthcare in the United States

What can technology do?

The dirty secret

- In aggregate, outcomes from health care in the United States lag those of every other advanced country and quite a few developing countries
  - We do a particularly poor job in managing and improving chronic conditions, esp. compared to our peers
- Per-capita costs of healthcare in the United States are double the per-capita costs of every other advanced county
  - Health care in the United States delivers worse outcomes and costs twice as much

Why?

- Culturally, the United States believes that the concept of supply and demand best allocates resources and delivers the most optimum result irrespective of the nature of the market
- The demand for health care, however, is price insensitive. Healthcare is not a commodity that can be allocated according to supply and demand
- In the United States, we spend a lot of time and even more money trying to pretend that my second bullet isn't true.

Why? (cont.)

- This leads to fictions such as “if we allow for consumers to shop for health care, it will drive the cost down.”
  - In the best case, this would require that there were available quality metrics about health care – which doctors were best at X, which hospitals were best at Y, etc. And the cost of those doctors and hospitals.
    - Neither of those metrics is available to the consumer (patient)

Why supply and demand fails in healthcare ("market failure")

- With few exceptions, desire for health care is not elective.
  - Almost always necessary
  - Individuals (patients) would not "buy" health care absent the condition making it necessary.
    - You might say "I would like a new car, so I will shop for one." Even if your existing car was just fine.
    - You will never say "I would like a new liver, so I will shop for one." Unless your existing liver is failing.
      - You might die without a new liver. You won't die without a new car.

Ancient History

- In the mid 1980s, the US government realized that the lack of patient health care data ("PHI") portability limited the ability to which patients could "shop around."
- HIPAA was the result. Fundamental concepts of HIPAA
  - The patient, not the provider, "owns" their medical records.
  - Providers must, under penalty of law, give patients their medical records so that they can take them and "shop around."

Recent History

- Twenty years later (mid 2000s), patient record portability was still non-existent.
  - Providers dragged their feet on the issue by maintaining patient health data on paper and then charging large “administrative fees” to copy the data for patients.
  - Paper data was “unstructured” and difficult for other providers to understand/use.

Government steps in, again

- US government realized that the goals of HIPAA could not be met so long as barriers to portability continued to exist.
- Government reasoned that if the data existed in *electronic* form, providers could no longer use the excuse that copying it would be “hard”
- Government also reasoned that patient health data in electronic form would be structured and thus more easily portable
  - This was also the impetus for creating diagnostic code taxonomies (e.g. SNOMED, ICD-9, ICD-10), many of which were already being used by other advanced countries to improve their healthcare outcomes and portability

Incentives

- Government took a two-pronged approach to moving in this direction.
- Positive incentives:
  - Cash allowances for providers that adopted electronic health record systems (“EHRs”)
- Negative incentives:
  - Penalties for providers that did not

EHR history

- The use of information technology (IT) in medicine in the United States has traditionally been for:
  - Software for individual diagnostic machines (e.g. MRIs, blood analysis, etc.) (“Medical Equipment”)
  - Billing (“Accounting”) (“Practice Management”)
- Practice management system vendors realized that with a few technical tweaks and a lot of marketing, they could rebrand their accounting systems as Electronic Health Record (EHR) systems
  - And the government would pay providers to buy them

As a result

- There are a lot of EHR vendors out there
- All of the big ones are derived from legacy accounting systems and have *billing* "in their DNA," not patient medical records.
  - They are very poor platforms with regard to inputting, storing, and analyzing metrics necessary to improve clinical outcomes.
  - The are very good platforms to make sure providers are paid for services

Government steps in, again

- The US government realized that EHRs were enabling better payments for services but not much else.
- Created the “Meaningful Use Program.”
  - Idea was to incentivize, again, the use of electronic health records to improve clinical outcomes
    - And to move from a “pay-per-service” model to a “pay-for-outcome” model

Impediments

- EHR vendors do not want patient health data to become a commodity
  - Easy interoperability is actually viewed as an existential threat by most EHR vendors
    - They drag their feet with regard to interoperability and make it as difficult as possible
    - Some of them (EPIC in particular) are being dragged before Congress to explain themselves
- Providers do not want to be paid for doing a *good* job. They want to be paid for doing *any* job.

Meaningful Use

- Stage 1: Provides large cash grants to providers which adopt EHR systems capable of a minimal level of interoperability and of a minimum level of health data storage and analysis
- Stage 2: Provides large cash grants to providers which start to use those EHR systems in a “meaningful way.”
- Stage 3: Provides large cash grants to providers who demonstrate that the use of those systems is improving their clinical outcomes.
  - As of about a month ago, Stage 3 has been “cancelled” due to the amount of anxiety it was creating among providers
  - Not clear yet what the replacement (if anything) will be

Interoperability standards

- H7 v.2 “Hat and Pipe protocol”
  - Most ubiquitous
  - Primarily focused on Admit/Discharge/Transfer (ADT) messages involving patient demographics and scheduling
    - Messages from practice management to various medical devices in a practice
  - Has extensions that can deal with structured data and unstructured (primarily image/fax) data
  - Authentication infrastructure virtually non-existent
    - Relies on private networks/VPNs for security

Interop Standards

- HL7 v.3 “CDA/C-CDA”
  - Remarkably complex document rendered in XML that is designed to capture all of a patient’s health record in an extensible and structured way particularly with regard to transmitting patient data from provider to provider
    - Its complexity has been a major barrier to its adoption
    - My prediction is that it will be replaced by FHIR
    - Authentication is done largely through third-party “trusted” intermediaries
      - Health Information Exchanges (HIE)
      - Provider A sends the CDA to a HIE, the HIE sends it to Provider B. Provider A doesn’t need to know if Provider B is legitimate, just that the HIE is.

Interop, Cont

- FHIR
  - JSON-based interoperability standard that has a tremendous amount of promise from a developer's standard
    - Typically rendered via a webservice/RESTful interface
    - Fields are easily parseable (vs. parsing a CDA)
    - Authentication can be done via a number of well-understood methods

Developer Takeaways: Interop

- Providers don't want to be locked into vertical solutions to all their IT needs from a single EHR
  - Providers want interoperability
- Payers and the government want to measure clinical outcomes
  - Payers and the government want interoperability
- EHR vendors see interoperability as a threat to their business model
  - EHR vendors don't want interoperability

Developer Takeaway: Clinical Metrics

- Payers and the government want to enable clinical metrics to better clinical outcomes
  - Payers and the government want clinical outcome metrics
- EHR vendors want to tell a good clinical metrics story so that payers and the government will be happy and provide incentives to providers to buy their systems
  - EHR vendors want clinical outcome metrics
- Providers are very nervous about clinical metrics as they don't understand how to make money in a pay-for-outcome world but do in a pay-for-service world
  - Providers don't want clinical outcome metrics

Developer Takeaway

- Some customers will want us to enable interoperability and will pay us well to do that
  - ISVs developing new IT applications (biometrics, health portals, medical equipment manufacturers, etc.).
  - Providers (esp. hospitals) that don't want to be locked into a single EHR vendor's solutions.
- Some customers will want us to enable clinical data storage/retrieval/measurement – "big data" and will pay us well to do that
  - ISVs developing healthcare quality / performance analysis systems (payers, the government, IBM with Watson, startups like AkeLex, etc.)
- Some customers will want us to help them do both

Understanding customer motivations

- The economics of health care in the United States are anything but rational. Factors:
  - "Perverse Incentives"
    - Pharma kickbacks that influence prescription writing
  - Regulatory effects
  - Certification issues
  - Liability issues
- Everyone is miserable with the way things are
  - But they understand how to make money in the status quo
- Everyone is scared of things changing
  - They don't understand how to make money if things are "different."

Pharma

- Nearly all scientific research into medicines is done either directly by government or indirectly by universities using NIH grants
- The FDA approval process is such that medicines are brought to market not by virtue of their efficacy but by their profit potential
  - Maintaining monopolies on profitable medicines is extremely important to pharma. Eli Lilly, for example, offered to put all of its intellectual property into the public domain in exchange for perpetual patents on its medicines
- It is rare that the purposes for which a drug is developed are the purposes for which it is sold
  - Prozac example

Providers

- Providers have incentives to over-test, over-prescribe, and over-examine
  - Avoids liability (malpractice) stemming from accusations of "not considering everything"
    - HUGE inflator of the cost of health care
      - Could be avoided if government simply indemnified providers against malpractice (as is done elsewhere, e.g France)
- Providers will not perform any procedure for which there is not a CPT billing code
  - Implications for telehealth
  - Implications for patient data exchange
- Most actual *healthcare* is done by nurses and technicians operating at "the top of their license"
  - Providers, at least those not in the employ of a hospital, are business owners and real estate developers.

Hospitals

- Hospitals compete based on the amount of capital equipment and technology they possess, e.g. how many MRI machines they have, how advanced are their pediatric facilities, etc.
  - Only metric understandable by patients
- The other way hospitals compete is by not competing
  - Huge trend towards consolidation and mergers establishing de-facto regional monopolies of hospital chains
- Hospitals do not want to be hostage to any single technology vendor (hardware or software) and thus seek solutions that avoid this.
  - Interoperability and standards are thus very attractive to them

Payers

- Used as a scapegoat by the other players.
  - “Evil Insurance Companies”
  - Not really deserved
- Many would like to get out of underwriting altogether and simply serve as price negotiators
  - Generates stable & predictable recurring revenue stream
  - Problem is the Federal Government is about the best negotiator out there (VA system, Medicare, Medicaid, etc.)
- Are very interested in outcome-based payment models.
  - Like systems that collect qualitative data that can be used to assess the competence of individual providers as well as hospitals
    - Becomes a negotiating tool

Some strategies for the various markets…

Providers

- Technologies that help them push performance of healthcare to lower-cost tiers (e.g. nurses, technicians) are very attractive
- Technologies that allow them to better understand biometric information and imaging information are also very attractive
- Technologies that help them get paid more reliably and faster are very attractive
- Technologies that help them see more patients per physician/nurse per unit time very attractive

Payers

- Any technology that allows them to better assess the efficacy of treatment or medicine is attractive
- Any technology that gives them a price negotiating advantage is attractive
- Any technology that moves medical decision making power away from providers and to them is attractive

Government

- Wants to…
  - Assess quality
  - Improve quality
  - Lower cost
  - Improve access (eg. Telehealth, remote care)
  - Decrease in-clinic/in-hospital encounters
  - Better manage population health
    - Chronic conditions
    - Aging
- What technologies can do those things?

Specialty providers

- Aging population
- Telehealth
- Wound management
- Oncology infusion clinics
- Diabetes management clinics
- Etc.

What do specialty providers need

- Technologies that help them create new markets and offer new services
  - Data Analytics
  - Patient interaction
- Technologies that improve their productivity and lower their costs
- Technologies that help them do a better job in terms of outcomes