Transforming Health Care with Analytics

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Health care decisions are often bad!
- The body of knowledge on what works is often ignored
- Care decisions take too long, involve too many or few
- Still way too much medical error
- Clinical decisions often not tied to financial decisions

Little measurement/progress/accountability
- But better in health care than elsewhere!

Weak ties between data/information/knowledge inputs and decisions—but other things matter too

If we’re not getting better at decision-making, much is called into question
- EMRs, CPOE, data warehousing, analytics, reports, clinical decision support, etc.
The Best of Times?—New Decision Frontiers

► Analytics and algorithms for predictive modeling and scoring
► Checklists and care protocols
► Comparative effectiveness research
► Transparency movement around H/C costs
► Behavioral economics and “nudges” to change patient and provider behavior
► Decision automation and semi-automation
► …Etc.
### What Are Analytics?

- **Descriptive Analytics** (the “what”)
  - Metrics, then analytics!
  - Standard Reports: “What happened?”
  - Ad hoc reports: “How many, how often, where?”
  - Query/drill down: “What exactly is the problem?”
  - Alerts: “What actions are needed?”
- **Predictive and Prescriptive Analytics** (the “so what”)
  - Statistical Analysis: “Why is this happening?”
  - Randomized Testing: “What if we try this?”
  - Predictive Modeling: “What will happen next?”
  - Optimization: “What’s the best that can happen?”
Analytical Applications in Health and Life Sciences

- Identifying patients at risk of particular diseases
- Understanding patterns of appropriate care
- Testing and validating care protocols
- Helping patients select effective providers
- Identifying risk of rehospitalization or death
- Knowing how care variables drive finances
- Comparing effectiveness of different therapies
- Surveilling drugs and devices post-market
- Ultimately, personalizing medicine

All across providers, payers, life sciences, etc.!
## We’re Only Scratching the Surface

<table>
<thead>
<tr>
<th>Done on a small scale</th>
<th>Not ready for prime time</th>
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<tbody>
<tr>
<td>Identifying patients at risk (health and spending)</td>
<td>Payer/provider/life sciences collaboration on clinical analytics</td>
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<tr>
<td>Embedding clinical and business analytics into daily medical practice</td>
<td>Payer/provider collaboration on business analytics</td>
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<td>The analytics of protocol adherence and health behavior change</td>
<td>The analytics of care across the continuum</td>
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<tr>
<td>The analytics of patient and physician networks</td>
<td>The analytics of personalized genetic medicine</td>
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Analytical Capability  Organizational Context  Desired Result

Better Decisions!

Analytical Culture And Business Processes

Systematic Review and Learning

Data
Enterprise
Leadership
Targets
Analysts
Levels of Analytical Capability

Stage 5
Analytical Competitors

Stage 4
Analytical Organizations

Stage 3
Analytical Aspirations

Stage 2
Localized Analytics

Stage 1
Analytically Impaired
Overall, H/C Providers Rank Low

- Lack of good EMR data
- Absence of data standards
- Physician autonomy
- Little front line knowledge of costs
- Payer/provider lack of communication & collaboration
- Inability to hire skilled analysts

Data points are illustrative!
Transaction-focused culture in payers inhibits analytical orientation

Analytics are taking off in some large payers, but clear financial impact not yet apparent

It appears to be easier to establish strong analytical capabilities in a separate organization (e.g., OptumInsight, with the need and ideas coming from UHC)

Significant experimentation with predictive analytics for disease management and hospitalization, but economics are still a question
## Analytical Applications for Payers

| Patient | • Disease management to analyze outcomes and reduce avoidable costs  
|         | • Disease identification  
|         | • Predictive health status  
| Provider | • Evidence-based medicine  
|         | • Pay for performance  
|         | • Informed patient choice  
| Customer | • Employer group benefits and cost management  
|         | • Identification and retention  
| Financial/Operational | • Financial forecasting  
|         | • Actuarial rating  
|         | • Operations monitoring  
|         | • Fraud detection  

How to capitalize on the hoard of claims data?

How to be more predictive and drive value?

Payer Leading Practice: Humana

- CEO-led move to “strategic analytics”
- Created new “Humana Integrated Informatics” organization
- Trying to eliminate analytical silos
- Experiments in disease management, analytical pricing, employer targeting
- Strong focus now on consumer data and analytics
- Building capabilities, “but hard to change behavior”
- Recently acquired Anvita Health, a company that uses analytics to lower healthcare costs
Analytics in Pharma/Life Sciences

- Changing business environment bringing new pressure on decision-making and greater premium on analytics
- Analytical capabilities in discovery shifting to genomic and proteomic analysis, but no clear breakthroughs yet
- Analytics in development are mature; new methods (e.g., Bayesian) slow to be adopted
- Commercial analytics have wide range of sophistication; some limited by reporting of syndicated data
- Diverse analytical capabilities are siloed with little enterprise focus
Pharma Leading Practice: Merck

- Culture of fact-based decisions—perhaps overmuch at times
- Strong analytical capabilities in commercial, health economics, and R&D/clinical
- Commercial group very influential and capable, but primarily US-based
- Little collaboration across analytical groups, but interest in more—beginning a dialogue
The Analytical DELTA

DELTA Δ = change

Data ........ breadth, integration, quality
Enterprise .......... approach to managing analytics
Leadership ............ passion and commitment
Targets ............ first deep, then broad
Analysts .... professionals and amateurs
Data

- The prerequisite for everything analytical
- Clean, common, integrated
- Accessible in a warehouse
- Measuring something new and important
New Metrics / Data

- Lens Customers
- Health Behaviors
- Smile Frequency
Still lacking EMR data

- Only 50% of hospitals with fewer than 200 beds at Stage 3 of 7 in EMR adoption

Needs to become more granular to change behavior

- e.g., institution to service line to procedure to clinician

Still hampered by institutional, service line, and clinician autonomy with regard to adoption of transactional systems
If you’re competing on analytics, it doesn’t make sense to manage them locally

- No fiefdoms of data
- Avoiding “spreadmarts”—analytical duct tape

Some level of centralized expertise for hard-core analytics

Organizations may also need to upgrade hardware and infrastructure
Business and operational analytics people have seldom collaborated with clinical analytics people
- But “meaningful use” is forcing it

What’s the enterprise—the practice, the provider institution, the IDN...?

The real opportunity involves the extended enterprise—collaboration across payers, providers, and patients
Leadership

» Gary Loveman at Harrah’s
  » “Do we think, or do we know?”
  » “Three ways to get fired”

» Jim Mongan, John Glaser, and Gary Gottlieb at Partners
  » “High Performance Medicine”

» Brent James and colleagues at Intermountain
  » “Science projects”

“Our CEO is a real data dog”
Sara Lee executive
Analytical Leadership in Health Care

- Most provider CEOs not aware of analytical possibilities
  - If they’re information-focused, they’re probably deep in EMRs and transaction systems

- An analytically-oriented senior clinician or CMIO could step up
  - James at InterMountain
  - Michael Gustafson at the Brigham’s Center for Clinical Excellence
Targets

- Pick a major strategic target, with a minor or two
  - Harrah’s = Loyalty + Service
  - Patriots = Player selection + TFE
  - Google = Page rank/advertising + HR
  - Partners = Adverse drug events + post-market surveillance
  - Intermountain = Validation of care protocols

- Can also have two primary user group targets
  - Wal-Mart = Category managers + Suppliers
  - Owens & Minor = Supply chain managers + hospitals
Targets in Health Care Analytics

Financial/Operational
- Occupancy analytics
- Revenue cycle analytics
- Quality and compliance analytics
- Cost management
- Operational benchmarks
- Population analytics
- Financial risk
- Supply chain analytics

Clinical
- Clinical problem tracking
- Patient safety analytics
- Prediction of treatment results or care status
- Scoring of patients at risk
- Care protocol analytics
- Evidence-based medicine analytics
- Personalized genetic medicine
Analysts

**Analytical Champions**
Lead analytical initiatives

**Analytical Professionals/Data Scientists**
Can create new algorithms

**Analytical Semi-Professionals**
Can use visual and basic statistical tools, create simple models

**Analytical Amateurs**
Can use spreadsheets, use analytical transactions

*percentages will vary based upon industry and strategy*
Health Care Analysts

- **Analytical Champions**: CEOs, CMOs, CMIOs (1%)
- **Analytical Professionals/Data Scientists**: Ph.D.s, MD/Ph.D.s, actuaries in payers (5-10%)
- **Analytical Semi-Professionals**: Business analysts, some clinicians (15-20%)
- **Analytical Amateurs**: All clinicians and staff (70-80%)

*percentages will vary based upon industry and strategy*
The Context: Analytical Culture

- Facts, evidence, analysis as the primary way of deciding—data is *not* the plural of anecdote!
- Pervasive “test and learn” emphasis where there aren’t facts
- Free pass for pushbacks—”Where’s your data?”
- Still room for intuition based on experience
- A focus on action after analysis
- Never resting on your analytical laurels
The Context: Analytical Processes

- **Creation Purchase Order**
- **Creation Sales Order Fulfillment Request**
- **Request Global ATP**
- **Global ATP Check**
- **Inventory Forecast**
  - “Will this be back in inventory?”
- **Returns per Customer**
  - “What is the customer history?”
- **Defection Risk**
  - “What is the customer status?”
- **CLTV**
  - “Does this order justify extra efforts?”
- **Delivery Execution**
- **Delivery Performance**
  - “How effective is our fulfillment process?”
- **Releases ASN**
- **Update Inventory**
- **Update Inventory Accounting**

Source: SAP AG 2006
A Study of Decisions

90% of companies could name one
Most decisions were frequent and operational
- Pricing (of consumer goods, industrial goods, government contracts, maintenance contracts, etc.);
- Targeting of consumers for marketing initiatives (by retailers, insurers, credit card firms);
- Merchandising decisions by retailers (what brands to buy in what quantity for what stores, shelf space allocation);
- Location decisions (for bank branches, where to service industrial equipment)

Most Common Decision Interventions

- Analytics
- Culture
- Data
- Process
- Education
- Override
- Analysts
- Informs
- Front Line
- Org Roles
- Method
- Commun
- Rules
- Testing
Dick Nesson at Brigham & Women’s viewed medical error as too high

He and John Glaser began to implement LMR and CPOE in 1992

Started with adverse drug events and lab tests

Engaged Partners Drug Therapy Committee and leading physicians in care protocol development

Spread system to multiple hospitals, including MGH

Established Clinical Informatics R&D group

Now working with AHRQ on clinical informatics and knowledge for other providers

**Result:** adverse drug events reduced by 55%
Tom Brady as “a student of error”

The US Army’s “After Action Review”

The University of Michigan Health Center
  - Disclosing and compensating for medical errors reduced claims and legal costs by 61%

Providence Regional Medical Center in Everett, Washington
  - “The hospital set up an independent panel to investigate medical mistakes, disclose its findings to the patient, and voluntarily offer a financial award if warranted. As a result, Providence has only two malpractice suits pending, compared with an average of 12 to 14 at other hospitals of similar size.” (Business Week, Jan. 7, 2012)
Keep in Mind

- Five levels, five factors for building analytical capability
- Data is the most important prerequisite
- Make sure your targets are strategic
- Tie all your work to decisions
- Don’t slow down—you have an historic opportunity to change your industry!
Contact Info

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To learn more about the practice of analytics:

www.iianalytics.com
(International Institute for Analytics)