Analytics Governance in Support of Health Care Transformation

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Associate CMIO
Professor

Geisinger
Outline

1. The Value of Data and The Problem
2. Analytics use in Business and Healthcare
3. Establishing Analytics Governance at Geisinger
4. Early Successes
The Value of Data and The Problem
Health Data is a Primary Asset

**CURRENT STATE OF HEALTH DATA**

- Health data collection is idiosyncratic and fragmented
- Health data is collected in multiple data silos
- Significant quantities of health data are inaccurate or missing
- Terabytes of irrelevant, inconsistent and duplicative data are clogging systems

**CURRENT NEEDS FOR HEALTH DATA**

- Growing demand for data and analytics for clinical and business decision making, operations, regulatory reporting and strategic planning
- Protected Health Information and Business Sensitive Information represent potential security threats with growing cybersecurity crime
Depends on Health Data

- Delivery of health care
- Coding and Billing
- Calculating costs of clinical care
- Regulatory reporting
- Medical research
- Resource management
- Personnel management
- Billing
- Financial analyses and planning
- Medical education
- ...and more everyday
Health Data is a Primary Asset

Health Data...

• is valuable
• costs money to produce, store and use
• should be collected intentionally
• needs to be managed and used effectively
• is necessary to run the business of health care
“In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purpose of comparison. If they could be obtained, they would enable us to decide many other questions besides the one alluded to. They would show subscribers how their money was being spent, what amount of good was really being done with it and whether the money was not doing mischief rather than good.”

Florence Nightingale
Over a century later...a simple request?

- Gastroenterology would like to ensure our patients are receiving the recommended screening colonoscopies on schedule.
- They are requesting a tool that will remind us and the patient when it is time to schedule their initial and subsequent colonoscopies.
Investigation reveals...

Entry Form for Surgical History

Date is free text field!

There is a free text comment field

• How do we solve the problem moving forward?
• What do we do about all the old bad data?
Solution?

• Made leadership aware and got buy-in
  • Met with leadership teams to personally communicate issue and solution
• Introduced field input mask for date
• Trained individuals who enter this data
  1. Created and published Fast Facts
• Manually correct the existing low-quality data only when necessary

Geisinger

Ambulatory Epic Fast Facts Effective: Immediately

Data Standardization: Medical/Surgical History Documentation

Purpose:
To communicate the importance of using standardized formatting when documenting patient medical and surgical history dates in Epic.

What is required?
In the medical and surgical history activity, a date can be documented on the patient in order to indicate when the patient had a procedure or clinical onset.

Correct Date Entry:

Incorrect Date Entry:

Because this field currently allows free-text entry, it’s possible to enter non-date responses that cause one significant patient care issue and one documentation issue:

1. Patient care is compromised because surgical or medical history information cannot be used by analytics designed to identify the patient’s care gaps. Additionally, these errors cause us to report below-actual percentages for measures that impact our CMS Five Star and other important national ratings.

2. Documentation is incomplete because the “Age” field next to the “Date” field cannot auto-calculate the patient’s age at the time of the historical surgical or medical event.

To prevent these negative outcomes, please consider the following:

• Enter a date in the “Date” field. Please see the next section for tips on entering estimated dates.
• Use the “Comments” field when documenting “Unknown” or extended text responses.

What about estimated dates?
It’s understood that the exact date will often times be unknown. When estimating dates, it is acceptable to enter the year or partial date in the following formats:

- MMYY (E.g. 12/97)
- YYYY (E.g. 1997)
- YYYY/MM (E.g. 12/1997)
- Month YYYY (E.g. Jan 1997 or January 1997)

Questions?
Contact your best practice analyst or the GHS Data Quality Team (570-214-8468).
This is just the tip of data quality issues.
Analytics use in Business and Healthcare
Major Findings:

- Top-performing organizations are twice as likely to apply analytics to activities.
- The biggest challenges in adopting analytics are managerial and cultural.
- Visualizing data differently will become increasingly valuable.

Steve LaValle, Eric Lesser, Rebecca Shockley, Michael S. Hopkins and Nina Kruschwitz

Big Data, Analytics and the Path From Insights to Value
Analytic Strumps Intuition

The tendency for top-performing organizations to apply analytics to particular activities across the organization compared with lower performers. A likelihood of 1.0 indicates an equal likelihood that the organizations will use either analytics or intuition.

The Impediments to Becoming More Data Driven

The adoption barriers organizations face most are managerial and cultural rather than related to data and technology.

- Lack of understanding of how to use analytics to improve the business
- Lack of management bandwidth due to competing priorities
- Lack of skills internally in the line of business
- Ability to get the data
- Existing culture does not encourage sharing information
- Ownership of data is unclear or governance is ineffective
- Lack of executive sponsorship
- Concerns with the data
- Perceived costs outweigh projected benefits
- No case for change
- Don’t know where to start

Respondents were asked to select three obstacles to the widespread adoption of analytics in their organization.
### The Three Stages of Analytics Adoption

Three capability levels — Aspirational, Experienced and Transformed — were based on how respondents rated their organization's analytic prowess.

<table>
<thead>
<tr>
<th>Motive</th>
<th>Aspirational</th>
<th>Experienced</th>
<th>Transformed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use analytics to justify actions</td>
<td>• Use analytics to guide actions</td>
<td>• Use analytics to prescribe actions</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional proficiency</th>
<th>Aspirational</th>
<th>Experienced</th>
<th>Transformed</th>
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</thead>
<tbody>
<tr>
<td>• Financial management and budgeting</td>
<td>• All Aspirational functions</td>
<td>• All Aspirational and Experienced functions</td>
<td></td>
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<tr>
<td>• Operations and production</td>
<td>• Strategy/business development</td>
<td>• Risk management</td>
<td></td>
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<tr>
<td>• Sales and marketing</td>
<td>• Customer service</td>
<td>• Customer experience</td>
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</table>

<table>
<thead>
<tr>
<th>Business challenges</th>
<th>Aspirational</th>
<th>Experienced</th>
<th>Transformed</th>
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</thead>
<tbody>
<tr>
<td>• Competitive differentiation through innovation</td>
<td>• Competitive differentiation through innovation</td>
<td>• Competitive differentiation through innovation</td>
<td></td>
</tr>
<tr>
<td>• Cost efficiency (primary)</td>
<td>• Revenue growth (primary)</td>
<td>• Revenue growth (primary)</td>
<td></td>
</tr>
<tr>
<td>• Revenue growth (secondary)</td>
<td>• Cost efficiency (secondary)</td>
<td>• Profitability acquiring/retaining customers (targeted focus)</td>
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<table>
<thead>
<tr>
<th>Key obstacles</th>
<th>Aspirational</th>
<th>Experienced</th>
<th>Transformed</th>
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</thead>
<tbody>
<tr>
<td>• Lack of understanding how to leverage analytics for business value</td>
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<td></td>
</tr>
<tr>
<td>• Executive sponsorship</td>
<td>• Skills within line of business</td>
<td>• Management bandwidth due to competing priorities</td>
<td></td>
</tr>
<tr>
<td>• Culture does not encourage sharing information</td>
<td>• Ownership of data is unclear or governance is ineffective</td>
<td>• Accessibility of the data</td>
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</table>

<table>
<thead>
<tr>
<th>Data management</th>
<th>Aspirational</th>
<th>Experienced</th>
<th>Transformed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Limited ability to capture, aggregate, analyze or share information and insights</td>
<td>• Moderate ability to capture, aggregate and analyze data</td>
<td>• Strong ability to capture, aggregate and analyze data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Limited ability to share information and insights</td>
<td>• Effective at sharing information and insights</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Analytics in action</th>
<th>Aspirational</th>
<th>Experienced</th>
<th>Transformed</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Rarely use rigorous approaches to make decisions</td>
<td>• Some use rigorous approaches to make decisions</td>
<td>• Most use rigorous approaches to make decisions</td>
<td></td>
</tr>
<tr>
<td>• Limited use of insights to guide future strategies or day-to-day operations</td>
<td>• Growing use of insights to guide future strategies, but still limited use of insights to guide day-to-day operations</td>
<td>• Almost all use insights to guide future strategies, and most use insights to guide day-to-day operations</td>
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</tbody>
</table>
5 Dimensions of Analytics Maturity

1. Organization
2. Infrastructure
3. Data Management
4. Analytics
5. Governance

Halper and Stodder. TDWI Analytics Maturity Model Guide. TDWI.org
The life-span and value of data decay at an exponential rate.

Figure 2. Parallels between the growth in size and decay in value of large heterogeneous datasets. The horizontal axis represents time, whereas the vertical axis shows the value of data. As we acquire more data at an ever faster rate, its size and value exponentially increase (black curve). The color curves indicate the exponential decay of the value of data from the point of its fixation (becoming static).

Adopting healthcare analytics is hard!

- Absolute need for data and analytics accuracy due to life and death decision making
- Absence of evidence of its practical benefits in health care
- Lack of trust (and some fear) of the potential for these algorithms to replace providers or disrupt the physician-patient relationship
- Multiple ethical considerations
- Regulatory requirements and restrictions
Big data analytics and healthcare

1. Researchers lack consensus about the operational definitions
2. Comes from multiple internal and external sources
3. Natural language processing is the most widely used technique and most of the processing tools are based on Hadoop
4. Used for clinical decision support, optimization of clinical operations and reduction of cost of care
5. Major challenges in adoptions is non-availability of evidence of its practical benefits in healthcare

Ethical concerns

• Potential biases in AI models
• Lack of transparency with some AI algorithms
• Protection of patient privacy
• Safety and liability issues of AI algorithms in the clinical environment
• Gaining the trust of clinicians and the general public

Governance for ethical use

Establishing Analytics Governance at Geisinger
Geisinger’s journey starts with an article

- 2003 landmark NEJM article/RAND study
- Found that patients received recommended care 54.9% of the time
- Geisinger had implemented Epic in 1995
- Decided to apply process redesign methodology and reliability science to implement and consistently deliver evidence-based medical practices
ProvenCare Journey

ProvenCare® Elective Pulmonary Resection: Process Flow with Examples of Best Practices

Clinic → Pre-op → OR → Post-op → Return Clinic

This requires advanced data and analytic capabilities.

Heart Attack
– Less than 3 years
– 306 prevented with estimated savings of $27,111/case = $8.3M!

Stroke
– Less than 3 years
– 141 prevented with estimated savings of $59,064/case.

ProvenCare Diabetes

Retinopathy
– Less than 3 years
– 166 cases prevented!
– Quality of life maintained
– Savings...priceless!

recovery

Pilot program showed a 18 percent drop in opioid use and cut length-of-stay in half for certain surgery patients, yielding big savings.

Beth, News Editor
Analytics Governance Goals

1. Develop the vision for data and analytics and connect it to the strategic priorities of the organization
2. Define the organizational structure, roles and responsibilities
3. Manage the institution’s data assets
4. Implement a robust data governance program
5. Establish analytics processes to standardize visualization and delivery of data
6. Promote the thoughtful implementation and rigorous evaluation of institutional programs and initiatives
• Develop the vision and connect to the organization's strategic priorities

Use informatics to make better health easier

1. Develop the vision
Geisinger’s Analytics Transformation

**LESS MATURE**

Less Used

- Information is available via self-service (e.g., Analytics Hub)
- Information is provided automatically in the context of workflow

More Used

- Information is obtained via multiple request processes

**MORE MATURE**

More Used

- Information is available via self-service (e.g., Analytics Hub)

Less Used

- Information is obtained via single request process

**Impact:**

Less Used: Reports and dashboards proliferate. Operations and clinical stakeholders receive data, but not useful analysis. One-off requests lead to silos, duplication of effort, and inefficiency.

More Used: High-quality data and analysis are readily available to support Geisinger’s clinical, research, and educational mission, and it’s automated to fit seamlessly into each person’s workflow.
2. Define structure, roles, responsibilities

- Analytics governance will reach into every corner of the enterprise
- Formal and informal (dotted line) organizational relationships
- Organized formal channels of communication

Geisinger’s Informatics Core
1. Data Management
2. Data Governance
3. Data Delivery
### 3. Manage data assets

Multiple source systems feed into a data lake. From the data lake is derived multiple data warehouses.

<table>
<thead>
<tr>
<th>Transactional source systems for warehousing and analytics</th>
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<tbody>
<tr>
<td>Electronic health record systems (multiple)</td>
<td>Customer relationship management system</td>
</tr>
<tr>
<td>Departmental systems (e.g., Laboratory Information System)</td>
<td>Socioeconomic data and social determinants of health</td>
</tr>
<tr>
<td>Picture archiving and communication systems (PACS) and other imaging systems</td>
<td>Facilities data (e.g., utilities, maintenance, construction, supply chain)</td>
</tr>
<tr>
<td>Imported health data (e.g., scanned documents, digital data, health information exchange)</td>
<td>Outside data (e.g., rankings and ratings, benchmarks, public health)</td>
</tr>
<tr>
<td>Patient-generated health data</td>
<td>Financial data, including available payor data</td>
</tr>
<tr>
<td>Research generated data</td>
<td>Student and trainee data</td>
</tr>
</tbody>
</table>
4. Robust Data Governance

• Data governance is a prerequisite for analytics governance

• Aspects of data governance:
  ✓ Terminology standards
  ✓ Master data management
  ✓ Organization P&P for data security, privacy and sharing
  ✓ Monitoring compliance with P&P
  ✓ Assessing and improving data quality
  ✓ Ensuring data is available to measure health equity

Deliver the full value of our data.
5. Establish analytic processes

System Alignment

- Standards for tools and data visualization
- Request intake and prioritization process
- Monitor use of evidence-based CDS
- AI algorithm stewardship (assess potential bias)
6. Implement and Evaluate

- Evaluate effectiveness of existing and potential new tools
- Use quantifiable, measurable, previously defined outcomes
  - Value, clinical effectiveness, efficiency, satisfaction, financial ROI, equity, and dissemination
- Measure return on investment (ROI)
- Monitor any sociotechnical impacts, especially unintended negative consequences
- Initiate rapid changes as needed
Early Successes of Analytics Governance
Tracking of analytic requests

Top five requesting groups are Medicine Institute, Population Health, Pharmacy, Marketing & Communications, and Steele Institute.

Roughly two-thirds of the currently active requests are > 2 months old, and one-third are > 6 months old.
Tracking insights

The existing processes are not sustainable. We need a different approach.

Barely treading water
Receive 900 requests/quarter
Complete 874 requests/quarter
Know top requestors

COVID-19
Relationship management functionality
Open communications and preemptive solution building

Demand increasing
The more we do the more they want
Demand growth appears infinite
• Enterprise Analytics Hub
  ✔ One stop shop `for already developed analytic tools
  ✔ Open to all employees

• User friendly analytic tools
  ✔ DIY analytics
>500 unique resources available
Can request new resource or analyst consult
DIY Analytics

• Data exploration for clinical, access and revenue areas
• Users can investigate a hunch and refine searches on the fly
  • Searches are nimble and powerful with good user interface
  • Variety of visualization tools and measures
  • Dig into the details layer by layer
• Examine trends
• Drill down to line-level detail
• Jump to related records to follow up
• Win-Win
  • Users get answers faster and data analysts free for more complex analysis
Potential Users Require Training

• Initial login requires taking a tutorial on basic functionality – but this is not sufficient!

• Created additional training materials about data
  • Finding the right fields
  • Using your clinical judgement
  • Based on actual requests
  • Available when and where needed

• Identification of SME’s within functional units
Progress to Date

Successes

• Analytic tools more broadly available
• Our culture has evolved to be more aware of and sensitive to data
• Easier to integrate more complex sources of data
• Able to apply analytic tools with reasonable expectation of accurate results
• Improved efficiencies (fewer duplicative efforts, better distribution of resources)

Lessons Learned

• Analytics governance is complex and long-term
• Cultural and leadership alignment is critical
• Previous governance experience is necessary (e.g., HIT governance, data governance)
• Analytics is more a business function than a technical competency
• Beware analytics scope creep
• Critical to identify, measure and share outcomes to demonstrate value
• Demand for data and analytics will continue to grow for the foreseeable future
Thank you
Questions?
Comments?