Analytics 101

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Objectives

• Define analytics
• Re-define analytics
• Provide basic principles of good analytics practice
• Address barriers to good practice
• Outline steps to establish analytics
• Discuss an example application
What is Analytics?

“The systematic computational analysis of data or statistics” (Google)

Analysis vs. Analytics

Research and Analysis
Dr. John Snow’s path-breaking Cholera study (ca. 1854)

Analytics
CDC’s Waterborne Disease and Outbreak Surveillance System
Some Observations

Measurements are usually well-established

“Data gathering” is **not** trivial (especially in health care)

Analysis is mostly automated

Reporting should be concise

Dialog with users is essential

Is Analytics the Silver Bullet?
(Hype Cycle source/credit: Gartner.com)
Barriers to Healthcare Analytics
(KPMG survey of health care leaders)

Leading barriers:
- Data in silos, not standardized
- Lack of technology
- Lack of skills
- Organizational culture
- Cannot capture or exchange data
- Unclear ROI

What is Analytics?

“The systematic computational analysis of data or statistics” (Google)

Maybe a better definition would be:

“The positioning and coordination of people, tools, and techniques so that organizations can systematically leverage data assets for discovery, improvement, and innovation”
Members from the management team need reports for their presentations for the upcoming board meeting. The organization does not have an analytics data warehouse, so analysts must access production databases designed for claims processing (not analytics).

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Mary</td>
<td>There is no standard method, so Mary creates a query on the encounters database and builds a report for the Executive Director, who then shares it with the management team.</td>
</tr>
<tr>
<td>Peter</td>
<td>The CFO wants more detail, so she asks Peter to add some subgroups that weren’t in the original report. The subgroup totals don’t sum to Mary’s total, so Peter writes his own query, slightly different from Mary’s, to get an internally consistent report.</td>
</tr>
<tr>
<td>Paul</td>
<td>Meanwhile the new analyst, Paul, creates yet another report for the Quality Director, however, he does not know to exclude inactive records because there are no standards or clear data dictionaries.</td>
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= 4 Resulting versions of “truth”! (3 reports + actual truth)
Recap

• Analytics is an organizational practice:
  • Decision makers must prioritize analytics
  • Most everyone plays a role (like it or not)

• Top barriers in healthcare analytics:
  • Data quality, availability
  • Organizational alignment

• First steps building analytics practice:
  • Plan  Data model  Manage data

Degrees of Sophistication
(another nice chart from Gartner.com)
Production *versus* Ad Hoc Analytics

- **Production** analytics is usually automated
  - Focus on standardized measurement
  - Should have quality controls!
- **Ad Hoc** is semi-automated
  - Focus on exploration
  - Requires a dedicated, documented data warehouse or data marts
  - Need more than just access to data systems

Analytics in Small Organizations

- Technology is only part of analytics
- More important is organizational practice...*regardless of size* of the organization
- *small data* is as useful as Big Data
  - A practice level EHR could be a useful source of small data – the key is organizing it for easier analysis
Big Data or small data?

- Don’t skip your analytics plan and data model
  - Does not have to be complicated

- Data must be:
  - Correct – *must reflect reality*
  - Complete – “null” values are usually NOT “zeros”
  - Current – *depends on end use*
  - Consistent – agreement among sources
  - Documented – or else data is nearly useless

- Data management centrally coordinated
  - Strive for a common version of the truth

Where does your analytics bandwidth go?

Weak analytic practice:  Strong analytic practice:

- Understanding the question
  - Hunting for data
  - Loading, processing, troubleshooting
  - Interpreting results
  - Report distribution
    - No value added

- Understanding the question
  - Hunting for data
  - Loading, processing, troubleshooting
  - Interpreting results
  - Report distribution
    - Value added
Where Can Analytics Help?

Think of the Triple Aim:

• Improve **patient experience**
  • Healthcare processes and outcomes
    • Surgical or disease specific improvement; improving satisfaction; improving readmission rates, etc.
• Improve **population health**
  • Chronic condition management; vaccination rates; nutrition; anti-smoking efforts; use of preventive care services
• **Reduce costs through quality**
  • Improve efficiency, reduce LOS, staff stability etc.

Analytics Use Cases in a Medicaid Environment

• **Program costs** are often driven by a small proportion of patients with multiple health conditions, often exacerbated by mental illness, substance use disorders, cognitive limitations or functional impairments
• **High-cost clients** are often served in multiple Medicaid-funded delivery systems (medical, long-term care, mental health, substance abuse, developmental disabilities)
• **High-cost clients** often have significant social support needs such as the need for housing or employment support, or interventions to reduce the risk of criminal justice involvement
• **Persons dually eligible for Medicare and Medicaid** comprise a disproportionate share of high-risk, high-cost Medicaid beneficiaries
Example Analytics Application: PRISM

- Predictive Risk Intelligence System
- Integrates multiple WA State data sources
  - Sources internal and external to DSHS
- A longitudinal view of Medicaid clients
- Good resource for detailed background research, identification of subgroups

Multiple Data Sources

- School Outcomes
- Education Research Data Center
- Preschool – College
- Arrests
- Washington State Patrol
- Charges
- Convictions
- Community Supervisions
- Inpatient/Outpatient
- Hospital Inpatient/Outpatient
- Managed Care
- Physician Services
- Prescription Drugs
- Death
- Washington State Patrol
- Department of Health
- Emergency Shelter
- Transitional Housing
- Permanent Supportive Housing
- Public Housing
- Low Income Housing Vouchers
- Multi-Family Project-Based Vouchers
- Housing Assistance
- Employment Security Department
- Department of Corrections
- Department of Commerce
- Washington State Patrol
- Department of Health
- Housing and Urban Development
- Public Housing
- Low Income Housing Vouchers
- Multi-Family Project-Based Vouchers
- Administration
- Children’s Services
- Child Protective Services
- Child Welfare Services
- Adoption
- Adoption Support
- Child Care
- Out of Home Placement
- Residential Habilitation Centers and Nursing Facilities
- Case Management
- Community Residential Services
- Personal Care Support
- State hospitals
- State institutions
- State care facilities
PRISM Data Sources and Features

- Data sources
  - Medical, mental health and LTSS services from multiple IT systems
  - Medicare Parts A/B/D data integration for dual eligibles
  - Long Term Services and Supports functional assessments
  - Housing status (including some local jail stay data) from the state’s eligibility data system
- Data refreshed on a weekly basis for the entire Medicaid population
- Dynamic alignment of patients to health plans and care coordination organizations, with global patient look-up capability for providers
- 1,000 currently authorized users
- 700,000 page views in past 12 months

PRISM Users

- PRISM is used by:
  - Medical and behavioral health managed care organizations
  - Area Agencies on Aging
  - Health Home lead entities and their care coordination networks
- Business associate agreements and PRISM-related contract amendments govern external contracting entity access to PRISM
- PRISM risk score is a key criterion defining eligibility for Health Home services in Medicaid State Plan Amendment
- Medicare integration supports provision of Health Home services for Medicare/Medicaid “dual eligibles”
- Agreement with CMS gives state access to share of Medicare savings if Health Homes reduce Medicare costs
Some Uses of PRISM

- **Quality Improvement**
  - Analysis of care transitions or coordination
  - Analysis of disparities and barriers to care (housing, physical impairments, language)
  - Identification of psychotropic medication polypharmacy patterns associated with overdose risk
  - … and probably many others.
More Uses of PRISM

• Identifying Needs
  • Child health risk indicators for high-risk children (mental health crisis, substance abuse, ED use, nutrition or feeding problems)
  • Behavioral health needs (redacting information where required by state or federal law)

Even More Uses of PRISM

• Delivering the right services
  • Triaging high-risk populations to better allocate scarce care management resources
  • Informing care planning and care coordination for clinically and socially complex persons
  • Identification of potential narcotic drug-seeking behavior
Visibility to sources of risk

Cardiovascular, medium 8.5% 50 2013-05-07
Gastro, high 7.1% 1 2013-03-15
Pulmonary, medium 4.8% 25 2013-05-08
Substance abuse, low 3.4% 28 2013-05-03
On the Healthcare Analytics Horizon

- Real-time Analytics
  - Cross-setting care management
  - Integration with social media and “apps”
- Predictive Analytics
  - Improving diagnoses, use of genomic info
  - Manage medications (reduce risk, side effects)
Take Home Points

Analytics can be described as:
“The positioning and coordination of people, tools, and techniques so that organizations can systematically leverage data assets for discovery, improvement, and innovation.

Take Home Points

- Analytics is more than just a “department” in your organization
- Begin with a plan and a data model
- High quality “small data” is valuable
- Small HCOs don’t need a huge investment
  - Take stock and build a plan
  - Build analytics into workflows
Questions?

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