Analytics Governance in Support of Health Care Transformation

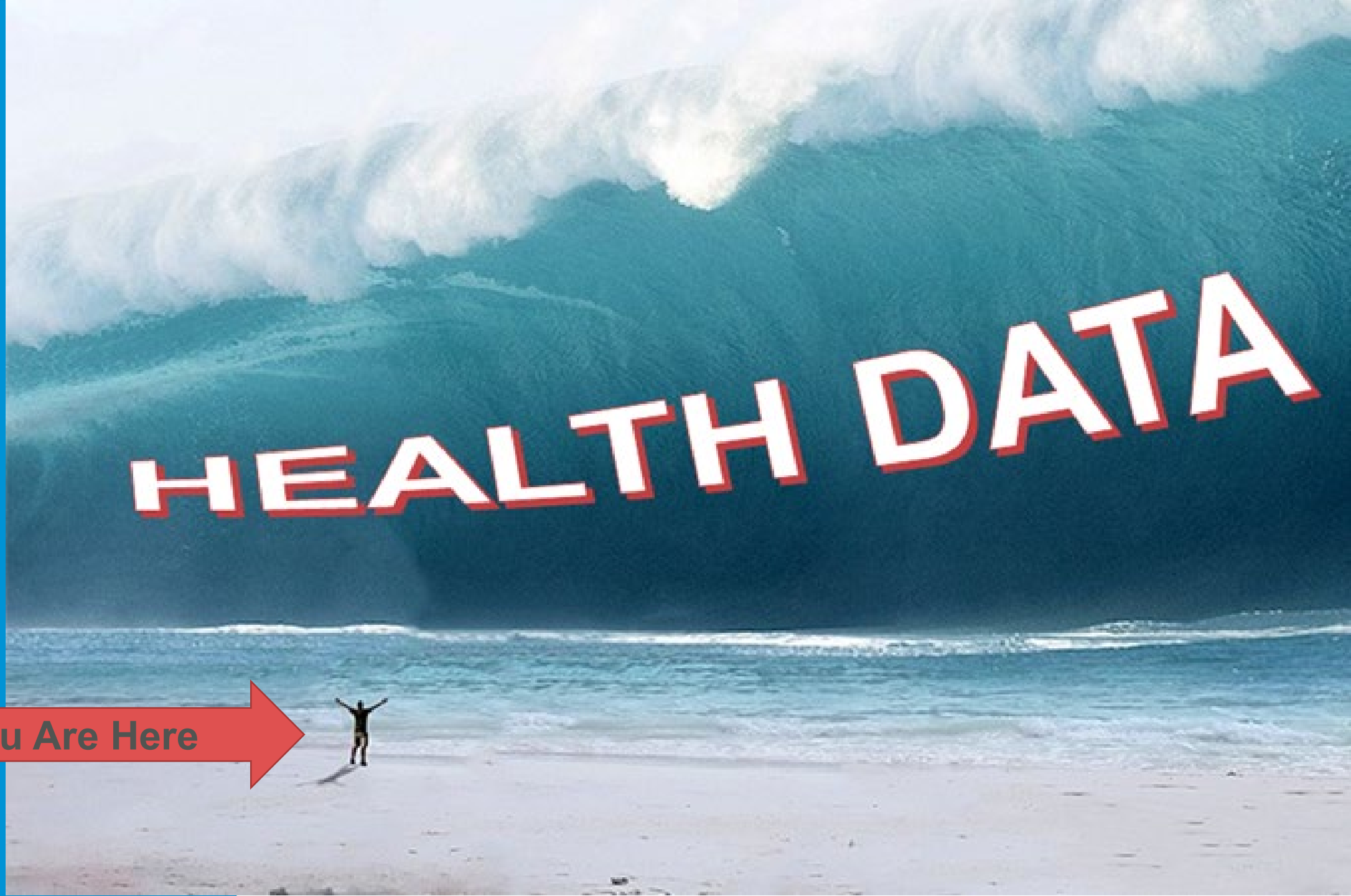
Bruce Levy, MD, CPE
Associate CMIO
Professor

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 Sucesses

The Value of Data and The Problem


HEALTH DATA
You Are Here

Health Data is a Primary Asset

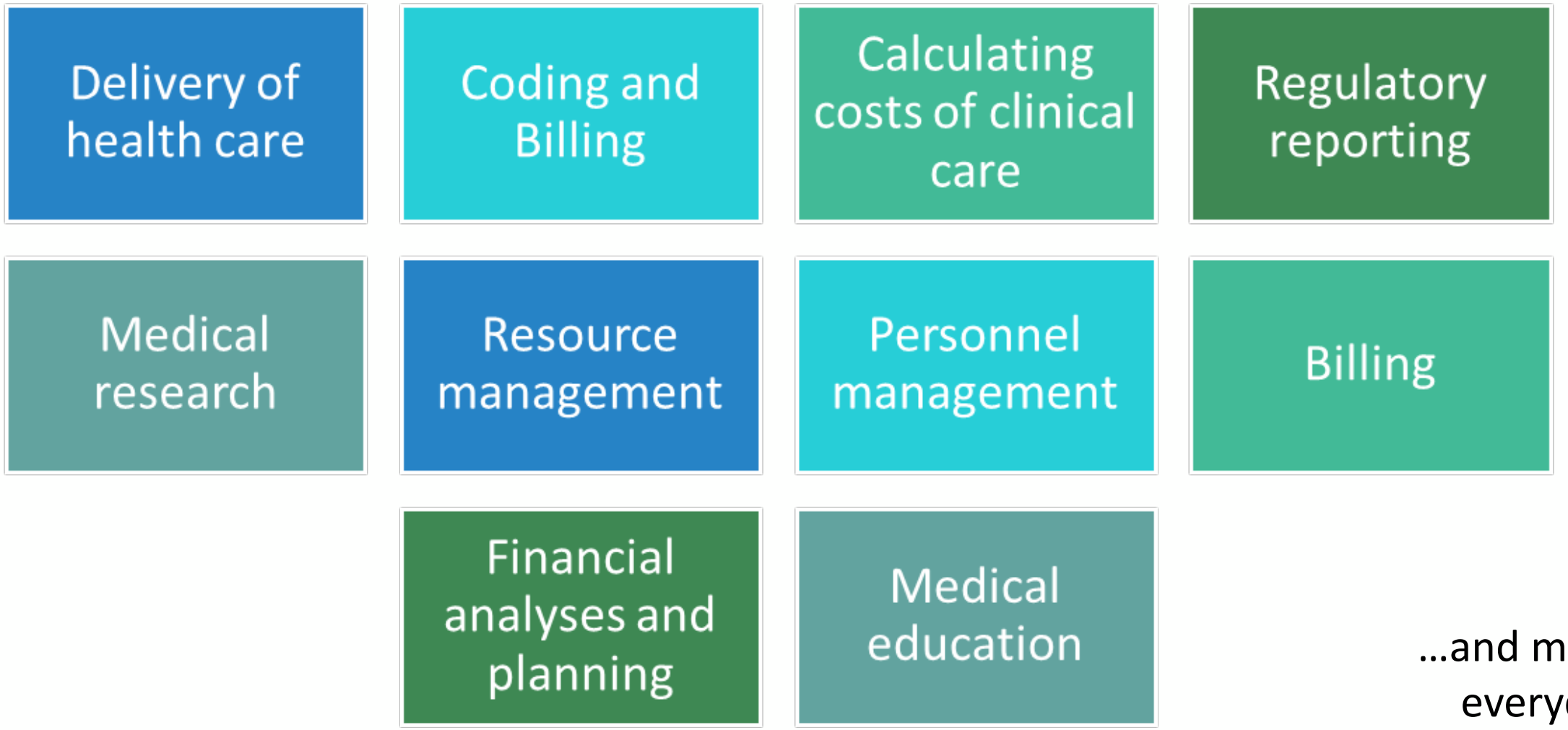
CURRENT STATE OF HEALTH DATA

- 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

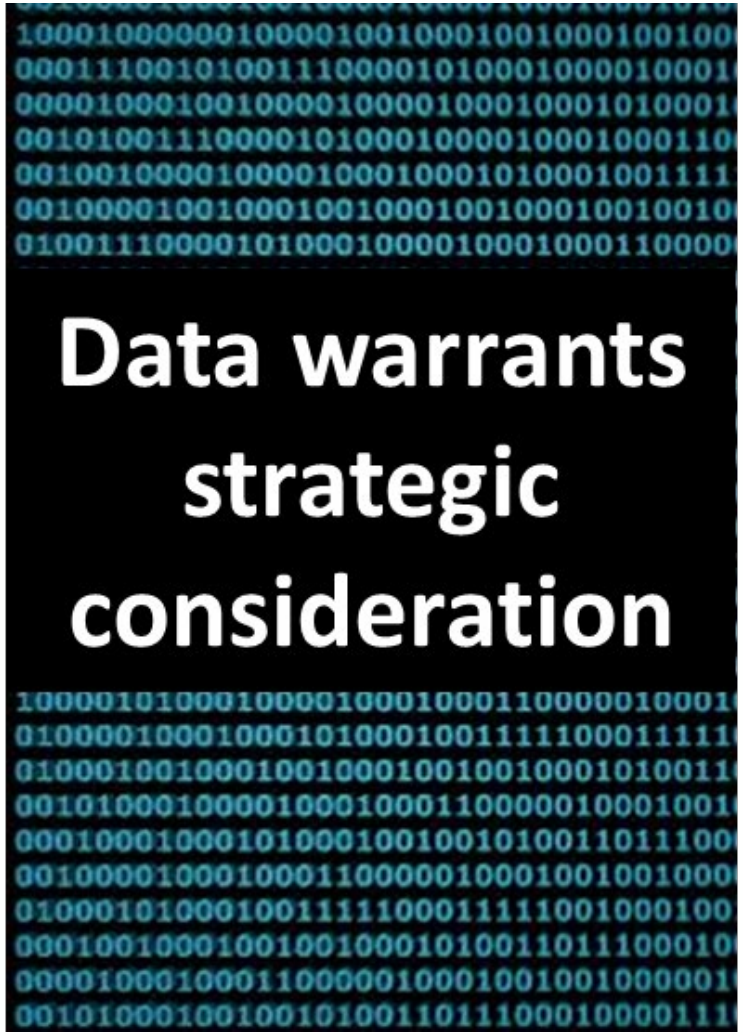
- Growing demand for data and analytics for clinical and business decision making, operations, regulatory reporting and strategic planning
- Protected Health Information and Business Sensitive Information represent potential security threats with growing cybersecurity crime

Depends on Health Data



…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

GHS_GHP Colonoscopy (Include Surg HX)
Reporting Period: 01/01/03 to 01/16/16
Generated: 01/19/2016 at 8:50:03AM

MRN	CPT Code	Proc Name	Surgical Hx Date	Contact Date
	45378	COLONOSCOPY,	3/4/03, 5/2005	12/22/2015
	44389	COLONOSCOPY,	1999,2000, 7/28/10	10/14/2015
	44389	COLONOSCOPY,	10/06,12-09,1/10,	02/02/2015
	EPIC6887	COLONOSCOPY	02/07	01/11/2016
	45378	COLONOSCOPY,	01/24/08	12/29/2015
	45378	COLONOSCOPY,	6-3-99, 2005	11/23/2011
	EPIC6887	COLONOSCOPY	'02	12/07/2015
	45378	COLONOSCOPY,	07/07/2010 DONE	10/20/2015
	EPIC6887	COLONOSCOPY	~1996	10/12/2015
	EPIC6887	COLONOSCOPY	discussed	08/25/2015
	45378	COLONOSCOPY,	01/09/2012	06/05/2015
	EPIC6887	COLONOSCOPY	'01	07/30/2015
	EPIC6887	COLONOSCOPY	2006/2010declined	11/23/2015
	EPIC6887	COLONOSCOPY	multiple	10/08/2015
	45378	COLONOSCOPY,	93-94	08/20/2015
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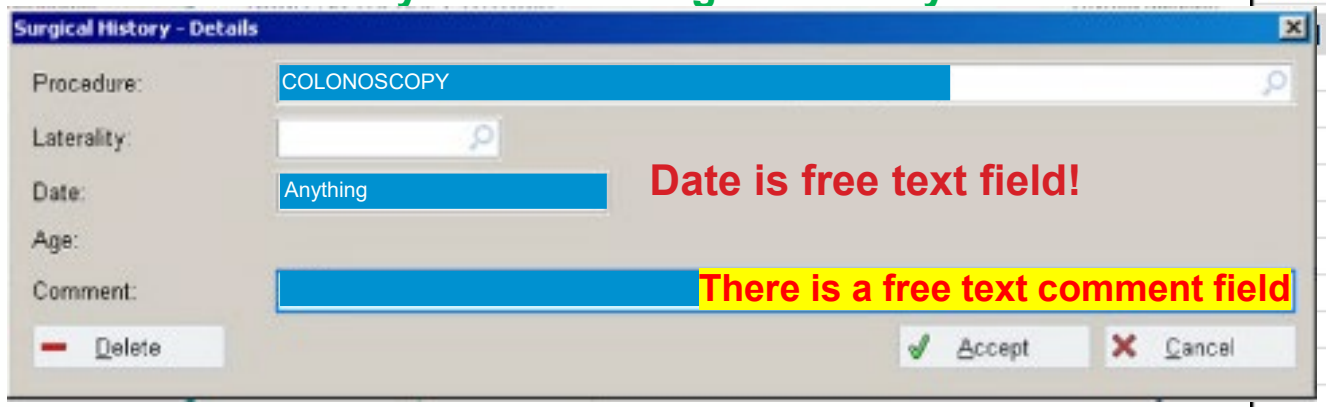
	EPIC6887	COLONOSCOPY	3-4 years ago	12/18/2015
	45378	COLONOSCOPY,	1/1/67;58;60	11/18/2015
		LONOSCOPY	/NOT READY 09-10	03/29/2015
			? 2003	01/12/2016
			unknown - old records pending	08/13/2015
			12/98-NORMAL	12/09/2014
		LONOSCOPY	45y/o, 50s	10/04/2015
	EPIC6887	COLONOSCOPY	205//06/07/09/10/11	08/25/2015

Poor Data Quality:
Unusable for analytics

Investigation reveals…

Entry Form for Surgical History



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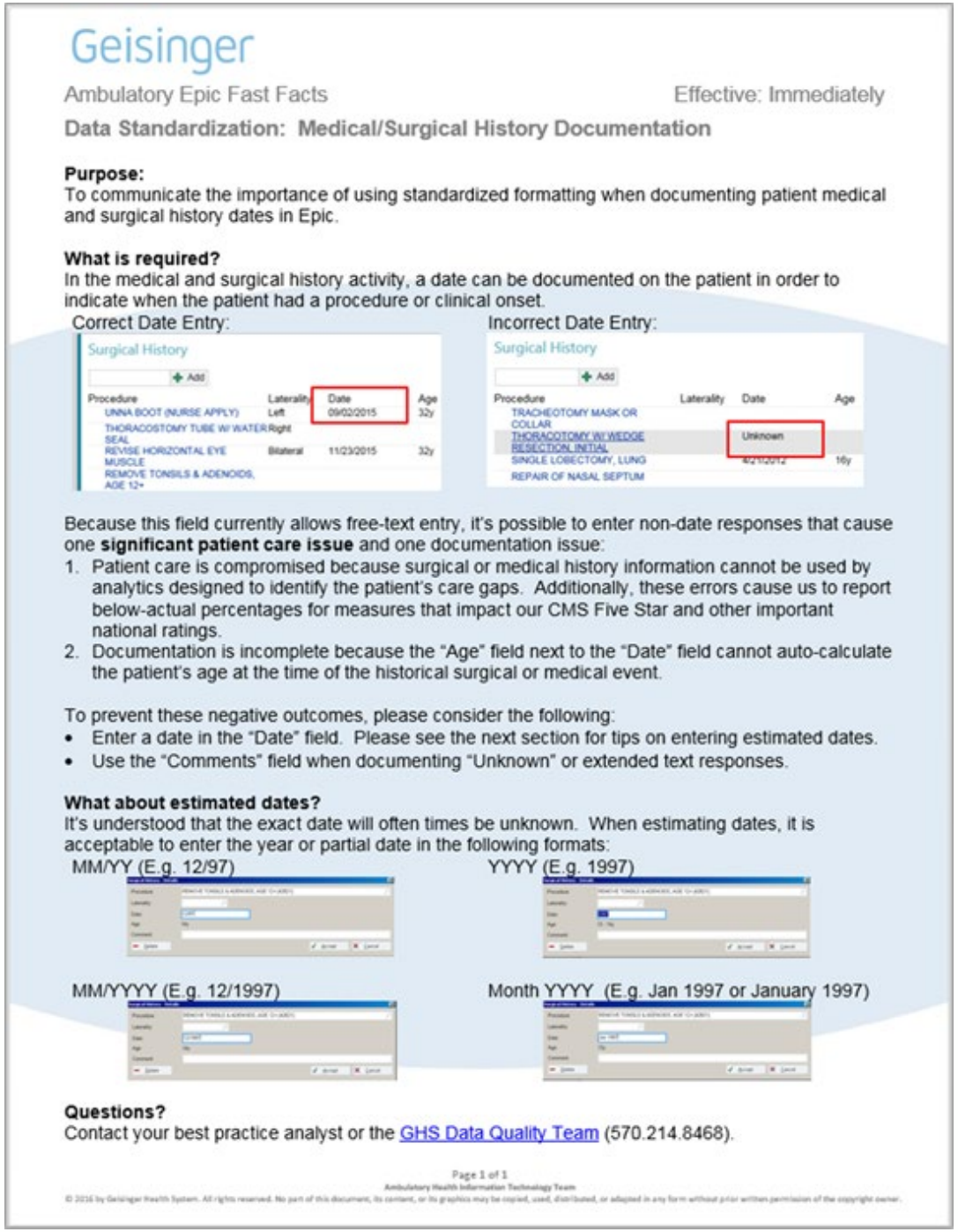
- *How do we solve the problem moving forward?*
- *What do we do about all the old bad data?*

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:

Surgical History

Procedure	Laterality	Date	Age
UNNA BOOT (NURSE APPLY)	Left	09/02/2015	32y
THORACOSTOMY TUBE W/ WATER SEAL	Right		
REVISE HORIZONTAL EYE MUSCLE	Bilateral	11/23/2015	32y
REMOVE TONSILS & ADENOIDS, AGE 12+			

Incorrect Date Entry:

Surgical History

Procedure	Laterality	Date	Age
TRACHEOTOMY MASK OR COLLAR			
THORACOTOMY W/ WEDGE RESECTION, INITIAL		Unknown	
SINGLE LOBECTOMY, LUNG		4/21/2012	16y
REPAIR OF NASAL SEPTUM			

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:

MM/YY (E.g. 12/97)

YYYY (E.g. 1997)

MM/YYYY (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).

Page 1 of 1
Ambulatory Health Information Technology Team


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

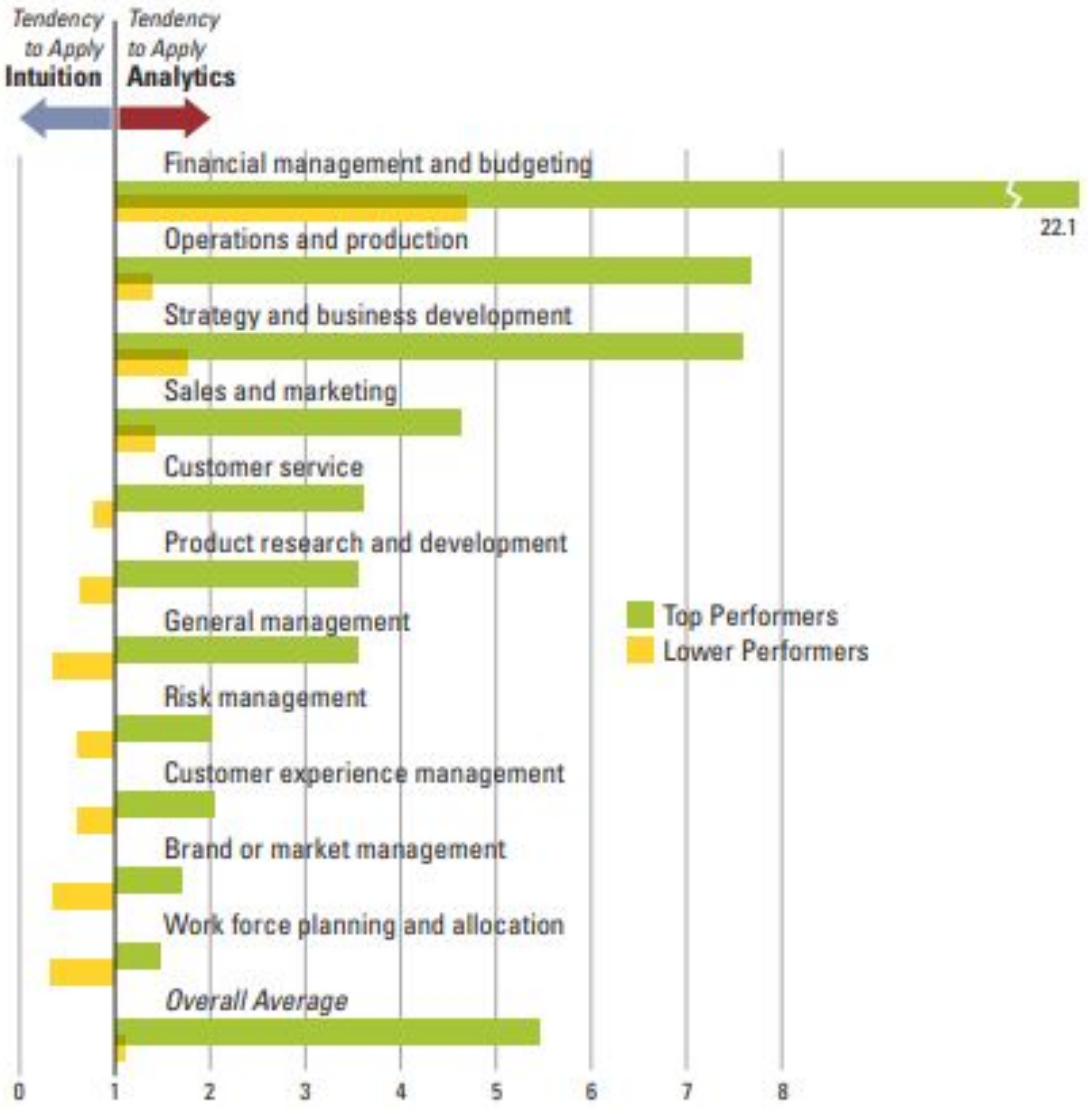
MIT Sloan Management Review

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

Big Data, Analytics and the Path From Insights to Value

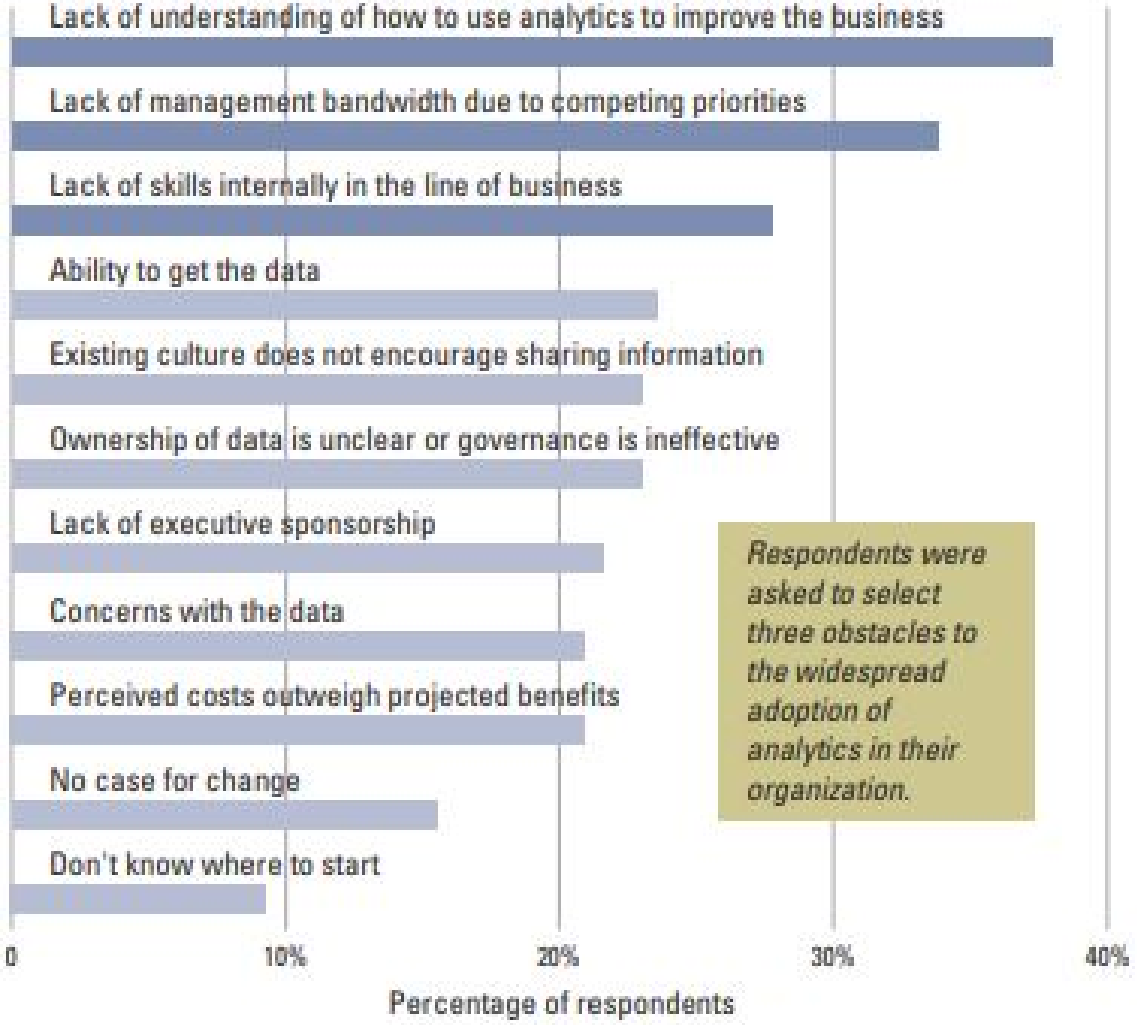
ANALYTICSTRUMPS INTUITION

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 IMPEDIMENTSTO BECOMING MORE DATA DRIVEN

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



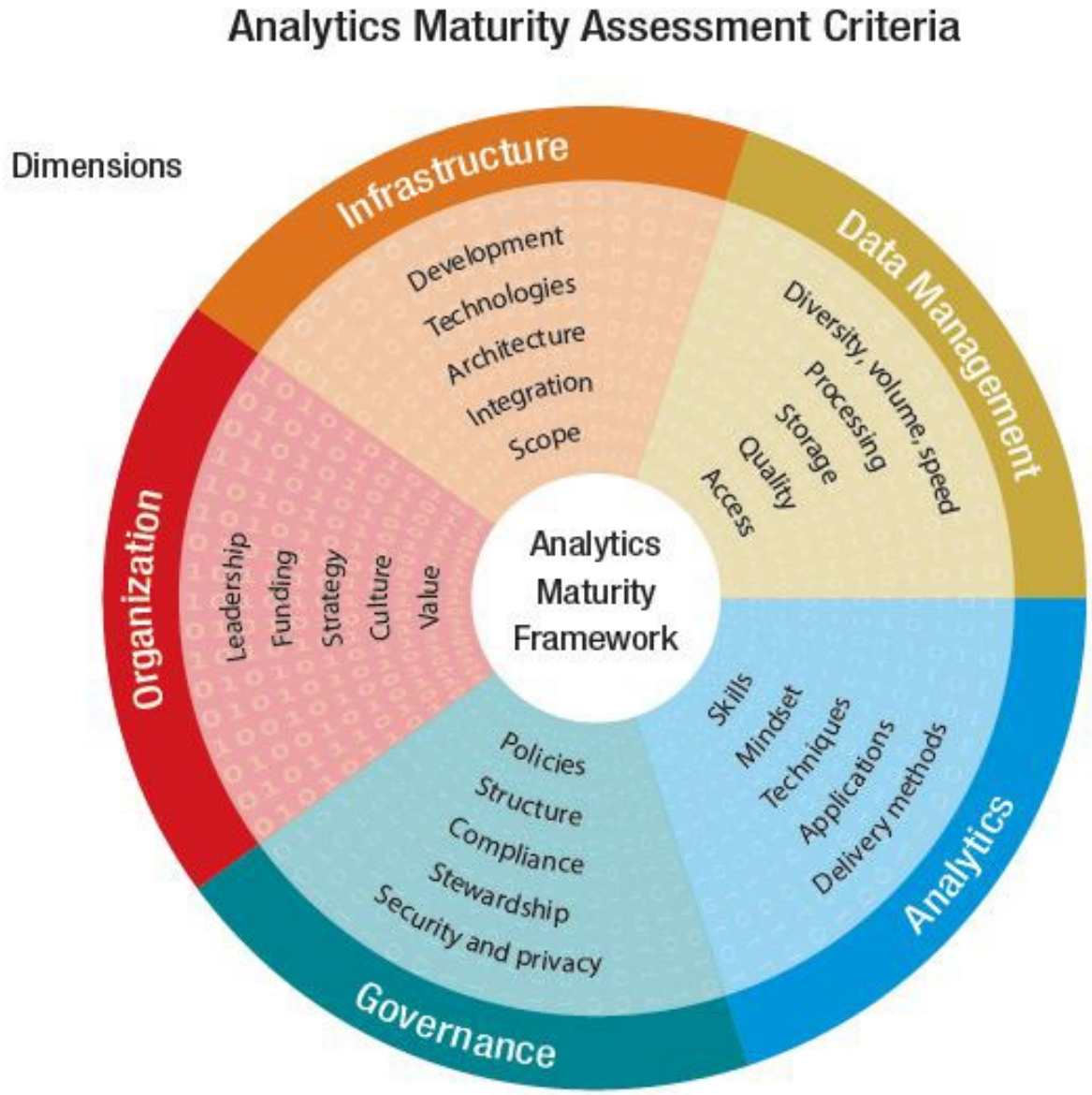
THETHREE STAGES OF ANALYTICS ADOPTION

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

	ASPIRATIONAL	EXPERIENCED	TRANSFORMED
Motive	•Use analytics to justify actions	•Use analytics to guide actions	•Use analytics to prescribe actions
Functional proficiency	•Financial management and budgeting •Operations and production •Sales and marketing	•All Aspirational functions •Strategy/business development •Customer service •Product research/development	•All Aspirational and Experienced functions •Risk management •Customer experience •Work force planning/allocation •General management •Brand and market management
Business challenges	•Competitive differentiation through innovation •Cost efficiency (primary) •Revenue growth (secondary)	•Competitive differentiation through innovation •Revenue growth (primary) •Cost efficiency (secondary)	•Competitive differentiation through innovation •Revenue growth (primary) •Profitability acquiring/retaining customers (targeted focus)
Key obstacles	•Lack of understanding how to leverage analytics for business value •Executive sponsorship •Culture does not encourage sharing information	•Lack of understanding how to leverage analytics for business value •Skills within line of business •Ownership of data is unclear or governance is ineffective	•Lack of understanding how to leverage analytics for business value •Management bandwidth due to competing priorities •Accessibility of the data
Data management	•Limited ability to capture, aggregate, analyze or share information and insights	•Moderate ability to capture, aggregate and analyze data •Limited ability to share information and insights	•Strong ability to capture, aggregate and analyze data •Effective at sharing information and insights
Analytics in action	•Rarely use rigorous approaches to make decisions •Limited use of insights to guide future strategies or day-to-day operations	•Some use of rigorous approaches to make decisions •Growing use of insights to guide future strategies, but still limited use of insights to guide day-to-day operations	•Most use rigorous approaches to make decisions •Almost all use insights to guide future strategies, and most use insights to guide day-to-day operations

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

Time Value of Health Information

The life-span and value of data decay at an exponential rate

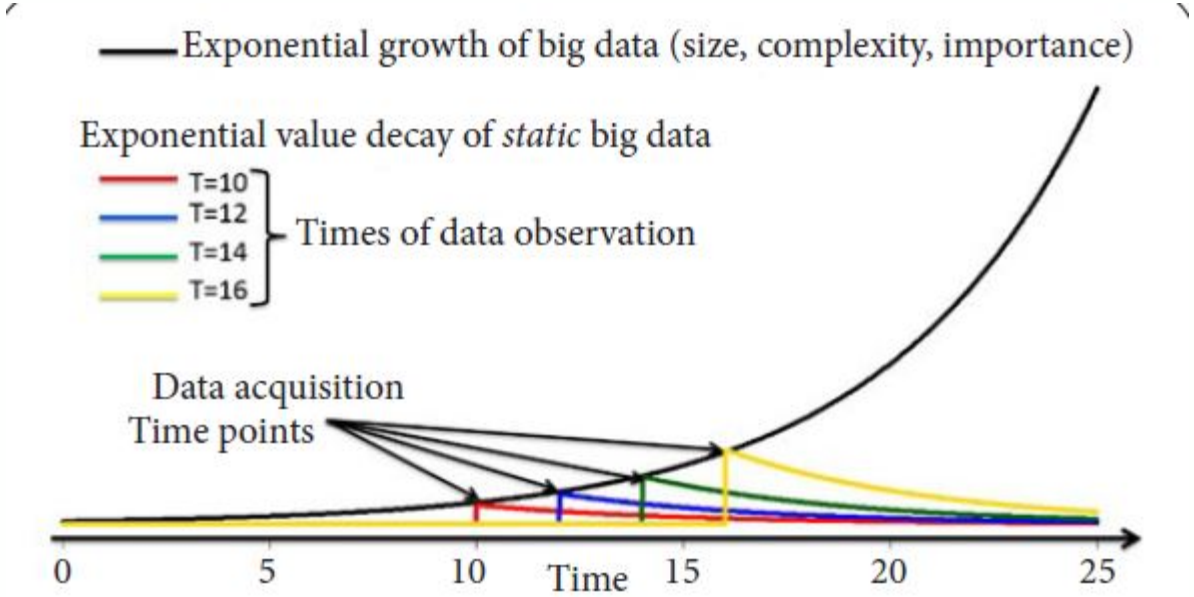


Figure 2. Parallels between the growth in size and decay in value of large heterogeneous datasets. The horizontal axis represents time, whereas the vertical axis shows the value of data. As we acquire more data at an ever faster rate, its size and value exponentially increase (black curve). The color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

Dinov ID. **Volume and value of big healthcare data**. *J Med Stat Inform*. 2016; **4**:3

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

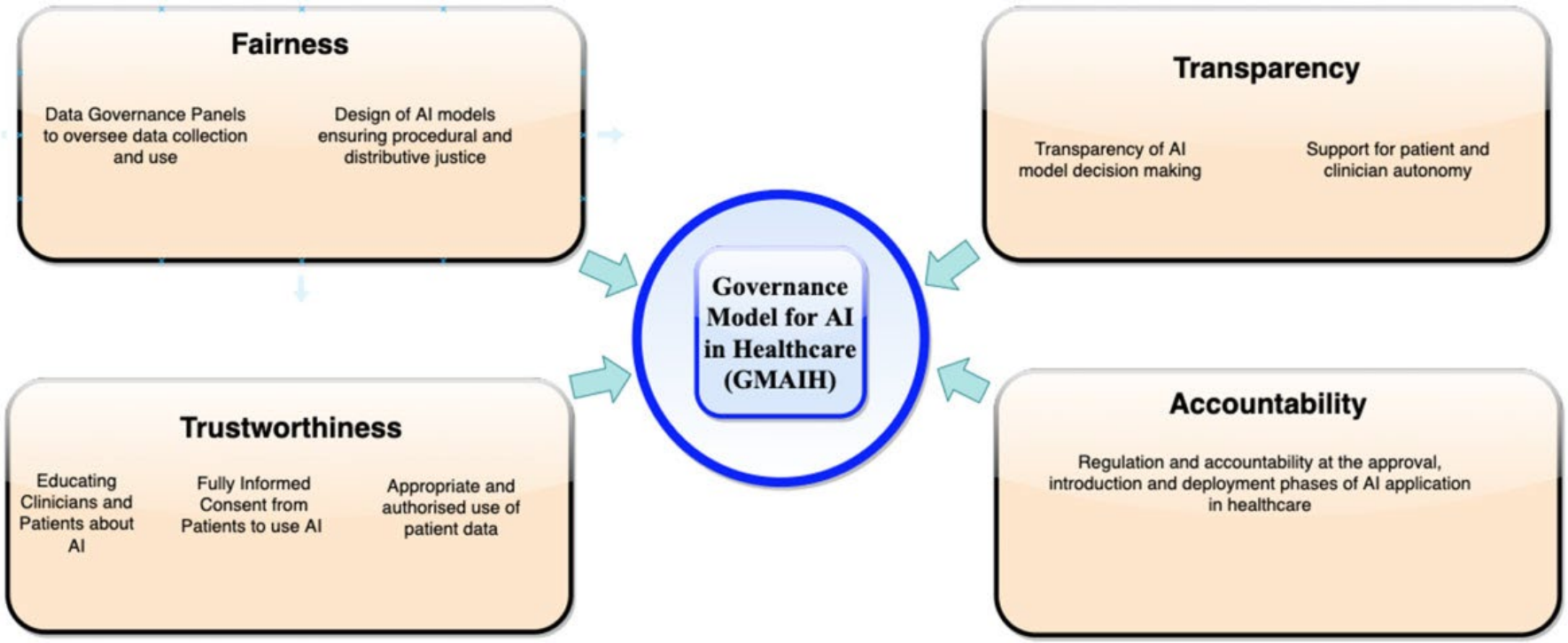
1. Researchers lack consensus about the operational definitions
2. Comes from multiple internal and external sources
3. Natural language processing is the most widely used technique and most of the processing tools are based on Hadoop
4. Used for clinical decision support, optimization of clinical operations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

Mehta N, Pandit A. Concurrence of big data analytics and healthcare: a systematic review. Int J Med Inform 2018;114:57–65

Governance for ethical use

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



Reddy S, Allan S, Coghlan S, Cooper P. A governance model for the application of AI in health care. J Am Med Inform Assoc 2020;27 (03):491–497

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

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

The Quality of Health Care Delivered to Adults in the United States

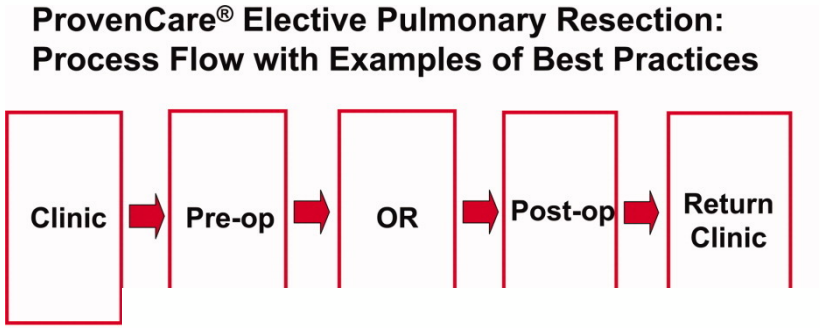
Elizabeth A. McGlynn, Ph.D., Steven M. Asch, M.D., M.P.H., John Adams, Ph.D., Joan Keesey, B.A., Jennifer Hicks, M.P.H., Ph.D., Alison DeCristofaro, M.P.H., and Eve A. Kerr, M.D., M.P.H.

ABSTRACT

BACKGROUND

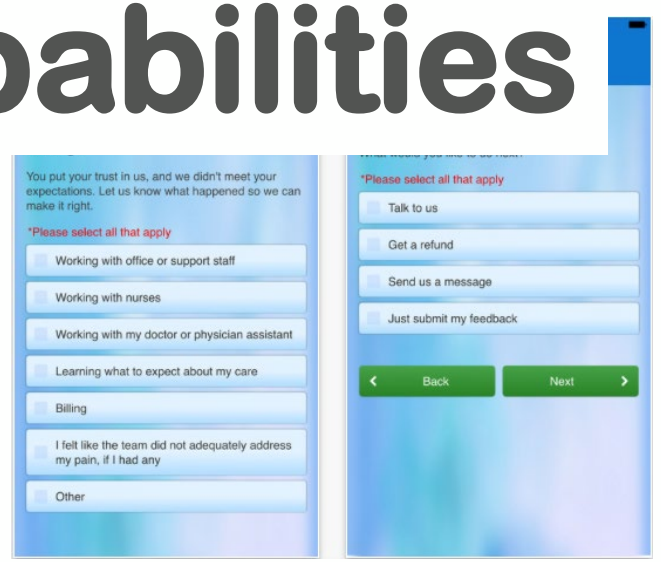
We have little systematic information about the extent to which standard processes involved in health care — a key element of quality — are delivered in the United States.

ProvenCare Journey



ProvenCare Diabetes

This requires advanced data and analytic capabilities



Analytics Governance Goals

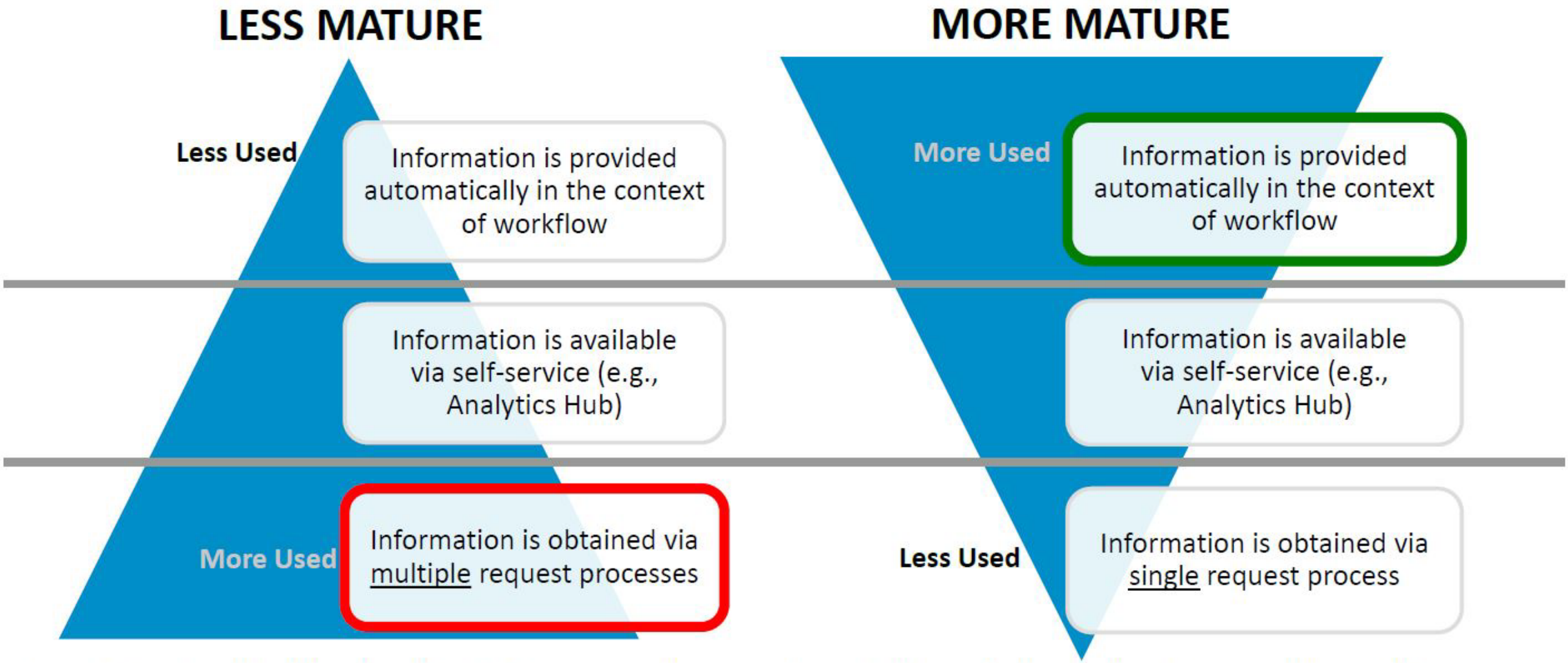
1. Develop the vision for data and analytics and connect it to the strategic priorities of the organization
2. Define the organizational structure, roles and responsibilities
3. Manage the institution's data assets
4. Implement a robust data governance program
5. Establish analytics processes to standardize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

1. Develop the vision

- Develop the vision and connect to the organization's strategic priorities

Use informatics to make better health easier

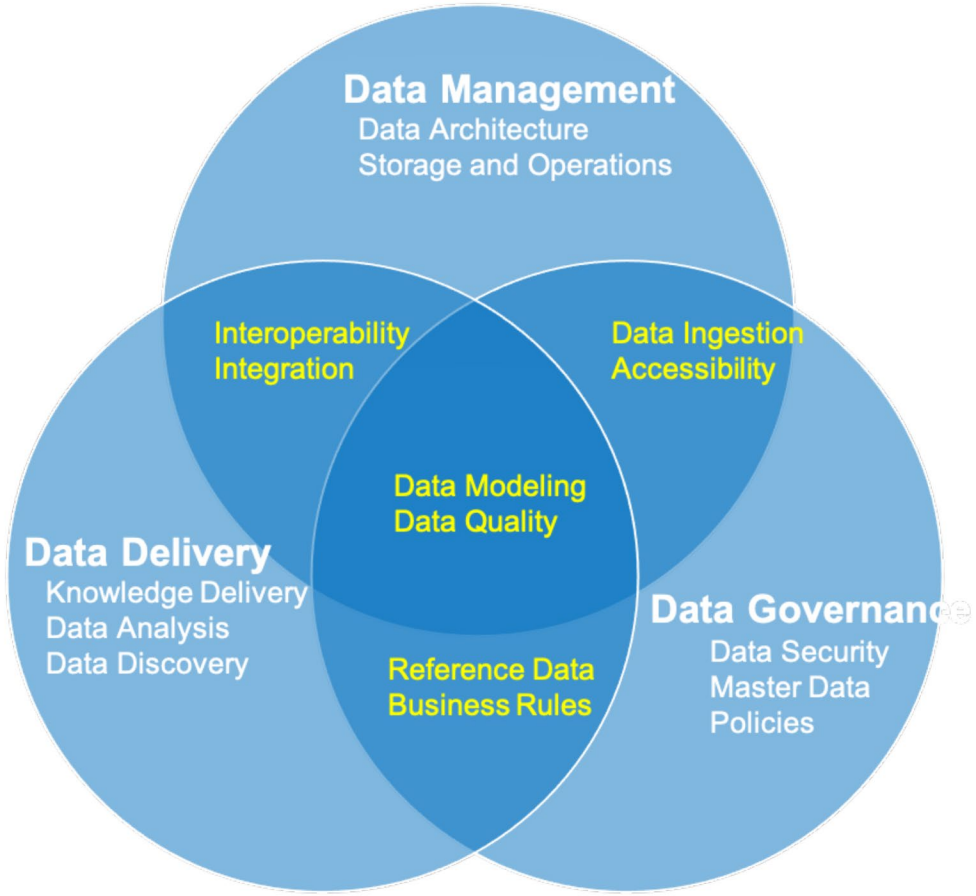
Geisinger's Analytics Transformation



Impact: 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.

Impact: 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

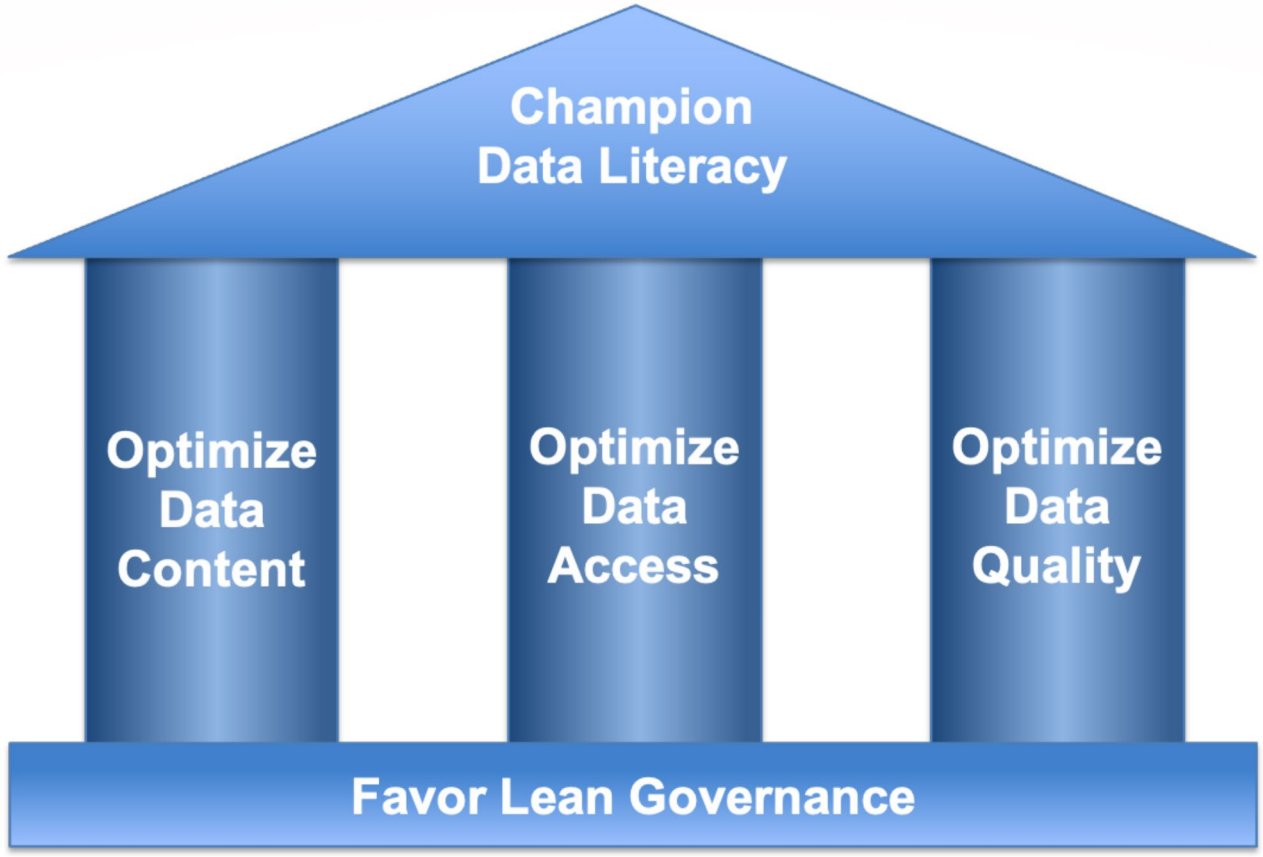
3. Manage data assets

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

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

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.

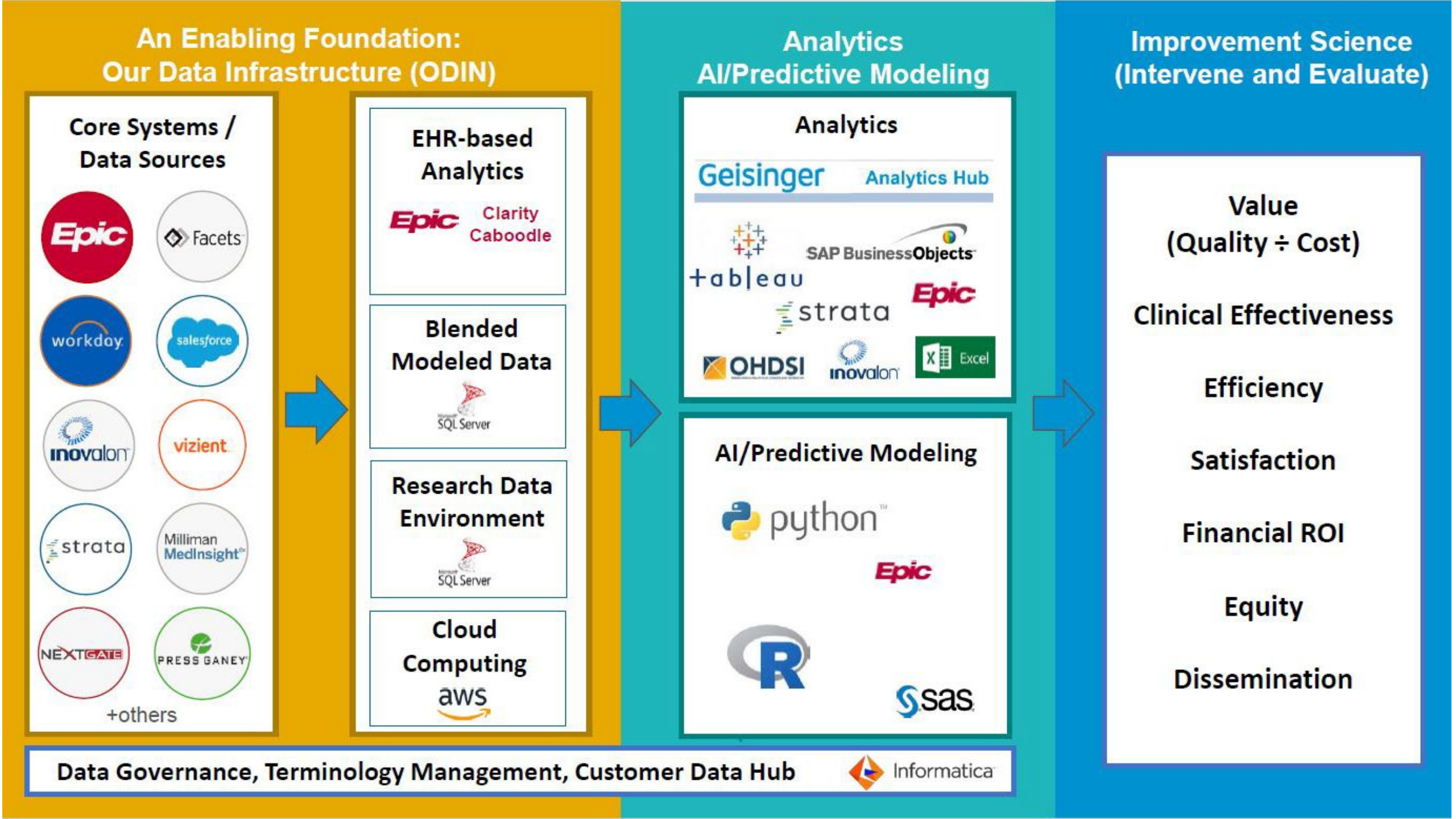
5. Establish analytic processes

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)

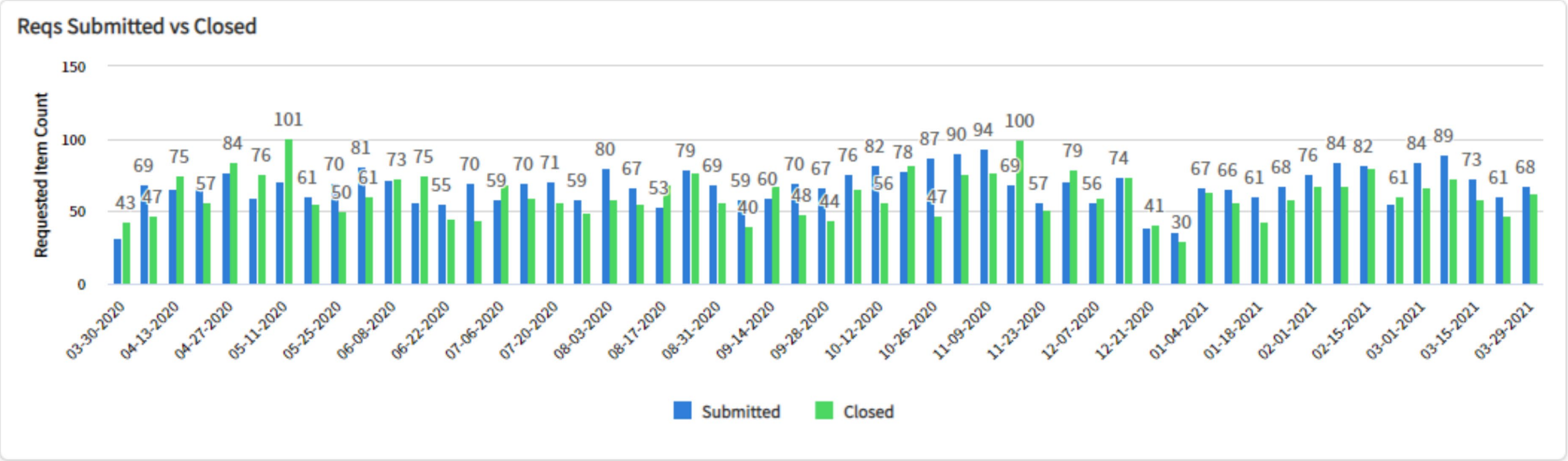
6. Implement and Evaluate

- 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


An Enabling Foundation:
Our Data Infrastructure (ODIN)
Core Systems / Data Sources
Epic
Facets
workday
salesforce
inovalon
vizient
strata
Milliman MedInsight
NEXTGATE
PRESS GANEY
+others
EHR-based Analytics
Epic
Clarity
Caboodle
Blended Modeled Data
SQL Server
Research Data Environment
SQL Server
Cloud Computing
aws
Analytics
AI/Predictive Modeling
Analytics
Geisinger
Analytics Hub
SAP BusinessObjects
tableau
Epic
strata
OHDSI
inovalon
Excel
AI/Predictive Modeling
python
Epic
R
sas
Improvement Science
(Intervene and Evaluate)
Value
(Quality ÷ Cost)
Clinical Effectiveness
Efficiency
Satisfaction
Financial ROI
Equity
Dissemination
Data Governance, Terminology Management, Customer Data Hub
Informatica

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

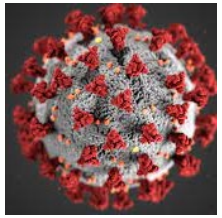
The existing processes are not sustainable. We need a different approach.

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

Analytics Self-Service

- Enterprise Analytics Hub
  - ✓ **One stop shop `for already developed analytic tools**
  - ✓ **Open to all employees**
- User friendly analytic tools
  - ✓ **DIY analytics**

Geisinger

Analytics Hub

Home>Analytics

Geisinger's Analytics Team is organized to help solve problems and promote data-driven decisions in support of our Strategic Priorities: **Managing Total Health**, **Access & Ease of Use**, and **Operational Excellence**.

If you can't find what you are looking for below, please contact us for a consultation. Need access to an existing dashboard/report? Request it here.

Search

Enterprise

COVID-19
Geisinger Enterprise Scorecard
Balanced Scorecard
Leadership Dashboard
Health Equity & Social Needs
Geisinger Innovations
Managing Total Health
Institutes
Hospital Scorecards
Service Line Scorecards
Provider Scorecards
Care Redesign

Geisinger Family

Employee Engagement
RN Satisfaction
Safety Culture
EHR Efficiency and Usability
Retention/Recruitment
Employee Health and Workplace Safety
Compliance Reporting
myHealth Rewards

Access/Patient and Member Experience

Patient Access
Pharmacy Operational Dashboard
MyGeisinger
Telemedicine
Transfers Dashboard
Patient Experience
Member Experience
Patient Liaison Dashboard
Patient Questionnaires
Digital Transformation Office

Quality

Access Forms
Care Gaps
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Pay for Performance Programs
Geisinger Health Plan
Outcomes
KACO
Process
Core Measures
ProvenCare / ProvenRecovery
Safety
Influenza
Immunization
Patient Satisfaction
Documentation & Coding
Documentation Compliance
Ratings/Rankings
Pharmacy
External References

Utilization/Flow

Acute Care Treatment Area
Advance Care Planning
Ambulatory Care Sensitive Conditions
Emergency Department
Geisinger at Home
Geisinger Health Plan
Inpatient Flow/Length of Stay
KACO
Mobile Integrated Health
PAC Referral Dashboard
Patient Volume
Pharmacy
Physician Alignment
Referral Patterns
Radiology

Financial Health

Operating Margin
Productivity
DSS Analytics Dashboard
Point of Service Collections

Population Management

GHP VBC Scorecard
Geisinger Bundles Program
KACO Board Meeting Presentation
POC A1C Dashboard

>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?

Geisinger