



Transforming the Health & Life Sciences Ecosystem Through Advanced Analytics

Date: June 5, 2018

Time: 1:50 PM

Room: Emperors II



Jason Burke
System VP & Chief Analytics Officer

Agenda for Today

- **The Problem**
- **The Opportunity**
- **The Plan at UNC Health Care System**
- **Q&A**





13 160 118.47 116.90 113.10

406 153 16



In an industry with more than 9,000 measures, how do we know which ones actually matter?

Good ≠ Important

 **JGIM**
Journal of General Internal Medicine

16 Oct 2012

Hospital Performance Measures and 30-day Readmission Rates

“Hospitals with greater adherence to recommended care processes **did not achieve** meaningfully better 30-day hospital readmission rates compared to those with lower levels of performance.”

HealthAffairs

June 2013

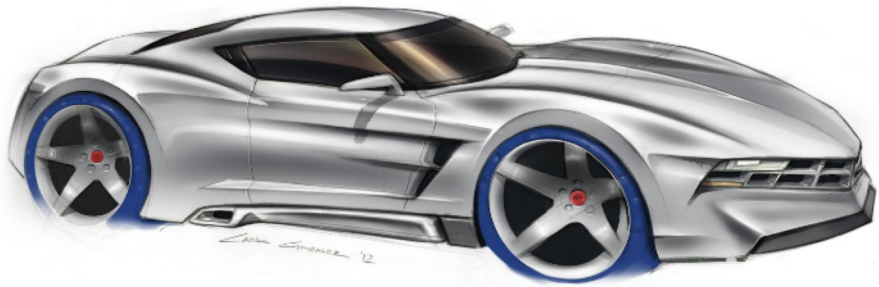
Limits Of Readmission Rates In Measuring Hospital Quality Suggest The Need For Added Metrics

JAMA
Journal of the American Medical Association

February 3, 2015

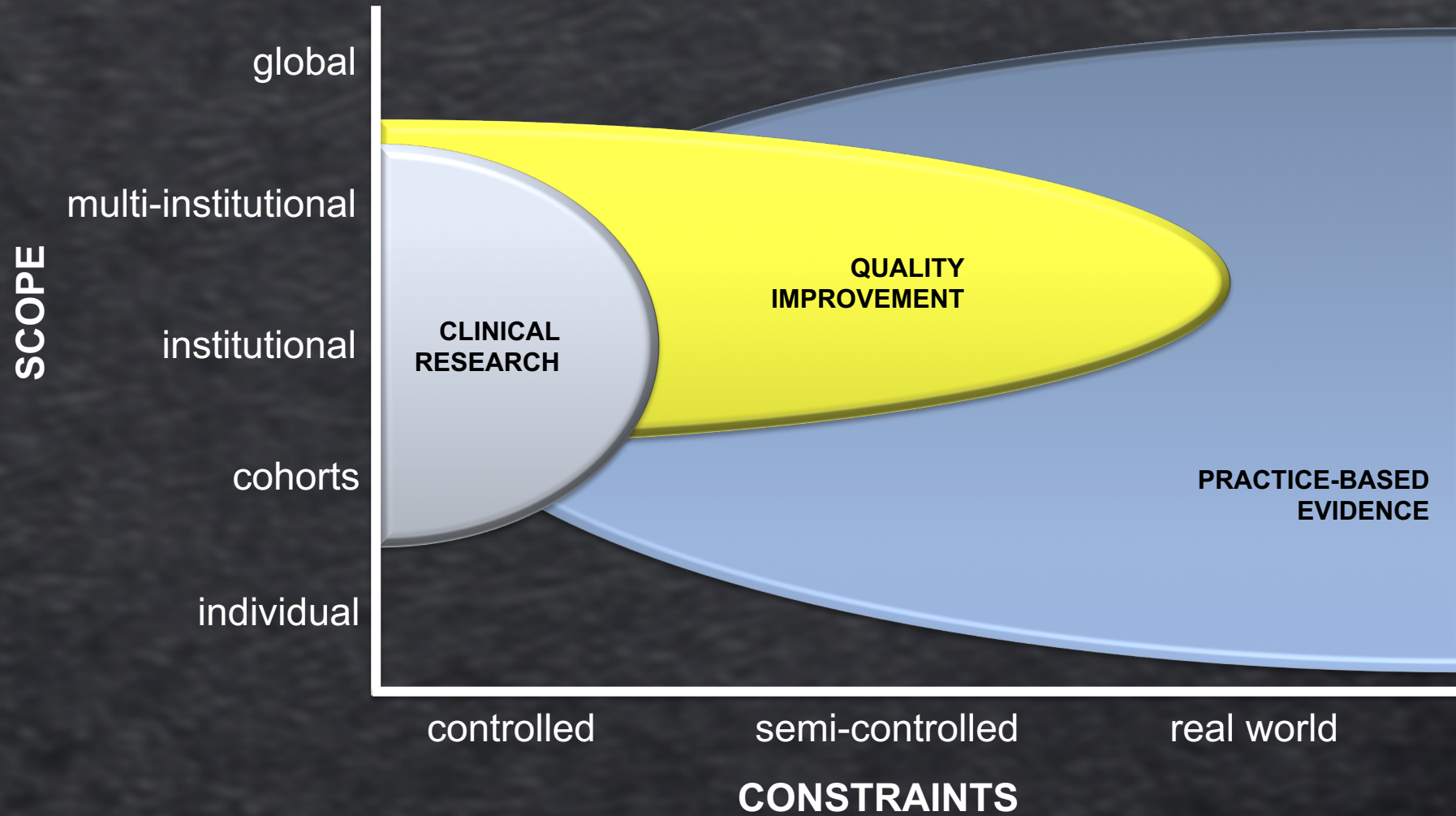
Association of Hospital Participation in a Quality Reporting Program With Surgical Outcomes and Expenditures for Medicare Beneficiaries

“Enrollment in a national quality reporting program **was not associated** with the improved outcomes or lower Medicare payments among surgical patients.”

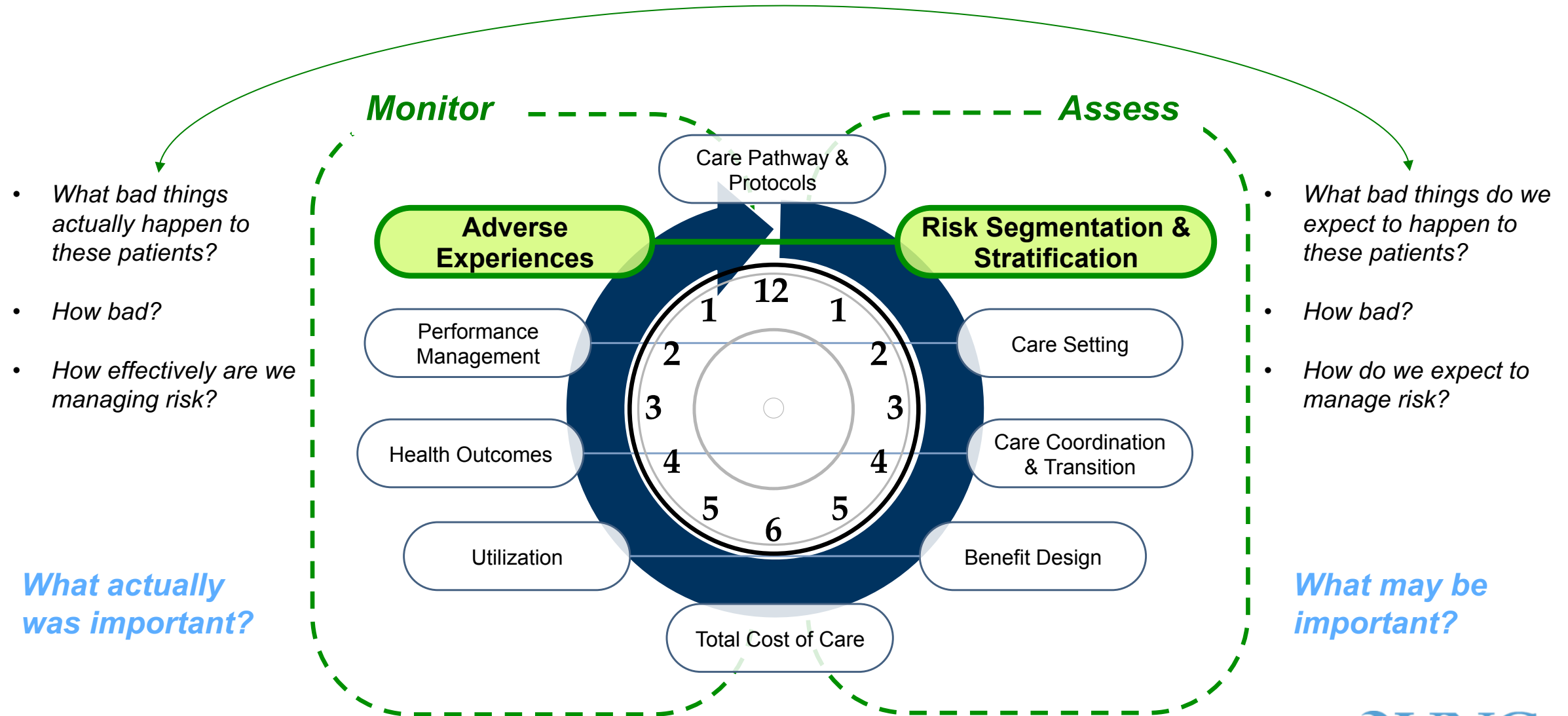


The Opportunity

What are we missing?



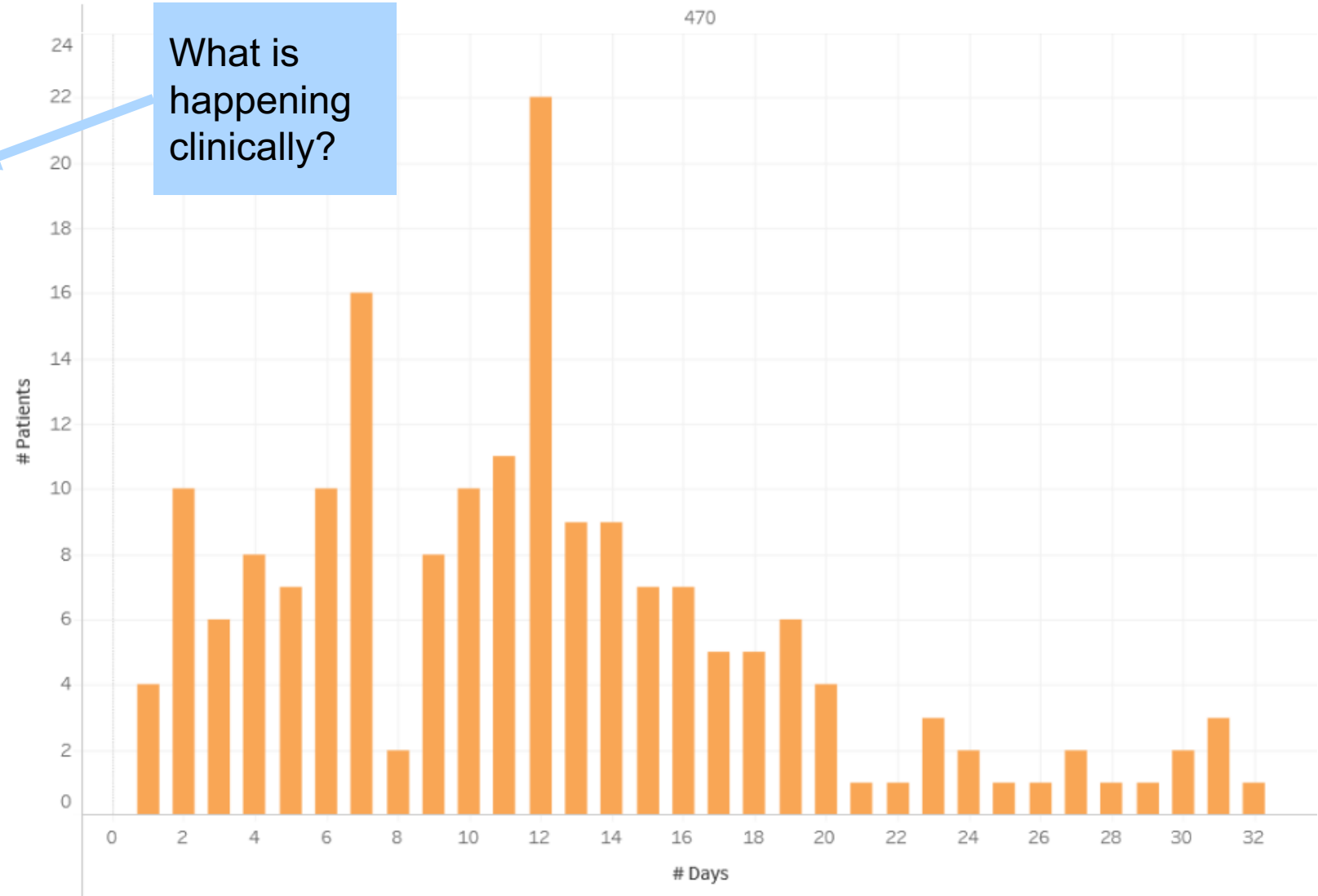
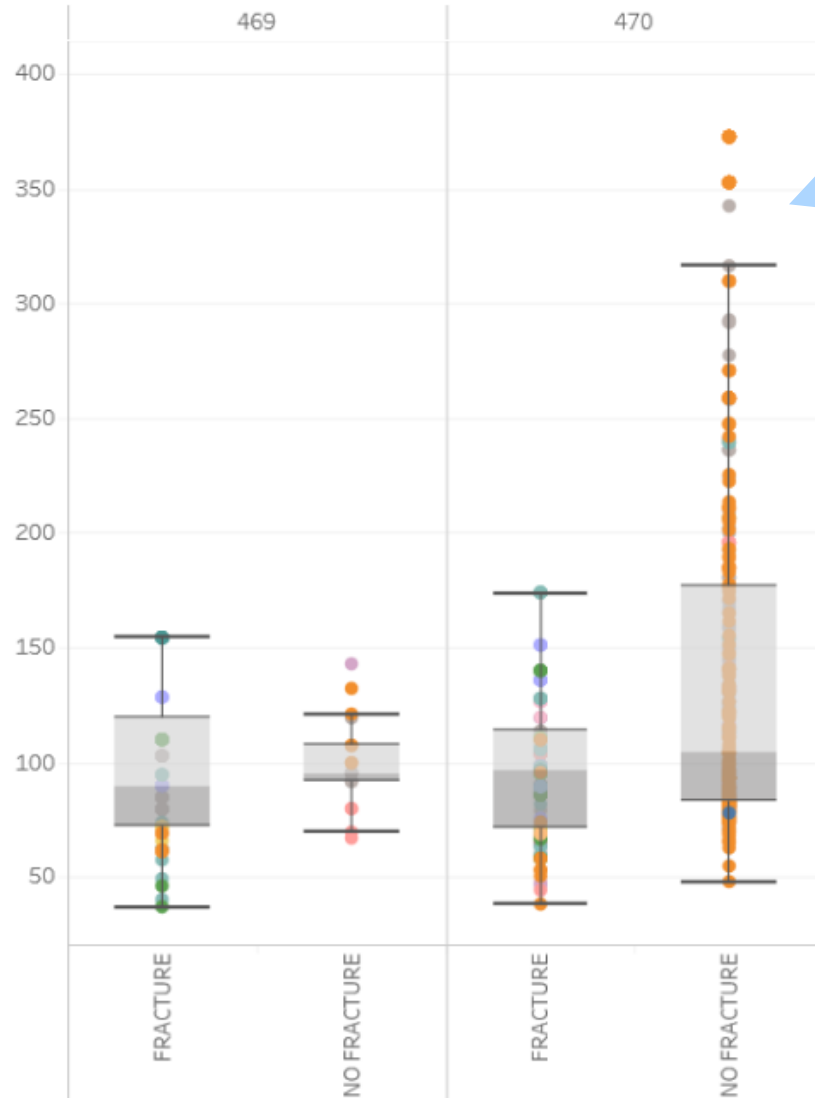
Example: Population Health



Example: Bundled Payments (Clinical Episodes)

Percent Episode payment to Target

SNF Length of Stay



How do you make clinical decisions?

Source	Sample of Short-comings
Published Research	<ul style="list-style-type: none"> • Sample bias • Publication bias • Information overload / innovation pace • Increasing specialization / complexity exceeds cognition • Data sparsity / completeness • Psychological / cognitive biases • Commercial bias • Limited scopes of inquiry • Bench to bedside timeframes
Other patients in practice	
Gut instinct	
Sales reps	

What if machines could help overcome these shortcomings?

- Crunch the sources and factors
- Model more representative populations
- Uncover patterns too complex for the human brain to readily identify
- Serve as an aide

Example: Health Outcomes Analysis

What Happens with “Patients Like This One”



Image via Flickr user jonicdao

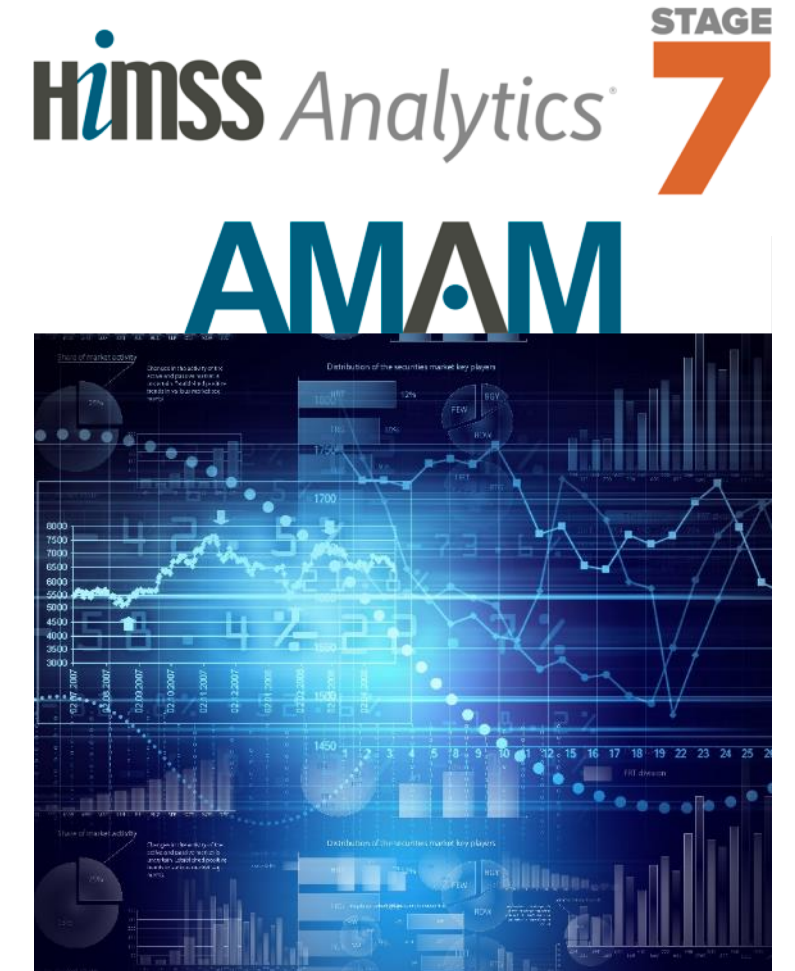


Enterprise Analytics @ UNC Health Care

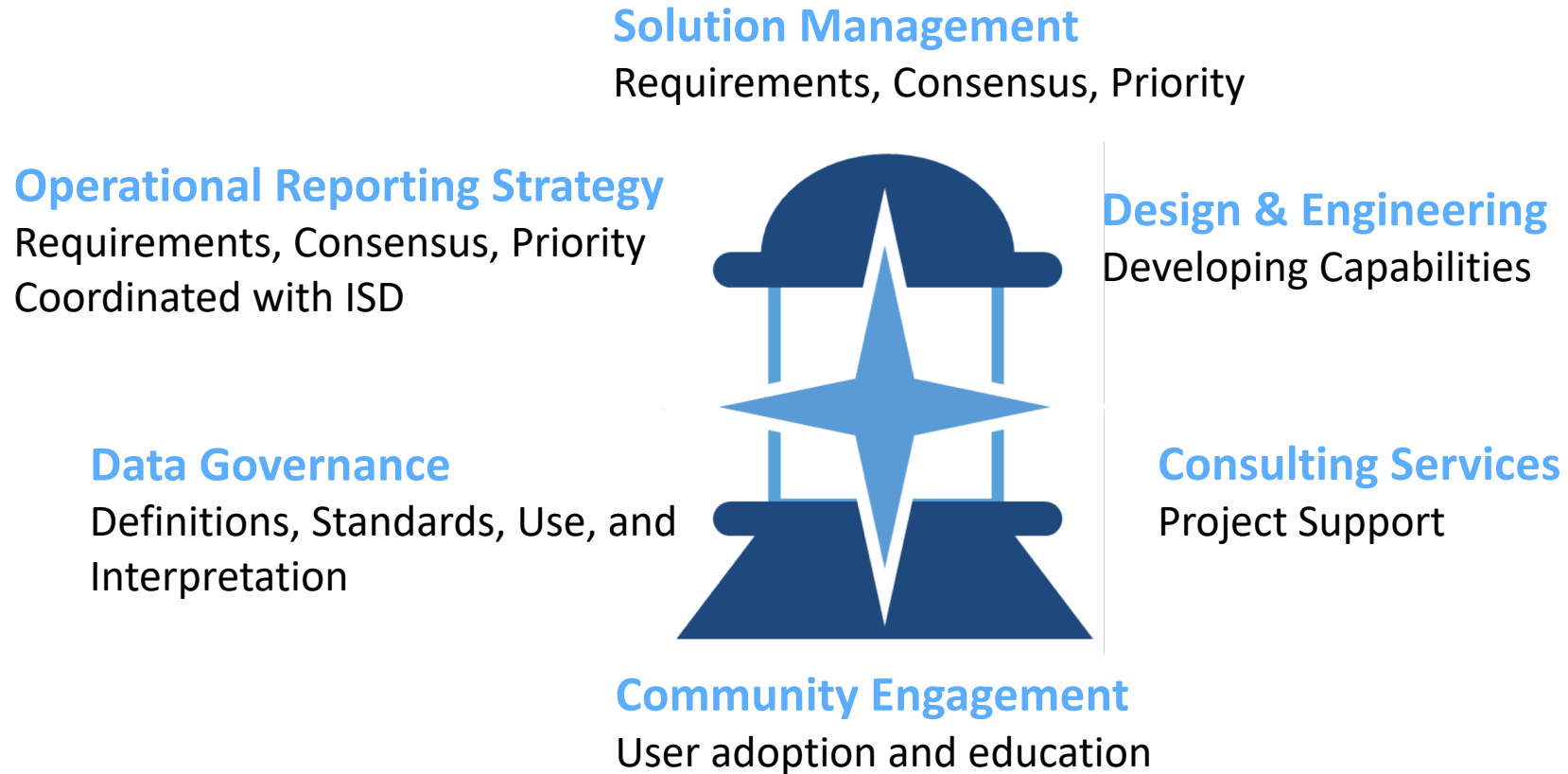
Enterprise Analytics & Data Sciences (EADS) Overview

EADS is a system-wide business function charged with growing UNC Health Care's capabilities in leveraging data and advanced analytical methods.

- **System-wide** – creating insights and assets that span individual hospitals, departments, and research areas
- **Business function** – reports to system CFO, and focused on clinical, financial, and administrative insights
- **Capabilities** – develops, implements, and maintains new reusable solutions (software, datasets, models, documentation, training) for other analysts to leverage in their own analyses
- **Data** – developing and managing processes that produce better data assets
- **Advanced analytical methods** – moving beyond descriptive and basic inferential statistics to develop more sophisticated forms of actionable insights



The Operating Model



Organizational Benefits

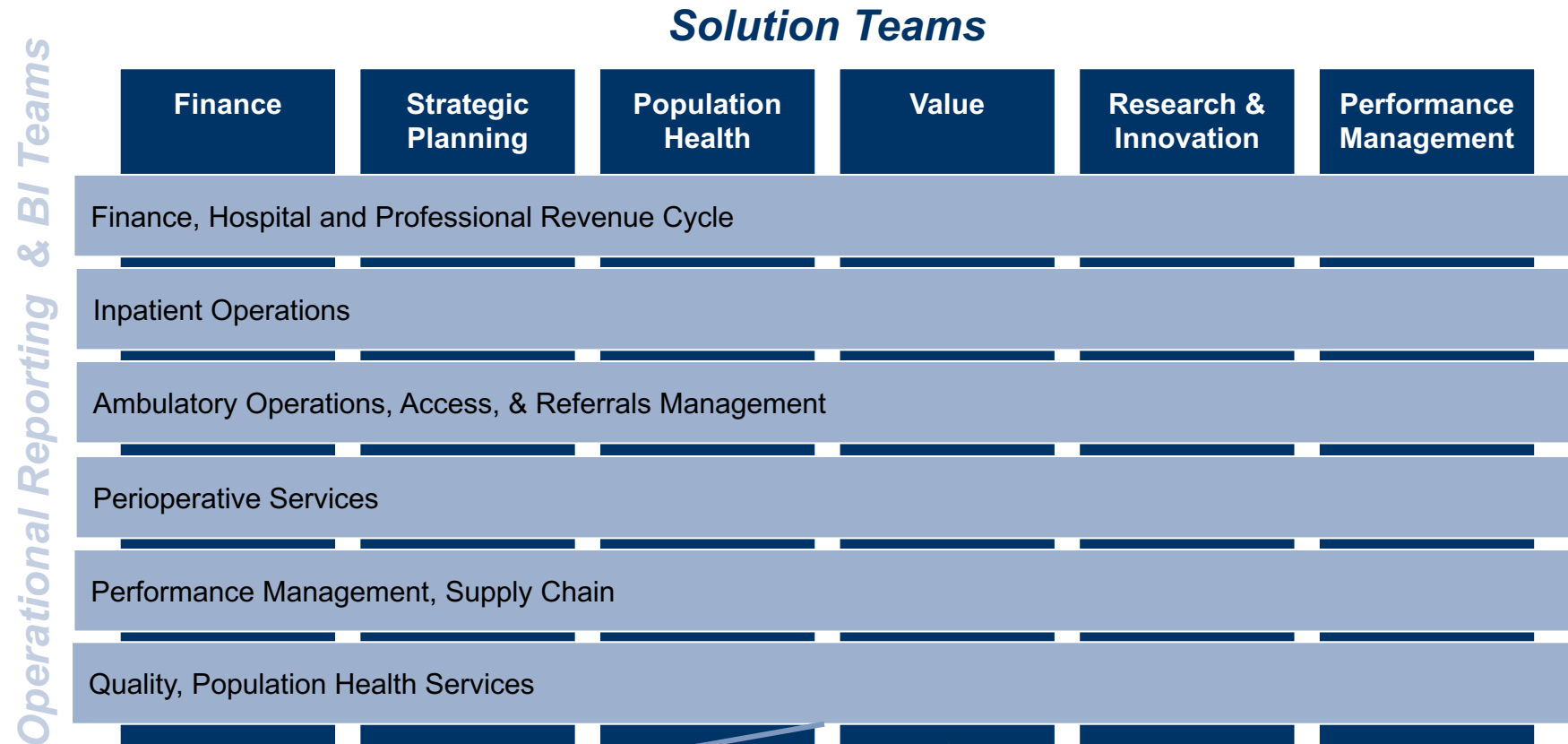
Reduce the time, effort, and resources currently associated with doing analyses

Increase the quality of data and analytical insights

Improve the empowerment and ease by which users can gain insights from analyses

Build expertise in data and analytical sciences

Organization of Work



Develop consistent reports by business function; escalate broader issues to EADS teams; standardize practices and workflow across organizational entities.

Facilitate data policy development; build reusable data sets and models that leverage those policies; drive processes, decisions and innovations.

Rethinking Analytics in Health Care

Most health industry analyses are conducted as a PROJECT

- Stakeholders are project area experts
- Effort is focused on predefined questions
- Work is relevant to project team
- Timeline is project driven
- Data definitions are project specific
- Data structured for single use
- Little-to-no analytical code reuse
- Release available to project stakeholders



Our work is managed more like a PRODUCT

- Stakeholders are functional experts
- Questions are not predefined
- Work must be relevant to multiple customers
- Timeline is engineering driven
- Data definitions are enterprise-wide
- Data is structured for broad re-use
- Analytical models are built for multiple projects
- Release available to entire enterprise



Making It Happen



Difficult Things

- ❖ Finding unicorns (they do exist)
- ❖ Executive education
- ❖ Staff education
- ❖ Dilutive investments
- ❖ Stakeholder expectations
- ❖ Balancing needs with ambitions
- ❖ Managing the funnel



Helpful Things

- ❖ Patience
- ❖ Investing in governance
- ❖ Storytelling
- ❖ Non-technical analogies
- ❖ Iterative delivery (agile)
- ❖ Finding customer champions
- ❖ Long-term view

Putting Together a Team



Roles

- Solution Managers
- Data Scientists
- Data Governance Experts
- Analytical Consultants
- Quality Assurance

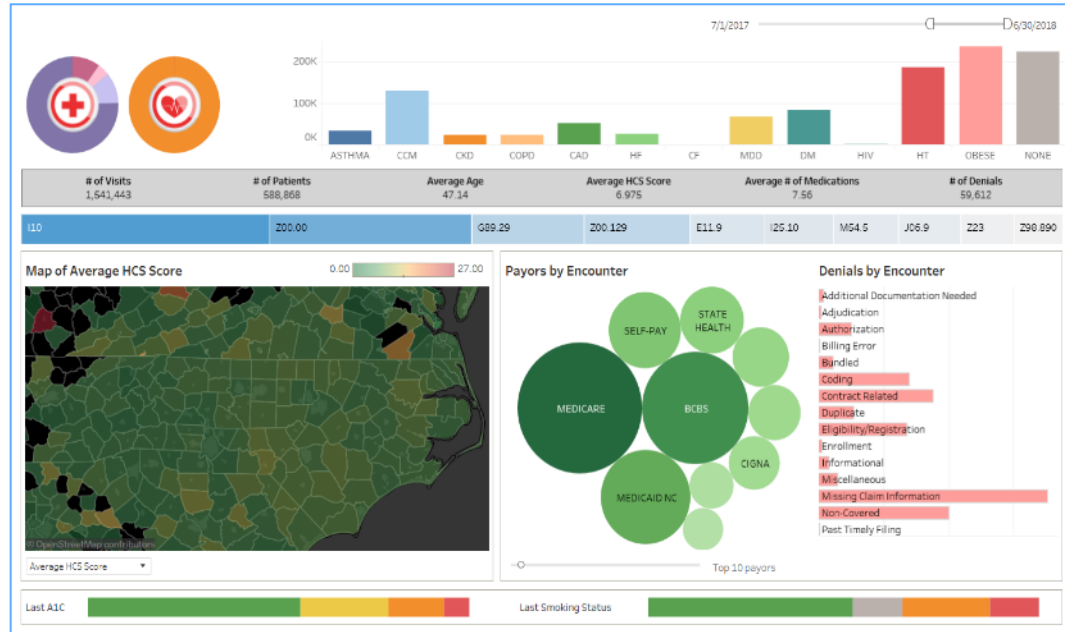
Skills

- Industry expertise
- Analytical methods
- Software engineering
- Project management
- Customer management

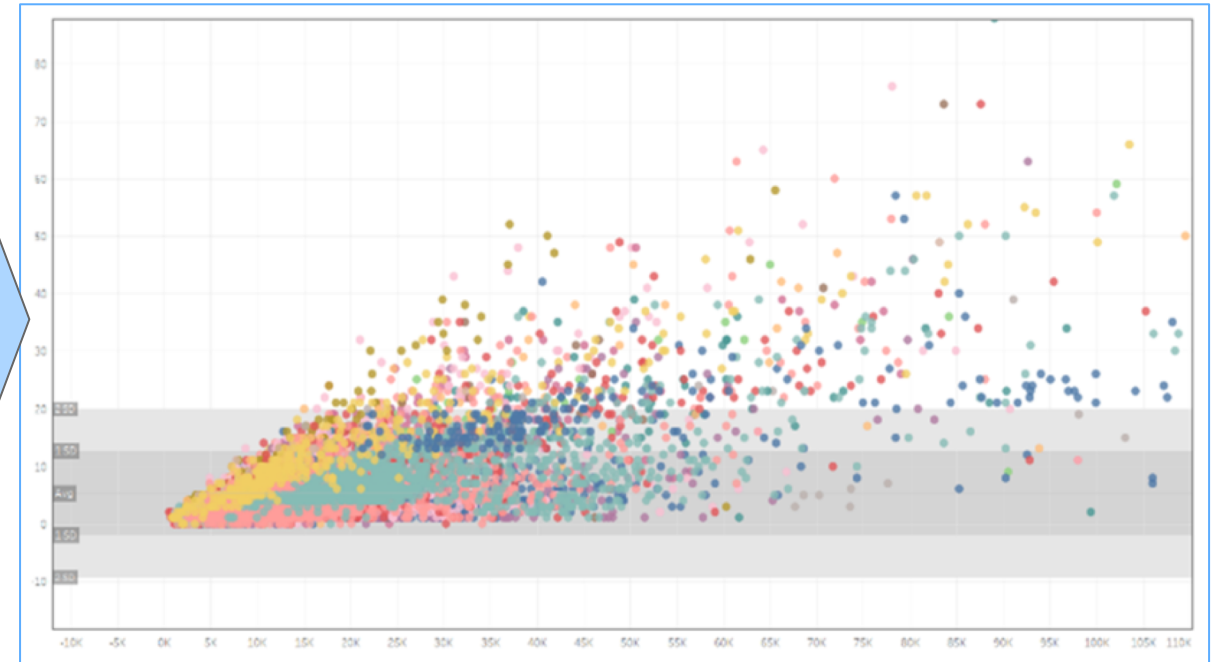
Attributes

- Passion for innovation
- Thrive in ambiguity
- Balance research and application
- Focus on quality
- Patience

Balancing Customer Demand and Organizational Value

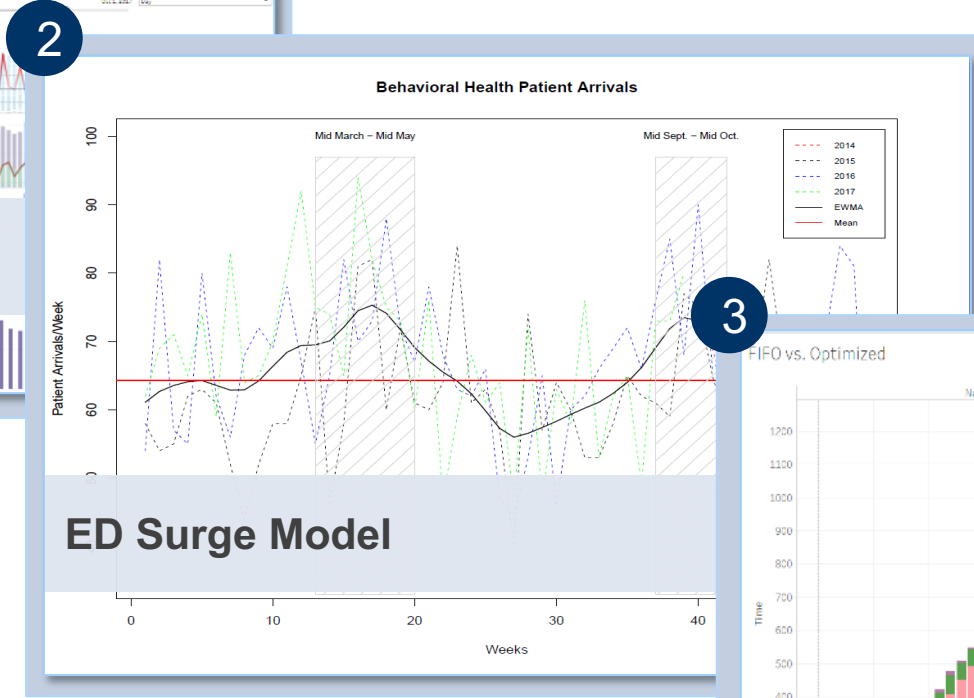
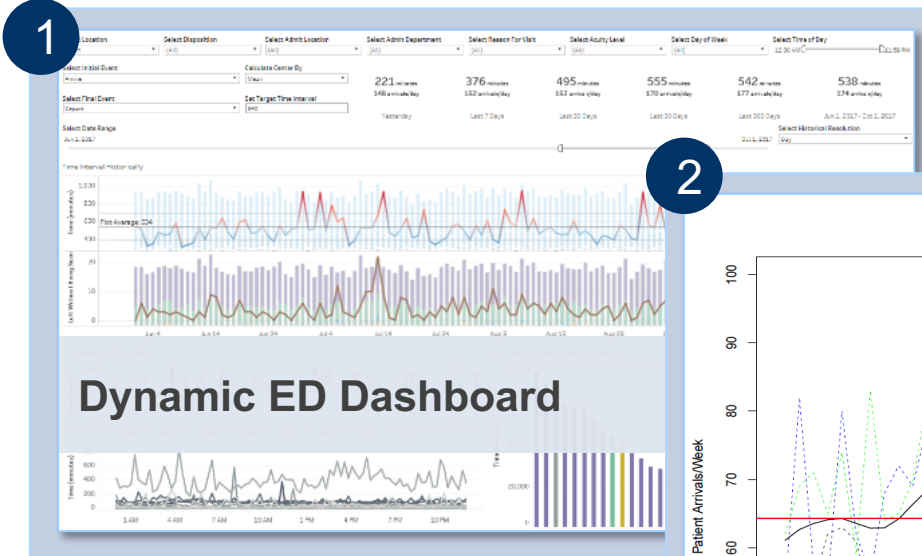


Utilization Explorer

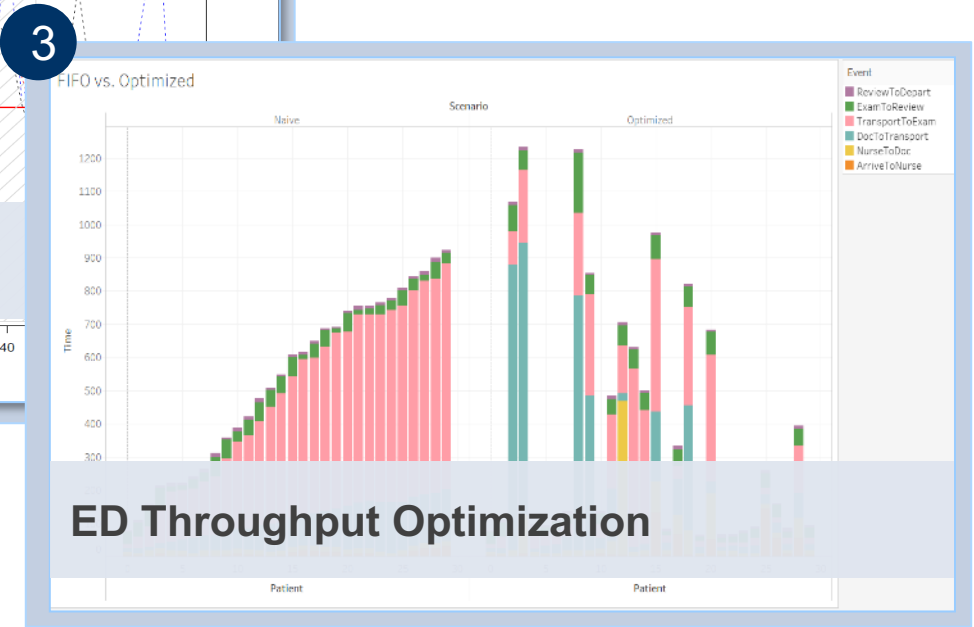


Care Variation Analytics

Growing Sophistication and Value



ED Surge Model

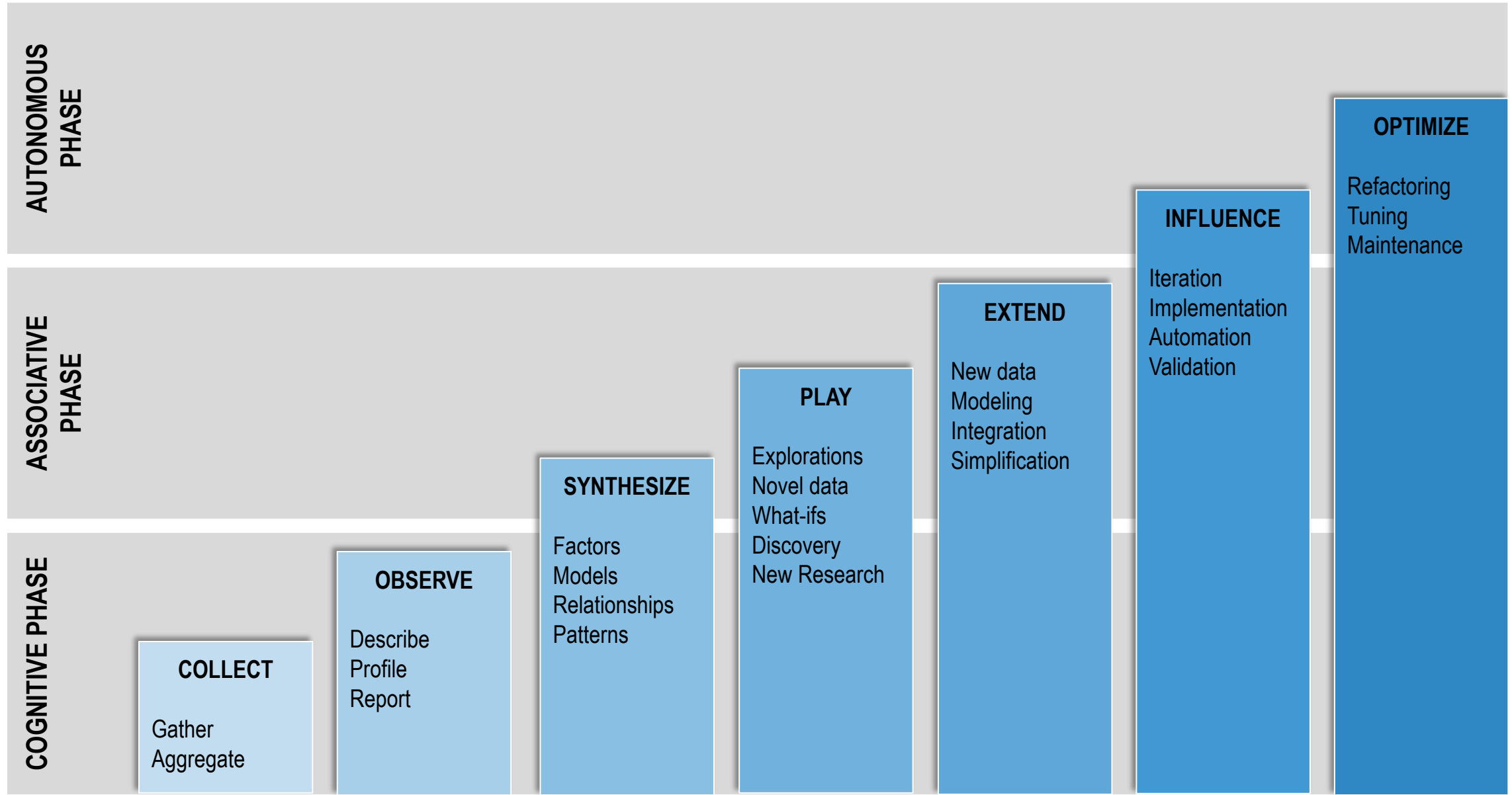


ED Throughput Optimization



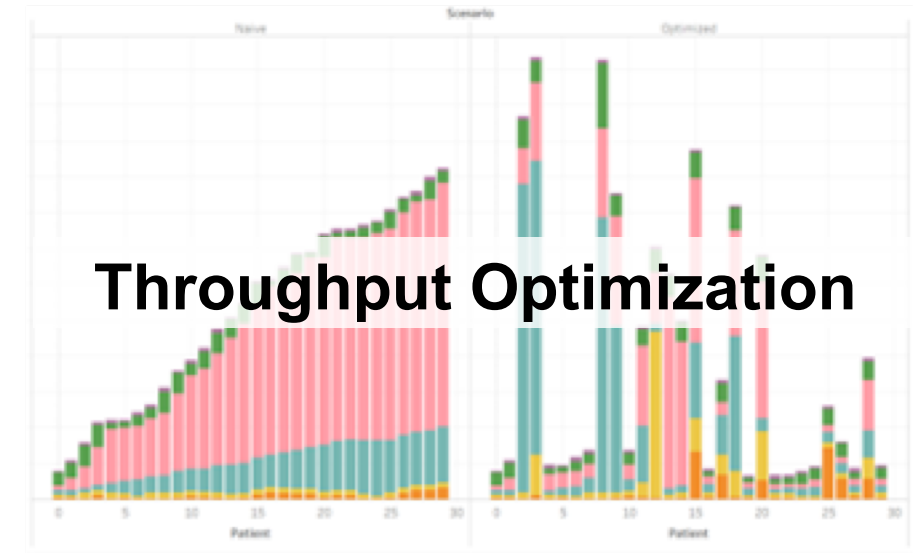
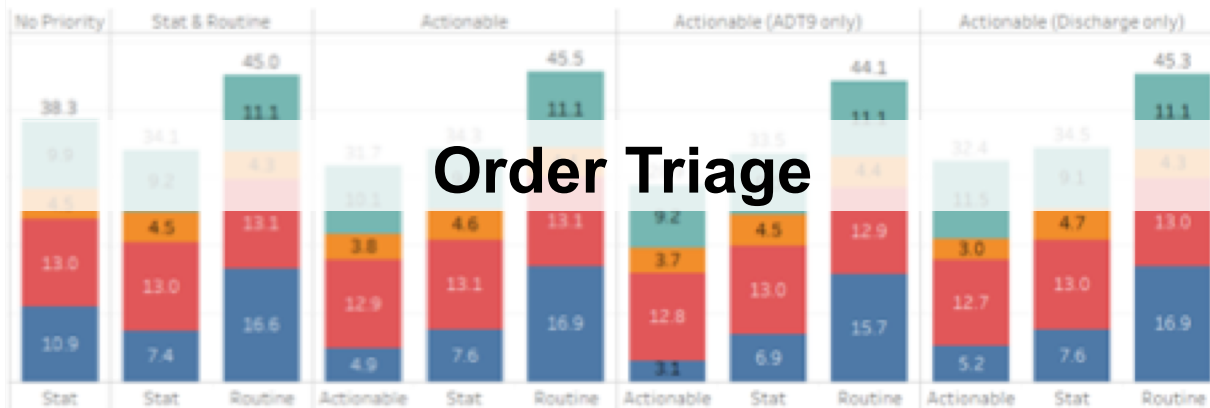
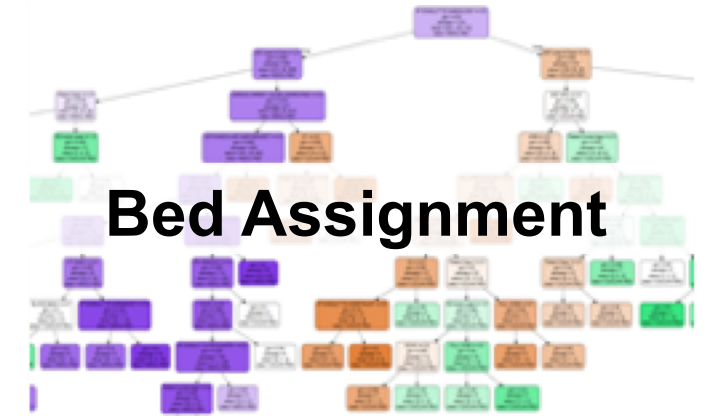
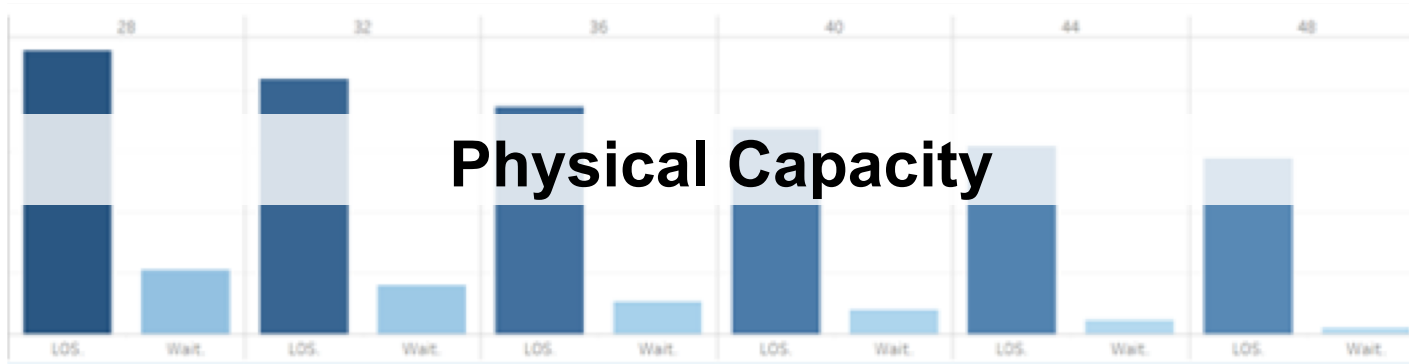
Learning Health System “Learning Model”

Derived from Fitts & Posner's 3 Stages of Cognitive Learning (1967)



Patient Throughput Optimization

Using discrete event simulation to drive operational efficiencies

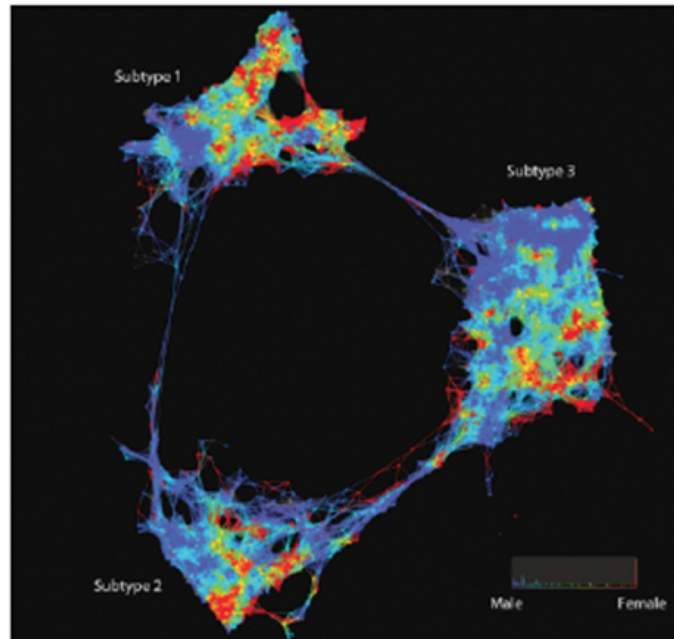


The Future is Here

NIH DIRECTOR'S BLOG

Big Data Study Reveals Possible Subtypes of Type 2 Diabetes

Posted on November 10, 2015 by [Dr. Francis Collins](#)



ScienceDaily®

Your source for the latest research news

Artificial intelligence achieves near-human performance in diagnosing breast cancer

Date: June 20, 2016

Source: Beth Israel Deaconess Medical Center

THE NEW YORKER

ANNALS OF MEDICINE APRIL 3, 2017 ISSUE

A.I. VERSUS M.D.

What happens when diagnosis is automated?

By Siddhartha Mukherjee

In some trials, “deep learning” systems have outperformed human experts.



Complexity Exceeds Cognition

Which of these patients is a higher risk for readmission?



Patient #1

Hospital: A

Diagnosis: Bronchitis

12-month hospital admissions: 1

chronic medical conditions: 1

comorbidities: 11

Albumin: Normal

score

76



Patient #2

Hospital: A

Diagnosis: Bronchitis

12-month hospital admissions: 1

chronic medical conditions: 5

comorbidities: 15

Albumin: Untested

score

73

Summary

Health care is becoming a data-driven industry

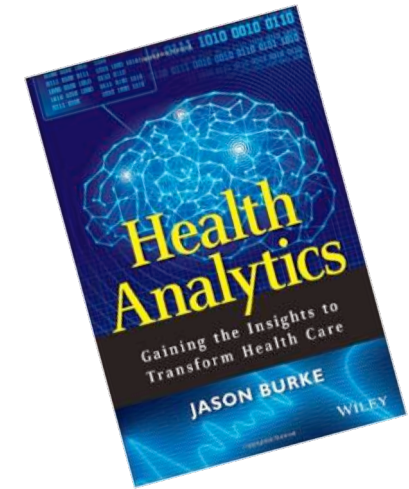
- IT and data are at the core of both processes and decisions

Historical approaches to data and insights (descriptive, retrospective views of limited data sources) are insufficient to support the complexity of high performance, 21st century medicine and decision making

- outcomes vs. costs
- standardized vs. personalized medical treatments

Modern health analytics are characterized by:

- collaborative, data-driven, predictive, patient-centered, and real-time capabilities
- combined perspectives of outcomes, costs, risks, quality, behavioral, and other dimensions
- Shifting the lens to economies of scale, single sources of the truth, and self-service insights



FOR MORE INFORMATION

Twitter
@jaburke

Reference Book
Health Analytics: Gaining the Insights to Transform Health Care
Jason Burke
Wiley Publishing, 2013

Discussion

