



It's all about... OUTCOMES !

Safety Care Variation eMeasures Quality Service Medication Errors
Clinical Decision Support Antimicrobial Stewardship
Length of Stay Readmissions
Cost of Care Process Improvement
Consumer Engagement EHR Adoption
Data Warehousing Efficiency Mortality Value Realization Optimization
Informatics Excess Days Blood Utilization Analytics Patient Satisfaction

Big Data – A Framework for Measuring the Value of Nursing

Ellen Harper DNP, RN-BC, MBA, FAAN
Assistant Professor University of Kansas



Conflict of Interest Disclosure

Ellen Harper DNP, RN-BC, MBA, FAAN

Assistant Professor University of Kansas School of Nursing
has no real or apparent conflicts of interest to report



Session Objectives

Attendee will be able to:

- Identify why the use of big data and data science is transformational to the future of nursing practice, quality and research
- Describe the national Nursing Value Data Model to measure patient-level nursing intensity and costs per patient in multiple care settings to support the continuum of care and to produce objective measures of nursing care value
- Identify new nursing business intelligence and analytic tools that will utilize the rich clinical, operational, financial, and quality/safety outcome data currently available to measure and compare nursing care value



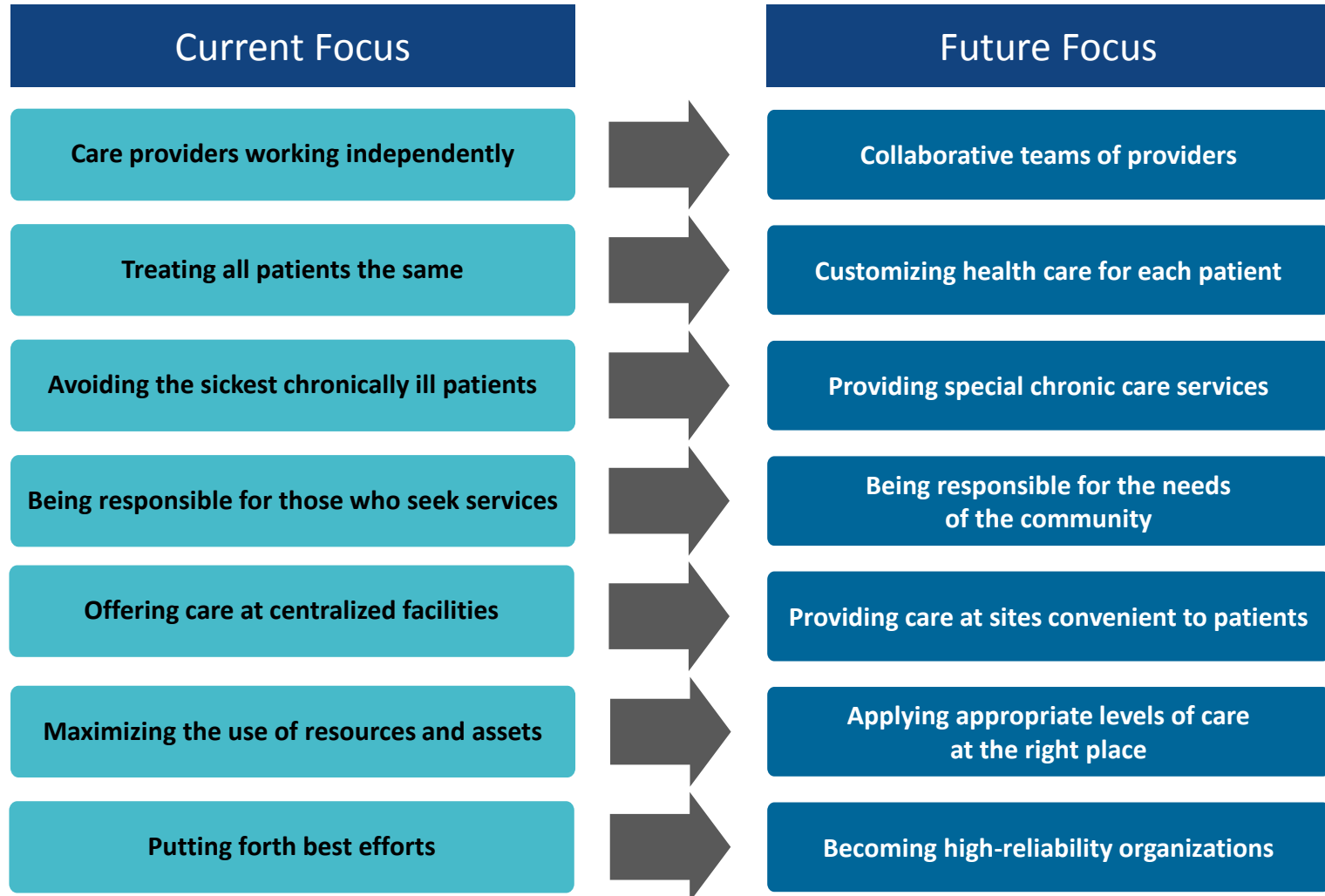
What's Driving Change

BIG DATA




Excess Days Mortality It's all about... Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety
Process Improvement Antimicrobial Stewardship Cost of Care Quality OUTCOMES ! Data Warehousing Efficiency Care Variation eMeasures Analytics
Consumer Engagement Clinical Decision Support Value Realization Service Medication Errors

Healthcare Business Model Changes






HIT Venture Investment Increase





• BIG DATA • BIG ANALYTICS • BIG INSIGHTS •

Home About Whitepapers Events Subscribe

HOME FEATURES ▾ SECTORS ▾ APPLICATIONS ▾ TECHNOLOGIES ▾ VENDORS ▾



Top News from
Leading Solution
Providers



April 20, 2016

Healthcare IT, Big Data Investments Surge in Q1

George Leopold



Venture capitalists poured more than \$1 billion into the healthcare IT sector during the first quarter of 2016 as investors look to target data analytics and telemedicine for growth.

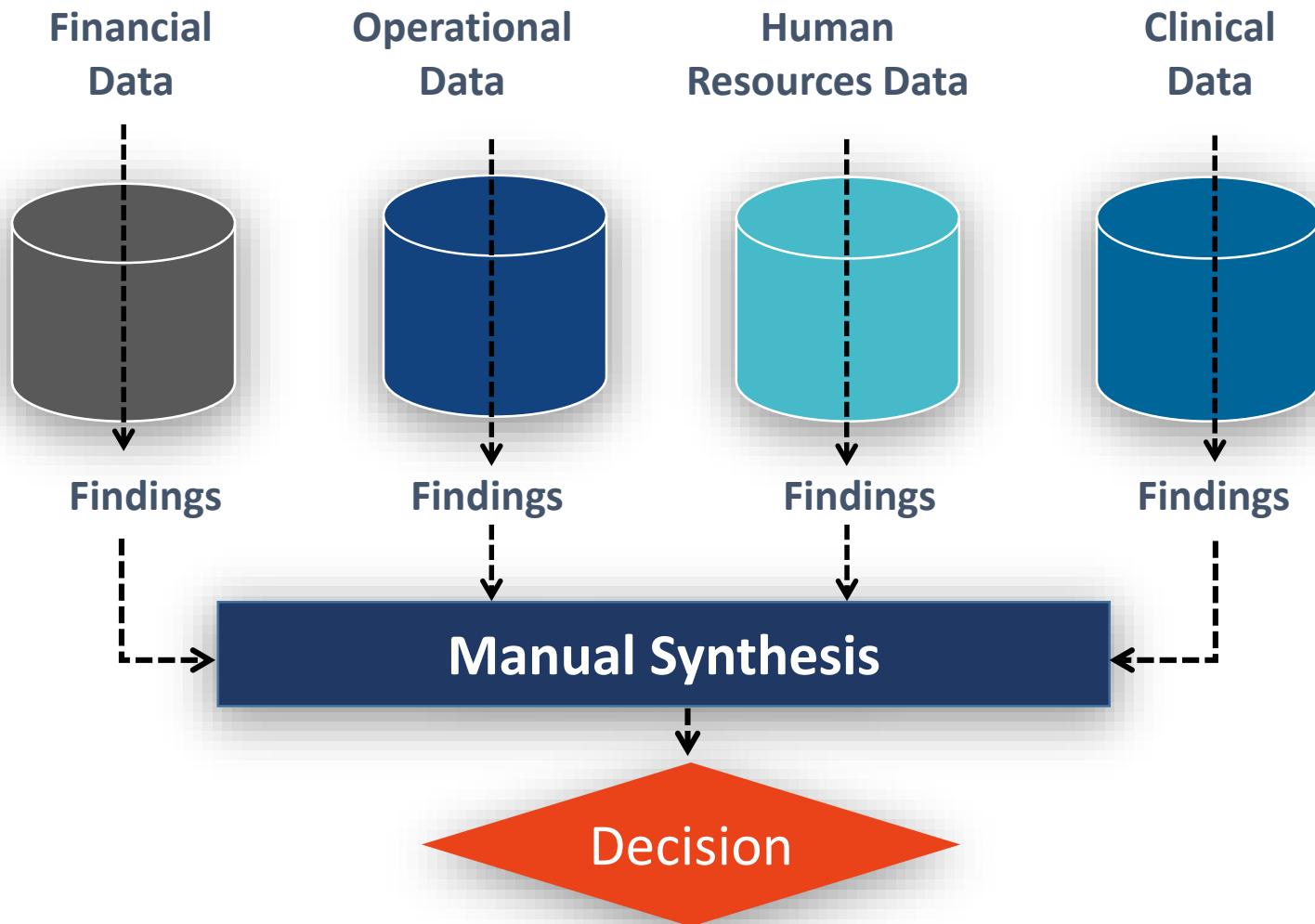
The first three months also saw several large big data acquisitions as key players like IBM's Watson Health unit continued their buying sprees.

Market researcher Mercom Capital Group reported that venture funding for healthcare IT and "digital health" soared 27 percent over the previous quarter during the first three months of this year. A total of 146 deals involving private equity and corporate venture capital generated quarterly investments totaling \$1.4 billion, Mercom said. Investments totaled \$1.1 billion in the previous quarter.



▶ Data-Driven Decision-Making

Traditional Approach



► Limitations of the Traditional Approach

- Interactions between data silos often under/over estimated
- Time-consuming
- Delayed
- Resource intensive

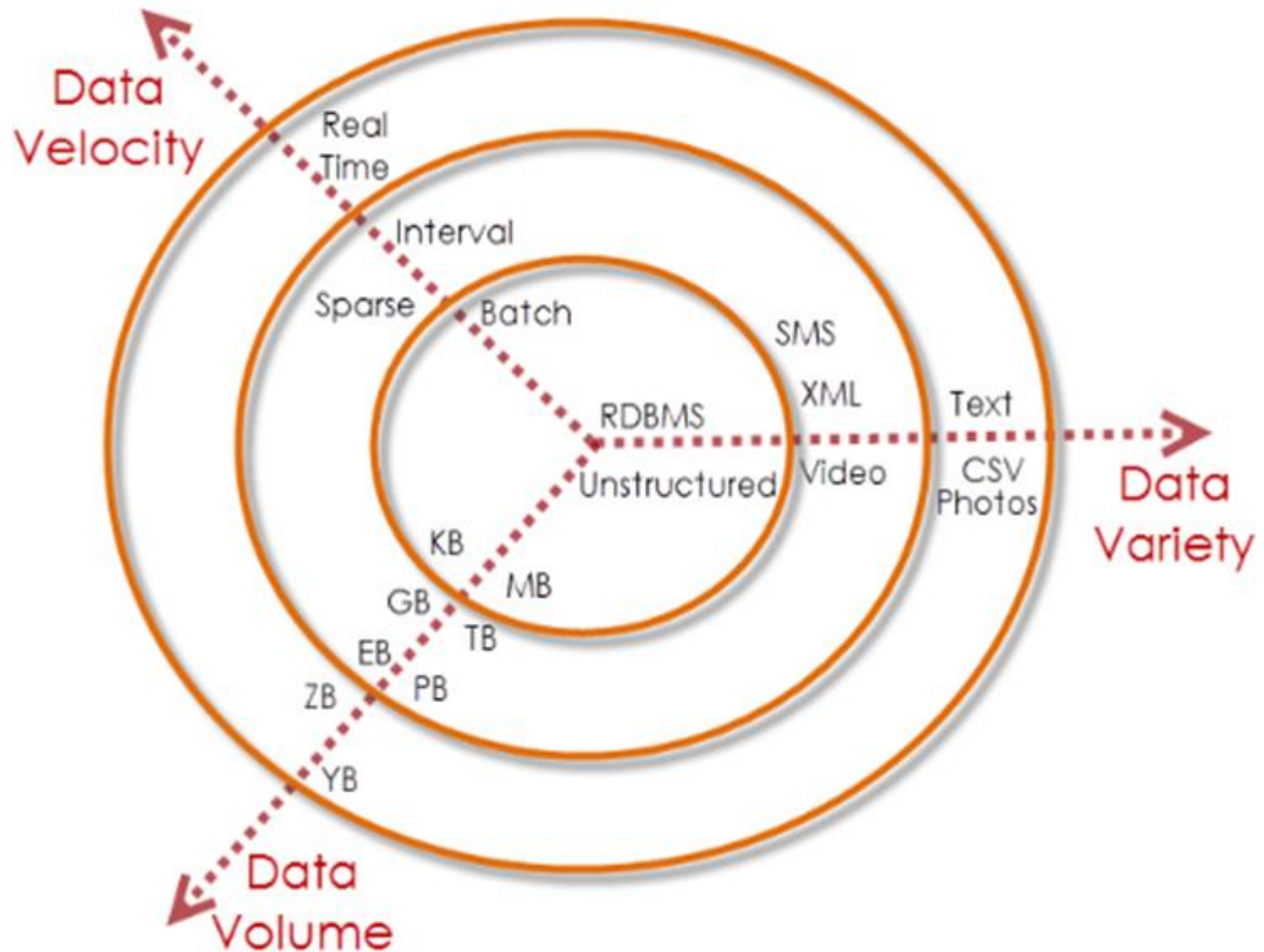
Variables important to nursing are often messy or missing





Brennan P, Bakken S. Nursing needs big data and big data needs nursing. *J Nurs Scholarsh* (2015), doi: 10.1111/jnu.12159

3 V's of Big Data



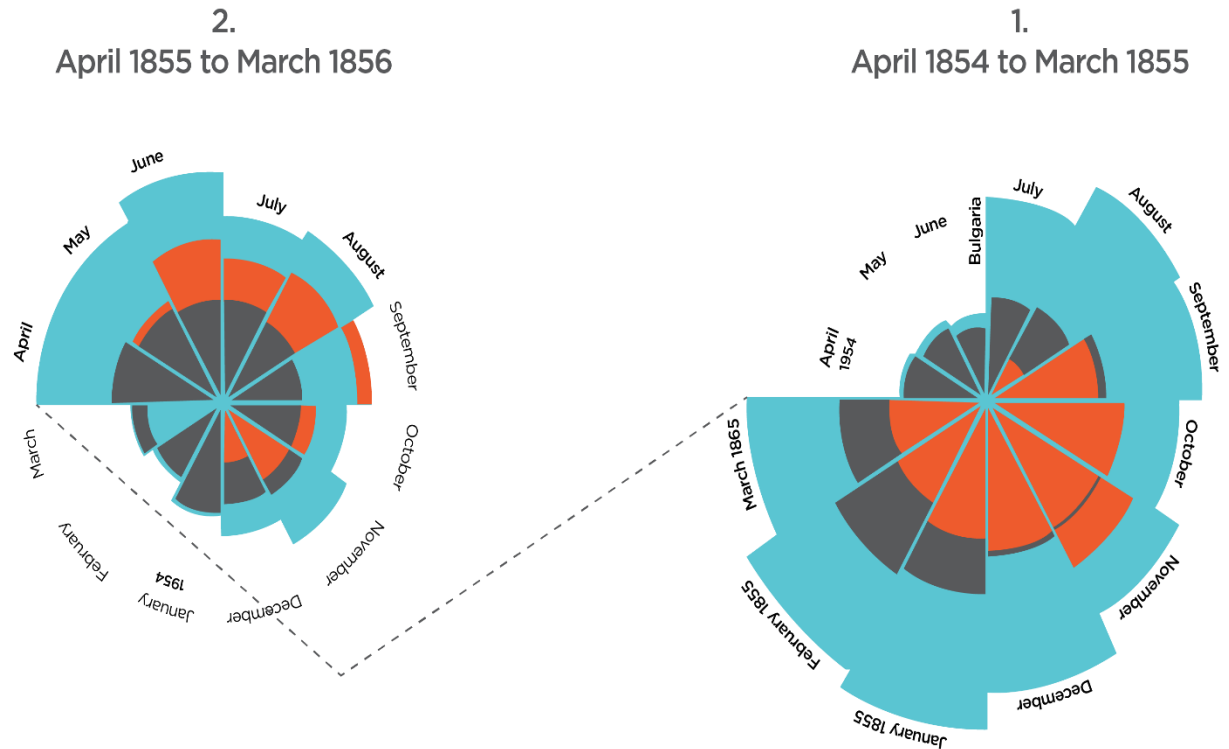




Big Data – The Nightingale Connection

Diagram of the Causes of Mortality
in the Army in the East

Value of
nursing care



Digitization of the electronic health record



Excess Days Mortality It's all about... Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety
Process Improvement Antimicrobial Stewardship Cost of Care Quality OUTCOMES! Data Warehousing Efficiency Care Variation eMeasures Analytics
Consumer Engagement Clinical Decision Support Value Realization Service Medication Errors

Continuity of Care Document

CONTINUITY OF CARE DOCUMENT		
Date/time printed: 08/30/2011 13:14:17 CDT		
From: Healthy City Hospital		
Patient Demographics		
Name: Jane C. Doe	ID Label Number:	Medical Record Number: 00-123456
DOB: 1/1/1959	Mailing Address:	123 Main Street
Gender: Female		Anytown, IA 52203
Insurance: HCHCARE 12d3q234444	Primary Phone:	555-555-5555
Allergies/Adverse Reactions (reaction, info source) - last reviewed 08/24/2011 12:10		
AMPICILLIN: Diarrhea, Nausea & Vomiting - patient history		
Active Medications - last reviewed 08/24/2011 12:15		
ZOCOR 40 MG: 1 tablet by mouth at bedtime, 08/24/2011		
SINGULAIR 10 MG: 1 tablet by mouth every evening, 08/24/2011		
AZITHROMYCIN 250 MG: 2 tablets by mouth today, then 1 tablet daily thereafter, 08/24/2011		
Active/Chronic Medical Conditions (date most recently addressed) - last reviewed 08/24/2011 12:20		
1. Coronary artery disease, non ST-elevation MI, 08/24/2011		
2. Hypothyroidism, 08/01/2011		
3. Hypertension, 08/01/2011		
Procedure/Operations (date)		
Removal of Artery Clot - 05/08/2011		
EKG - 05/08/2011		
Immunizations (date)		
Meningococcal, Conjugate - 01/04/2011		
Influenza - 12/14/2010, 10/24/2009, 11/17/2008, 12/01/2007, 10/23/2006..... (list truncated)		
Hepatitis B - 12/14/2010		
Pneumococcal - 12/14/2010		
Health Care Providers (Specialty /Location)		
Jordan Jackson, MD (INTERNAL MEDICINE) Cherokee, IA		
Jay Rummy, DO Cherokee, IA		
Imaging Studies - Since 09/01/2009		
Chest PA and Lateral, 6/29/2010; Heart size, mediastinal contour and pulmonary vascularity are normal. No focal acute parenchymal opacities are seen and there is no pleural effusion or pneumothorax. No acute findings.		

Where is the nurse-sensitive data?

- Pain control
- Pressure ulcer
- History of fall
- Ability to ambulate
- Mental status



Making Health Care Data Actionable

Your documentation is
just the beginning!



Clinical decision support



Practice



Research



Staffing



Policy



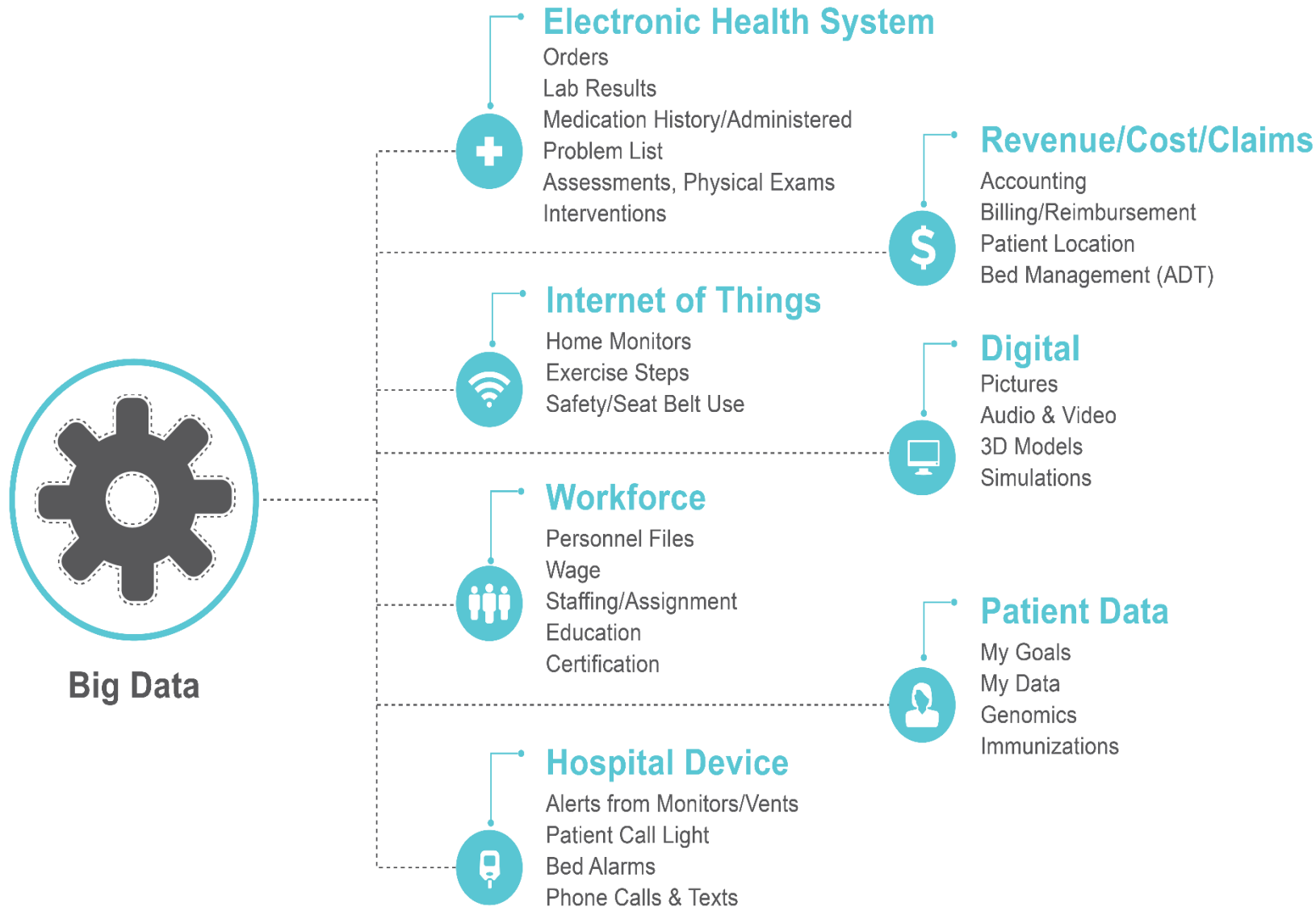
Excess Days Mortality It's all about... Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety
Process Improvement Antimicrobial Stewardship Cost of Care Quality OUTCOMES! Data Warehousing Efficiency Care Variation Analytics
Consumer Engagement Clinical Decision Support Value Realization Service Medication Errors eMeasures



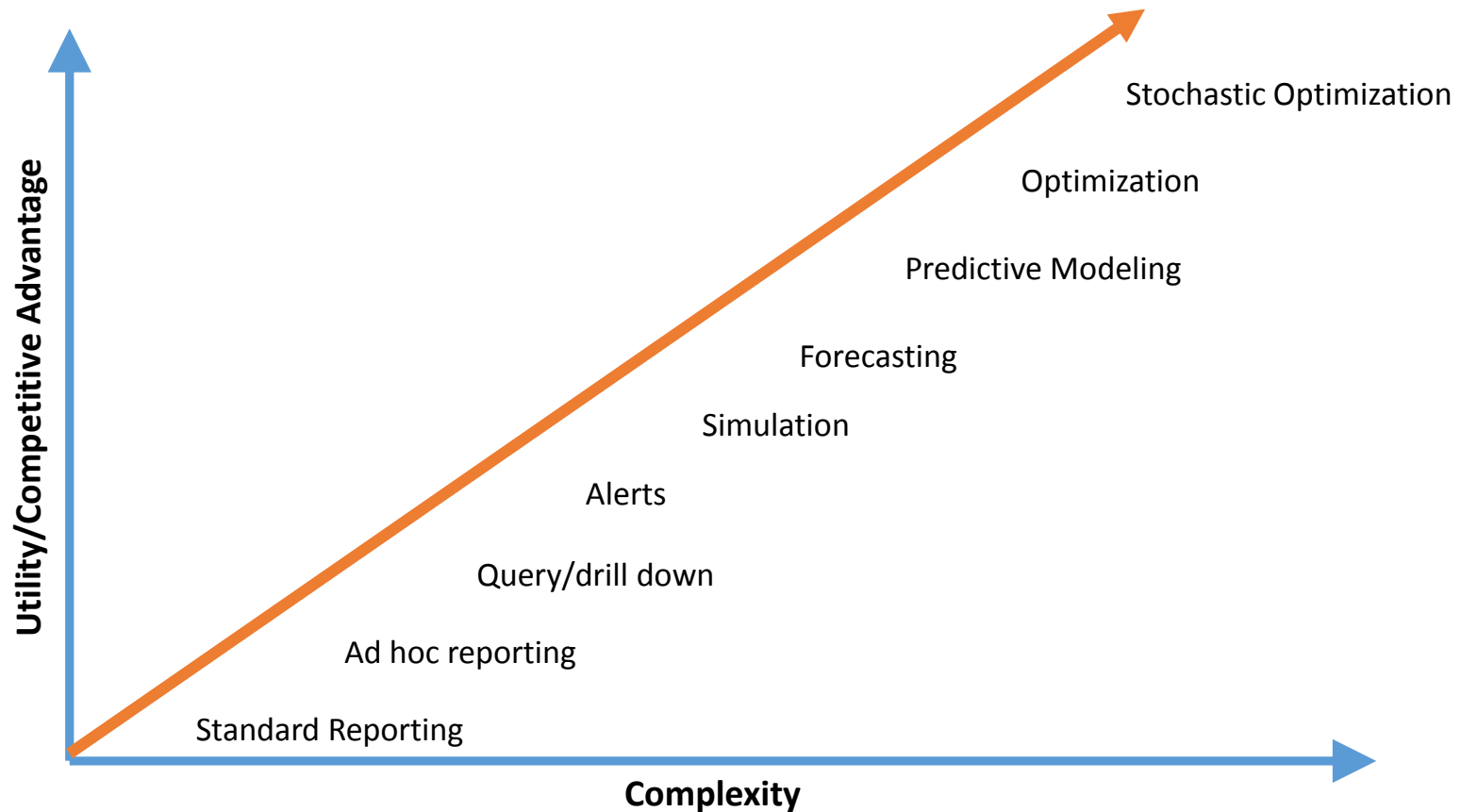
DATAFICATION

When words become data that is
machine readable

- Promote standardized terminologies (i.e. SNOMED CT, LOINC)
- Recommend research-based assessment scales and instruments
- Recommend that ANA-recognized nursing terminologies be consistently updated
- Promote consistent use of discrete data elements in support of research, analytics and knowledge generation



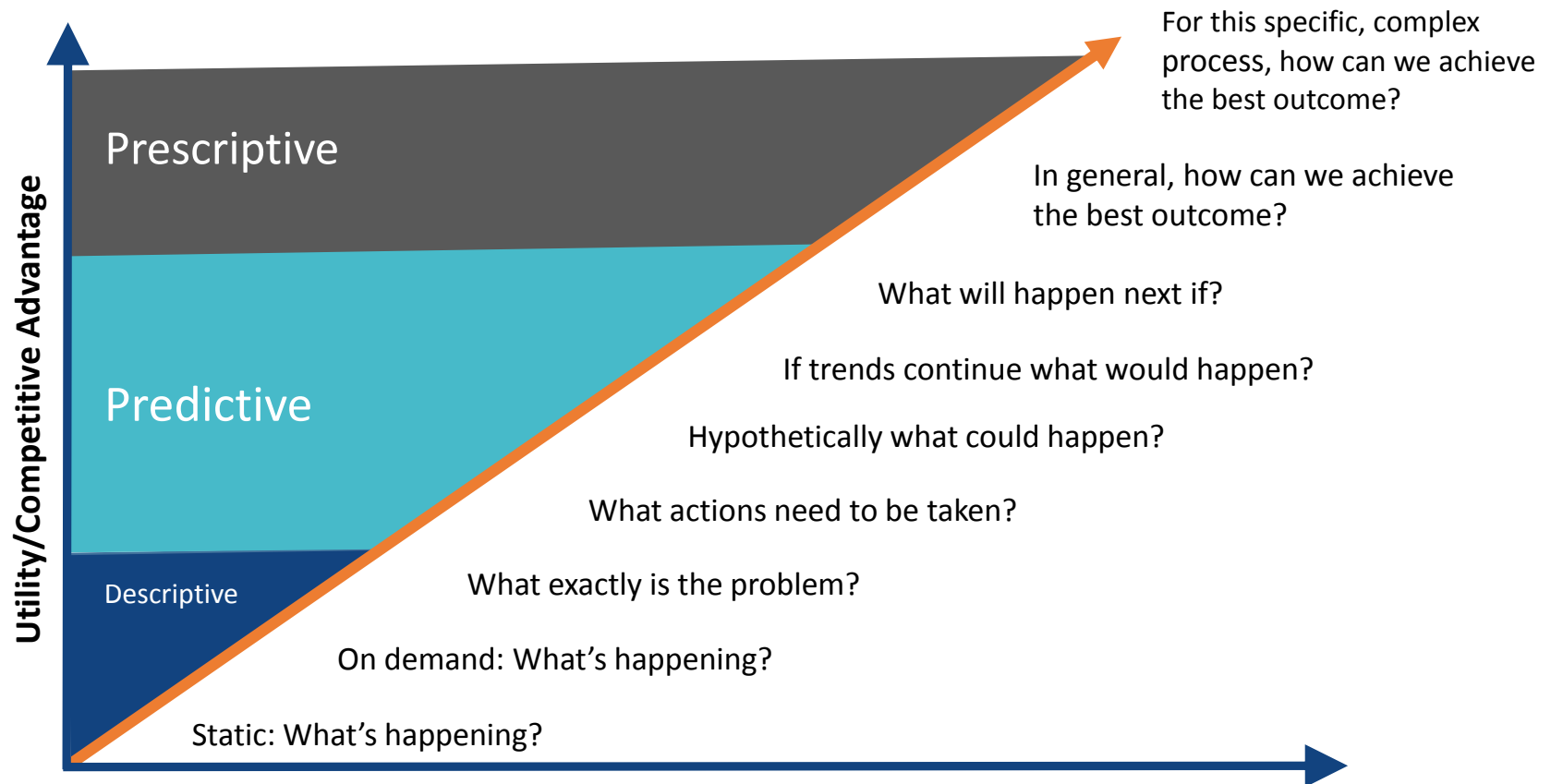
Clinical Intelligence and Analytics



Adapted from *Competing on Analytics*, Davenport and Harris, 2007



Clinical Intelligence and Analytics



Adapted from *Competing on Analytics*, Davenport and Harris, 2007



STAGE**Adoption Model for Analytics Maturity Cumulative Capabilities**

7	Personalized medicine & prescriptive analytics
6	Clinical risk intervention & predictive analytics
5	Enhancing quality of care, population health, and understanding the economics of care
4	Measuring and managing evidence based care, care variability, and waste reduction
3	Efficient, consistent internal and external report production and agility
2	Core data warehouse workout: centralized database with an analytics competency center
1	Foundation building: data aggregation and initial data governance
0	Fragmented point solutions

New Generation of Analytics Maturity

FROM Traditional Approach	TO Mature Analytics Adoption
Managing Projects	Developing products
Analytics as a demand driven support function	Analytics as a strategic business function
Data development driven by demand, developed for single use	Strategically build reusable data assets
Proliferation of dashboards and reports	Focus on capabilities, support with repeatable framework of tools
Hypothesis (Questions) are pre-defined	Questions are not pre-defined, start with the data
Timeline is project driven	Timeline is based on gaining capabilities

Used with permission HIMSS C&BI Work Group



Excess Days Mortality It's all about... Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety
 Process Improvement Antimicrobial Stewardship Cost of Care Quality OUTCOMES! Data Warehousing Efficiency Care Variation eMeasures Analytics
 Consumer Engagement Clinical Decision Support Value Realization Service Medication Errors

Nursing Knowledge: Big Data Science



Improved patient care
through sharable,
comparable data sensitive
to nursing practice

www.nursing.umn.edu



Excess Days Mortality It's all about... Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety
Process Improvement Antimicrobial Stewardship Cost of Care Quality OUTCOMES ! Data Warehousing Efficiency Care Variation Analytics
Consumer Engagement Clinical Decision Support Value Realization Service Medication Errors eMeasures

The Concept – Value of Nursing Care

- *Stop seeing nurses as a cost and start seeing them as a solution...*
- *Start measuring the affirmative actions of nurses, not just prevention of bad things happening*



Value Equation

- Business model

Value =

Quality



Price



Health care model

Value =

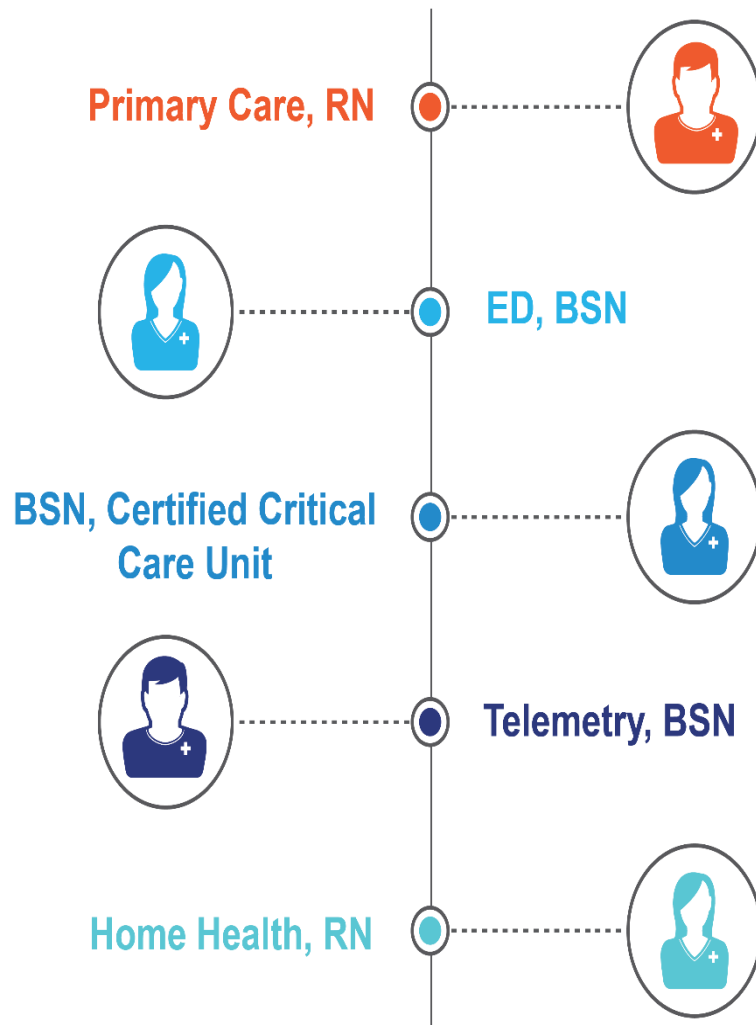
Outcomes



Price



New Models for Measurement

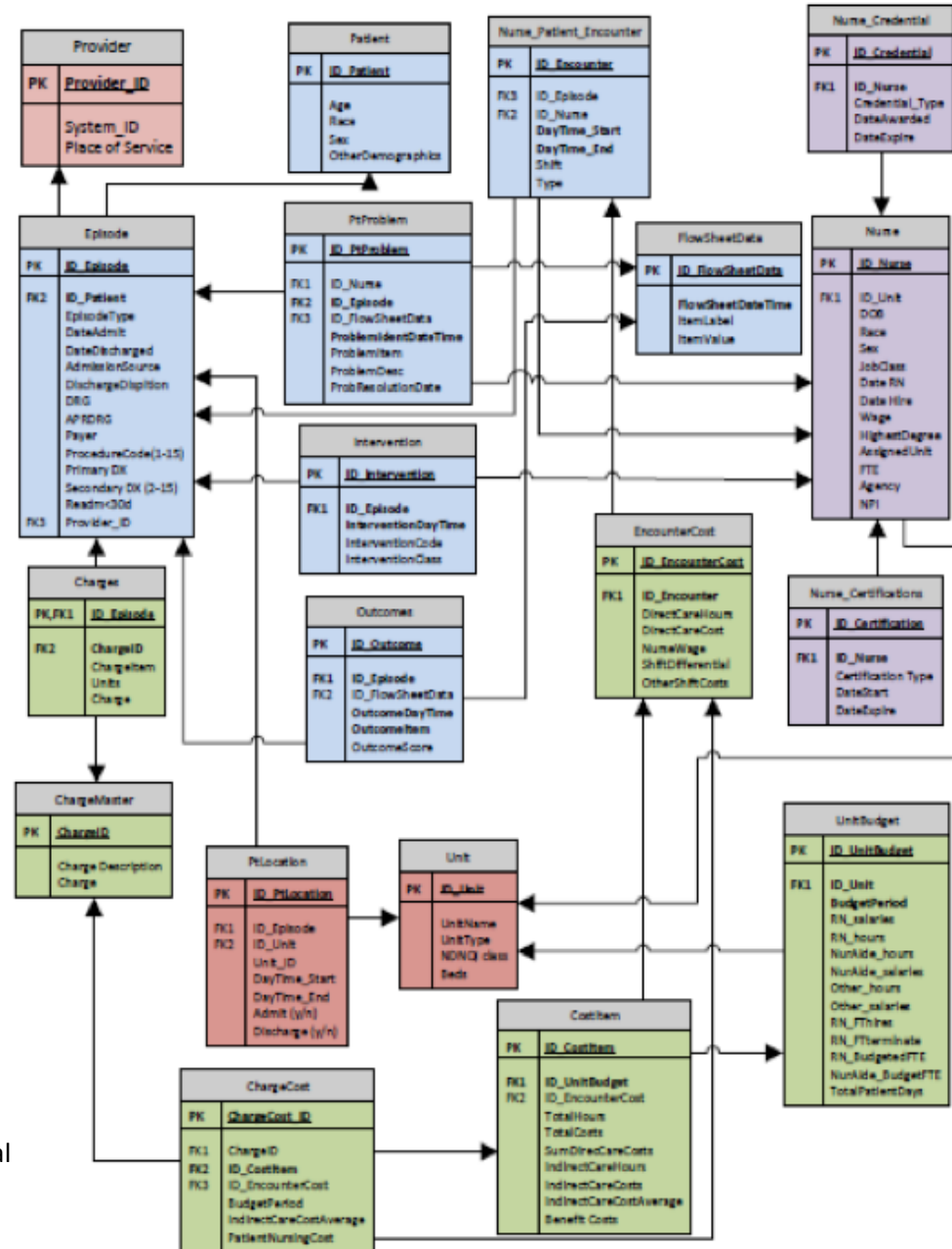


- One to one - individual patient to individual nurse
- Understand variability by nurse attributes i.e. licensure, experience, certification, etc.
- Actual nurse staffing cost by staff mix, day of stay, DRG, LOS, nursing unit, etc.
- Actual patient outcomes by individual nurse, nurse care team and full care coordination (future)



Green = costs; Blue = patient; Purple = nurse/provider; Red = facility/business entity

- Incorporates unique RN identifier
- Electronic health record & system agnostic
- Setting neutral

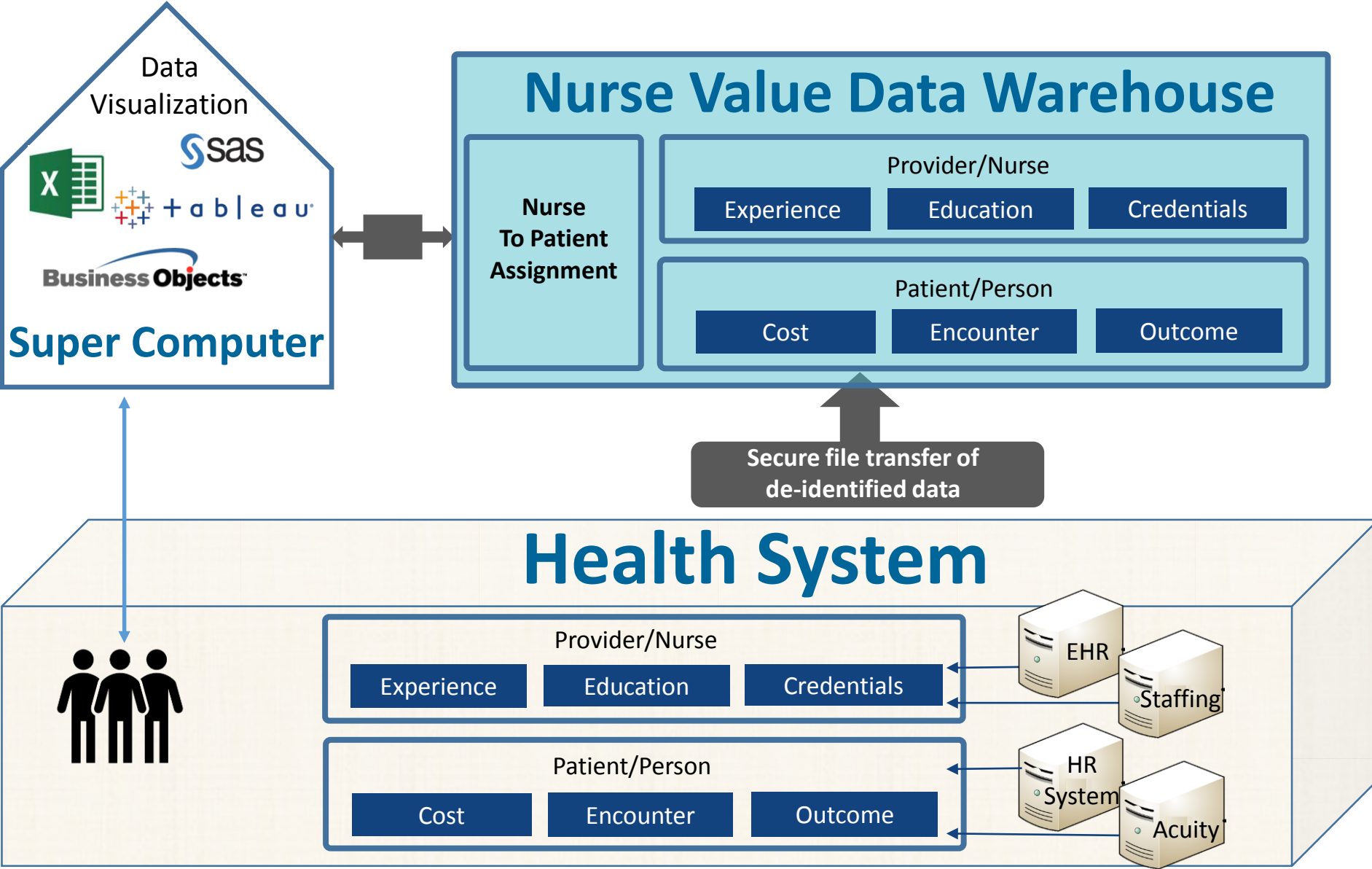


Welton, J. M., & Harper, E. M. (2016). Measuring Nursing Care Value. *Nursing Economic\$, 34*(1), 7-14

Pilot Research Study

- The purpose of the study is to examine and explore the relationship between individual nurses and each patient in an acute pediatric hospital setting.
- The study leverages existing electronic data (EHR & other systems) to identify effects of nursing care and effects of individual nurses on selected outcomes of care.
- In particular the overall short term outcomes of care and nursing financial outcomes of patient care.





It's all about... **OUTCOMES!**

Excess Days Mortality Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety

Process Improvement Antimicrobial Stewardship Cost of Care Quality Value Realization Data Warehousing Service Medication Errors Care Variation eMeasures Analytics

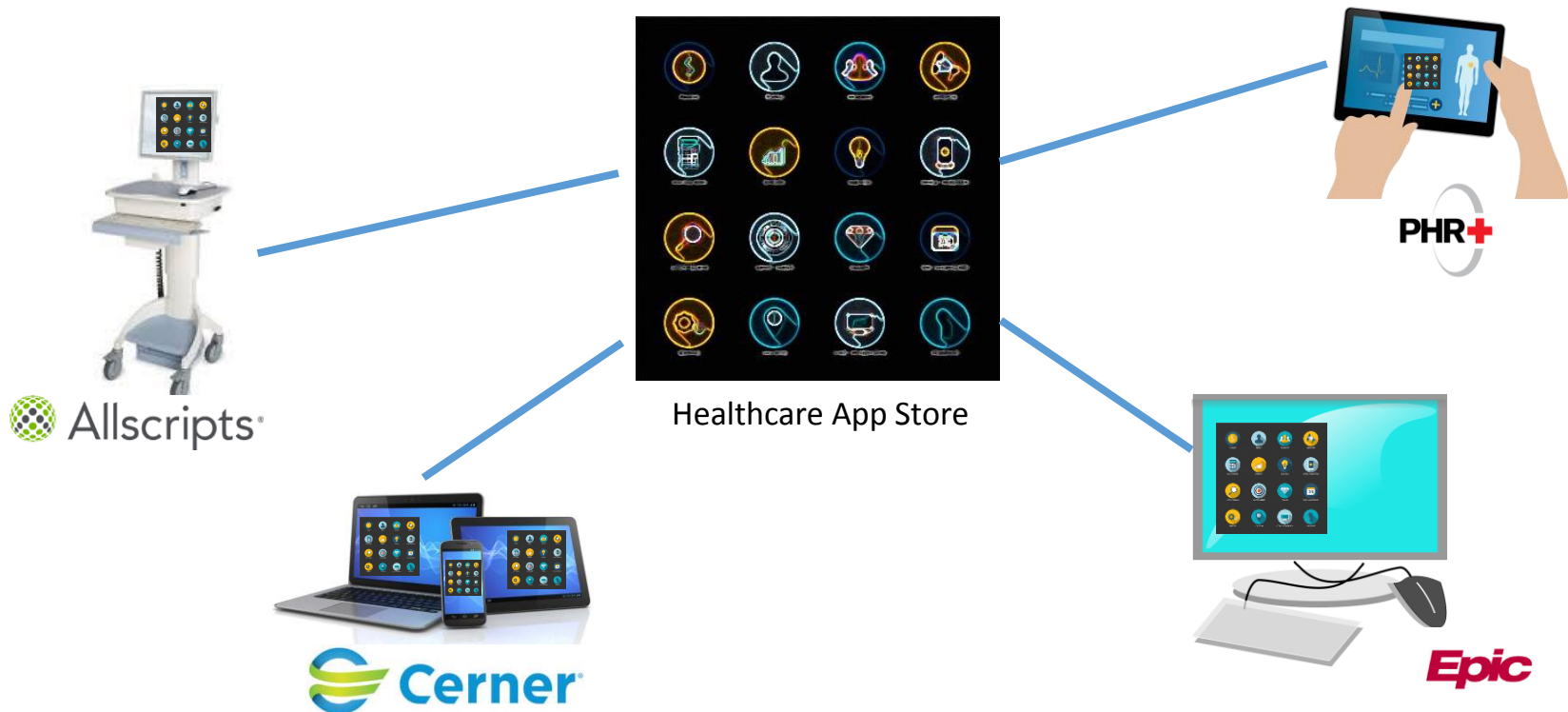
Consumer Engagement Clinical Decision Support

► Future Directions

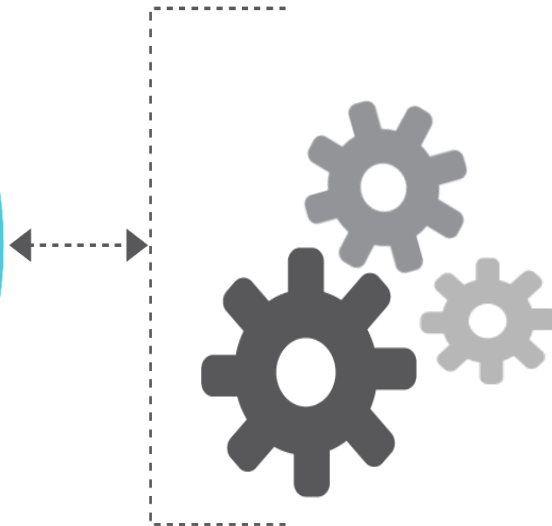
- Continue to add research sites (3 to date)
- Link all providers to person, family, community (primary, LTC, School)
- Follow patient/person across encounters/setting of care
- Direct tie to value-based health care
- Nursing costs & characteristics analyzed to person/population level outcomes

 Imagine....

Semantically Interoperable Healthcare focused Apps



Excess Days **Mortality** **It's all about...** Blood Utilization EHR Adoption Length of Stay Informatics Readmissions Safety
Process Improvement Antimicrobial Stewardship Cost of Care Quality **OUTCOMES !** Data Warehousing Efficiency Care Variation eMeasures Analytics
Consumer Engagement Clinical Decision Support Value Realization Service Medication Errors



 Supporting IT Health Systems

 Smart® Mobile Apps

 Smart® Web Apps



Children's Hospital Boston

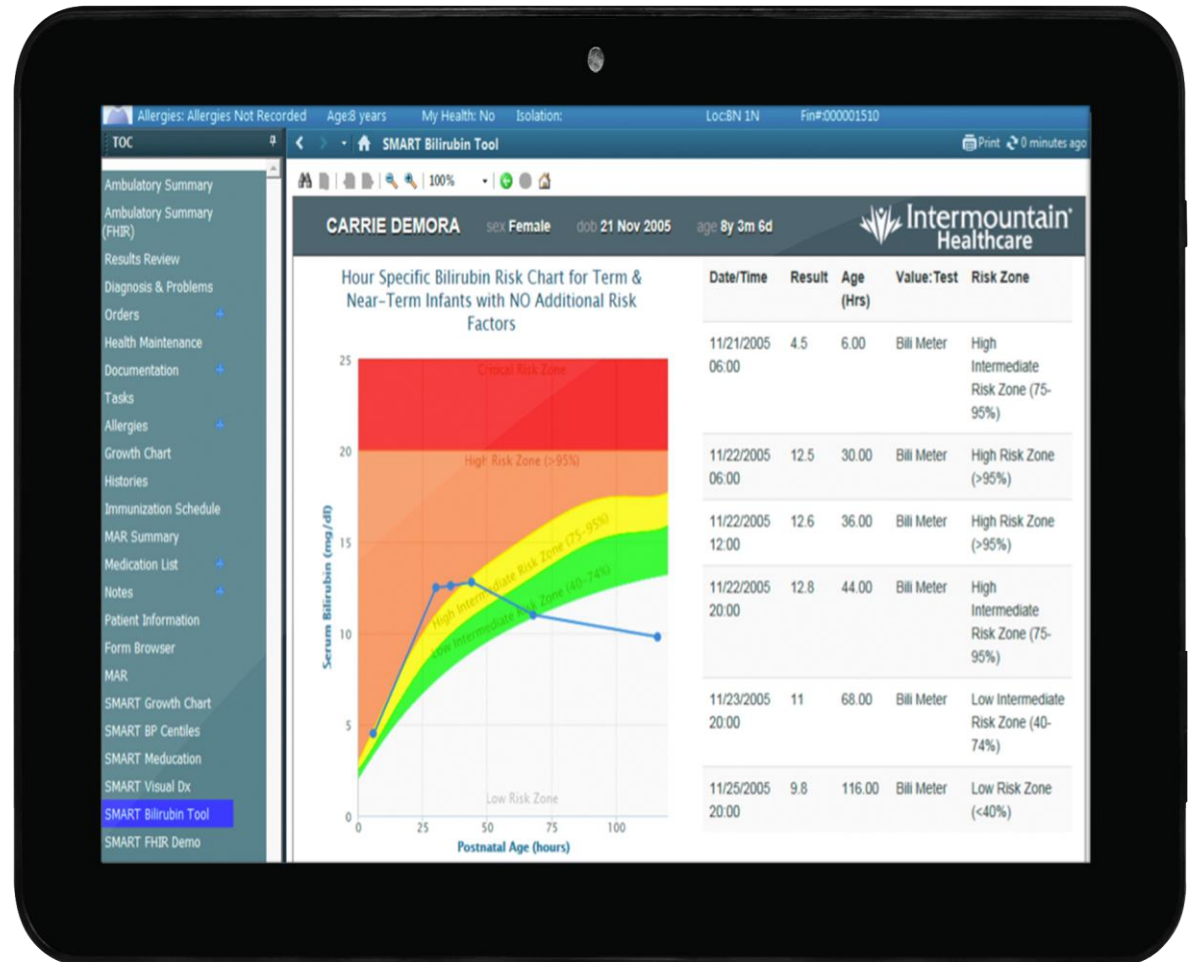


Intermountain®
Healthcare



HARVARD
MEDICAL SCHOOL

Neonatal bilirubin alerts



Today's Billboard





- Dr Ellen Harper
 - Assistant Professor
 - University of Kansas
 - eharper3@kumc.edu