2016 American Nurses Association Annual Conference

Connecting **Quality**, **Safety** and **Staffing** to Improve Outcomes

Big data and nursing care: “What would Florence say?"

Presented By
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ANA AMERICAN NURSES ASSOCIATION

Session description

Explore how key questions can be answered regarding the value and contribution of nurses to patient care by using big data and data science to measure:

- Quality
- Cost
- Outcomes of nursing care

Disclosure

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Presenters have no relationship with a commercial interest, product or service related to the content of this educational activity and therefore have nothing to disclose

Objectives

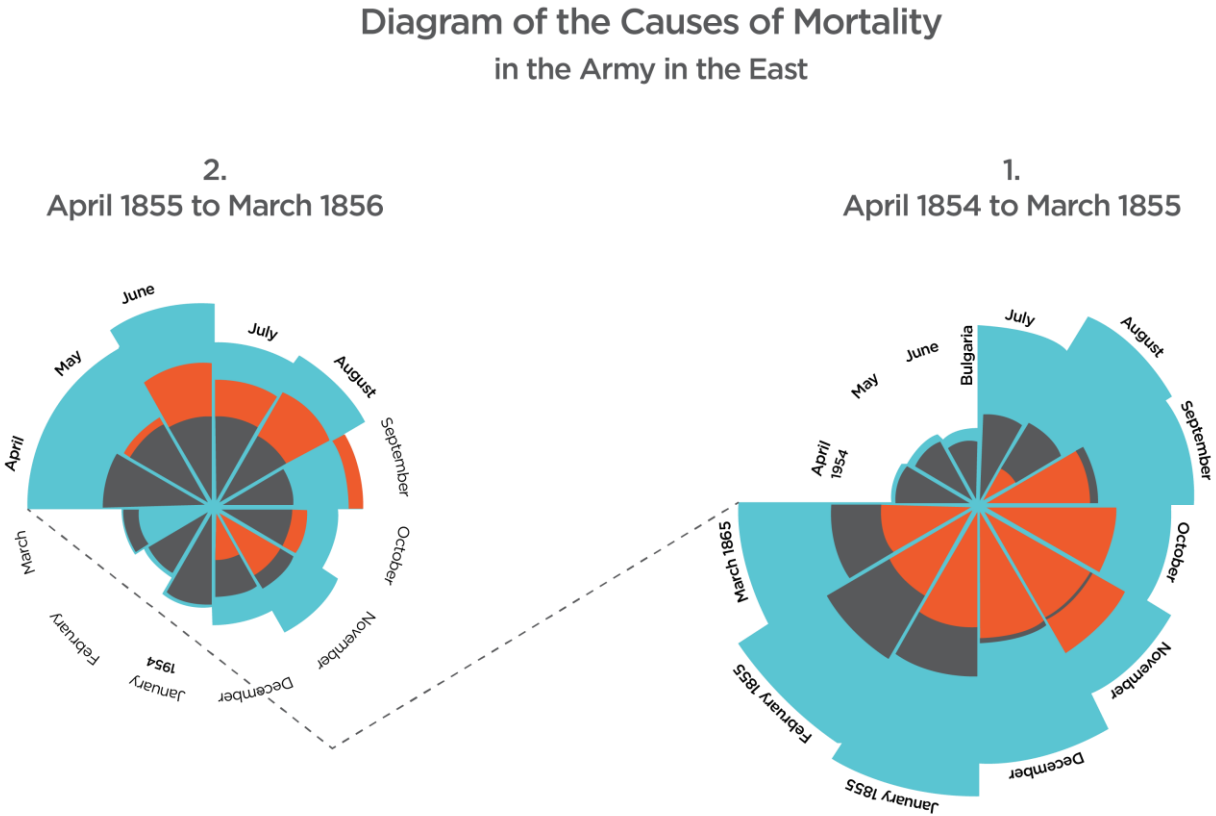
Attendees will be able to:

- Identify why big data is transformational to the future of nursing practice, quality and research
- Describe practical strategies to make health care data actionable
- Understand the nursing care value model's value to measure quality, cost and outcomes

Big data

The Nightingale connection

Value of nursing care



Images from the History of Medicine, U.S. National Library of Medicine, Ihm.nlm.nih.gov

Making health care data actionable

Your documentation is just the beginning!

- Clinical decision support
- Practice
- Research
- Staffing
- Policy

Digitization of the electronic health record

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)
Jordon 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

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

Big Data

Electronic Health System
Orders
Lab Results
Medication History/Administered
Problem List
Assessments, Physical Exams
Interventions

Internet of Things
Home Monitors
Exercise Steps
Safety/Seat Belt Use

Workforce
Personnel Files
Wage
Staffing/Assignment
Education
Certification

Hospital Device
Alerts from Monitors/Vents
Patient Call Light
Bed Alarms
Phone Calls & Texts

Revenue/Cost/Claims
Accounting
Billing/Reimbursement
Patient Location
Bed Management (ADT)

Digital
Pictures
Audio & Video
3D Models
Simulations

Patient Data
My Goals
My Data
Genomics
Immunizations

Interoperability

Interoperability occurs when information flows freely across organizational, supplier and geographic barriers

HL7® FHIR

- Supporting IT Health Systems
- Smart® Mobile Apps
- Smart® Web Apps

SMART®

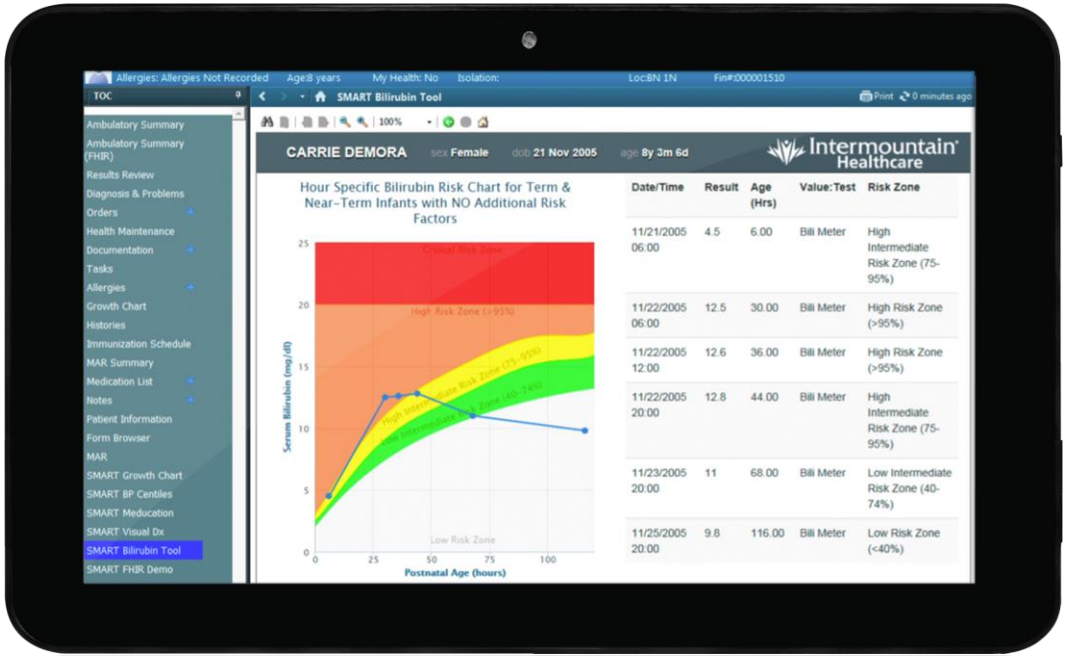
Children's Hospital Boston

Intermountain® Healthcare

HARVARD MEDICAL SCHOOL

Neonatal bilirubin alerts

Intermountain® Healthcare



The concept of value

Value of nursing care

Value equation

Business model

$$\text{Value} = \frac{\text{Quality}}{\text{Price}}$$

Health care model

$$\text{Value} = \frac{\text{Outcomes}}{\text{Price}}$$

Approaches to data-driven value

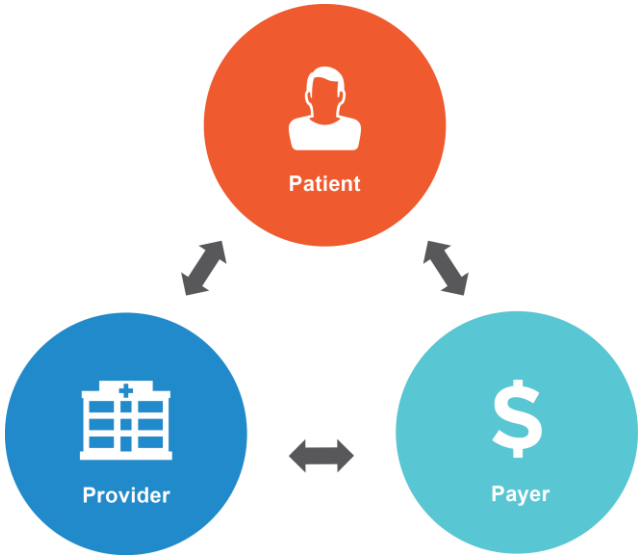
Clinical component (patient)

- Better population health
- Improve patient experience
- Higher quality of care

Operational component (system)

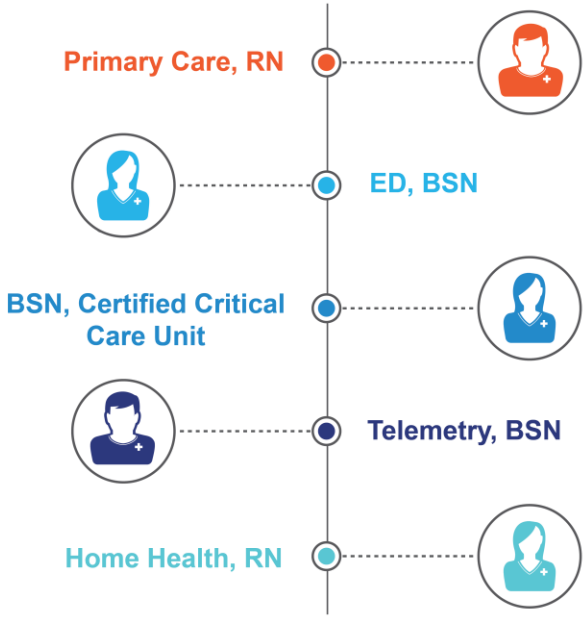
- Lower costs
- Seamless integration of care
- Data driven systems: effective high performance, productive and efficiency

The cost conundrum



- Cost of providing care
- Billing verses payment
- Real costs vs. intangible costs
- Direct costs vs. indirect costs
- Costs vs. quality/outcomes (value equation)

New nurse costing models



- Patient-level nursing time/costs
  - By day of stay, by diagnosis
- Cost variability by experience
- Actual nurse cost by DRG/APR-DRG
- New nursing budget models:
  - Future costs by volume, acuity
  - Cost volatility, cost of traveler/float
  - Seasonality by patient acuity
  - Staffing vs. true nursing costs
  - Assignment vs. patient outcomes

Value-based measures

Measures

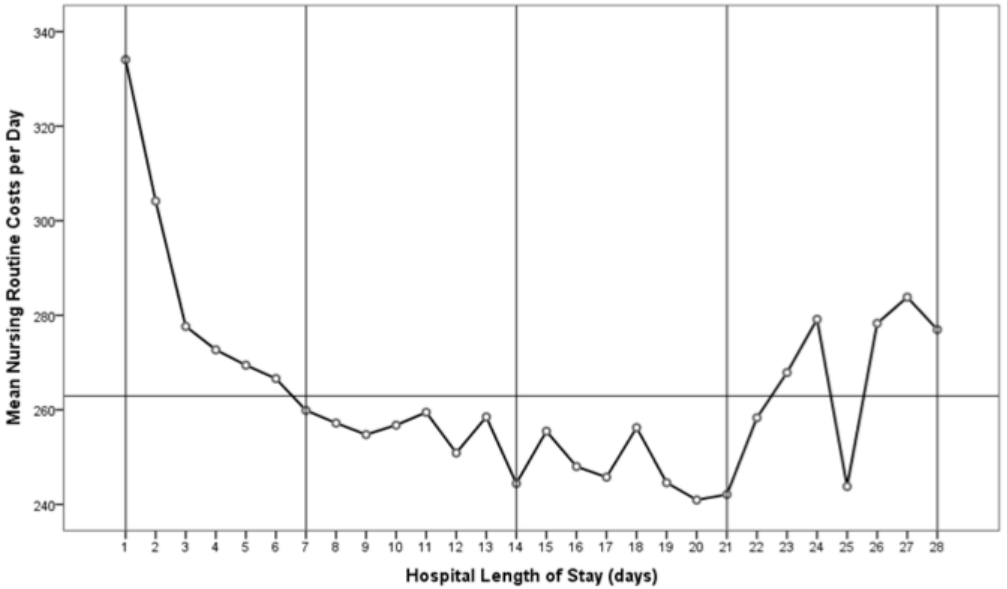
- Staffing levels/assignments
- Patient-level outcomes
- Trending and outliers
- Nurse characteristics
- Patient acuity and nursing case mix
- Workload and performance
- Nursing patient-level costs

Nursing business intelligence

Value-based analytics

- Intensity and costliness of nursing care
- Trending and forecasting ability
- Variation by patient, unit, DRG
- Comparison and benchmarking across settings
- Value based purchasing, ACO, bundled payment

Exemplar of patient-level nursing cost

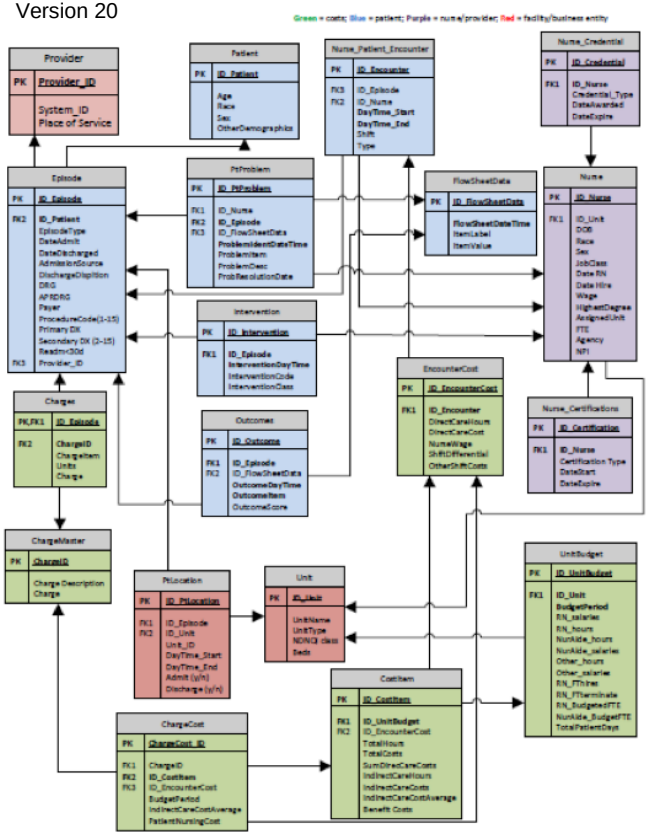


Welton, J.M., Caspers, Sanford, K. (2013). Inpatient nursing hours and cost outcomes within a health care system. Paper presented at the American Organization of Nurse Executive 46th Annual Conference, Denver, CO

Nursing value data model

- Organized by:
  - Facility costing, budget, wage
  - Patient, assessment, problem, outcome
  - Nurse/provider, certification, job class, hire date
  - Facility/business, unit
- Incorporates unique RN identifier
- Electronic health record agnostic
- Setting neutral

Nursing Value Data Model
Version 20



Future directions

- Real-time information systems
- Compare across settings of care
- Follow patient/person across encounters
- Link all providers to patient, family, community
- Performance-based analysis
- Value-driven health care
- Nursing costs and characteristics easily analyzed to person/population level outcomes

Rethinking nursing research

Machine programing learning

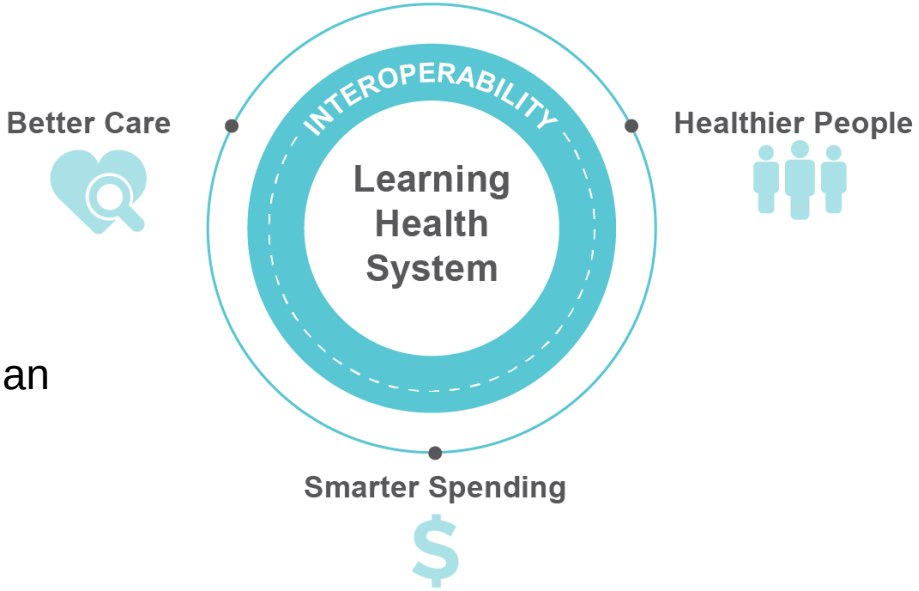
- Data transformation standards
- Time-referenced data

Real-time intelligence

- Right information, right person, right time
- Programmed algorithms to personalize plan

Distributed data management

- Primary inquiry and secondary analysis
- Longitudinal, person-centric



Thank you for your time today!

Questions?

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