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

Presented By
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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

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

2. April 1855 to March 1856

1. April 1854 to March 1855

Images from the History of Medicine, U.S. National Library of Medicine, ihm.nlm.nih.gov
Your documentation is just the beginning!

- Clinical decision support
- Practice
- Research
- Staffing
- Policy
Digitization of the electronic health record
Continuity of care document

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

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

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

- **Digital**
  - Pictures
  - Audio & Video
  - 3D Models
  - Simulations

- **Workforce**
  - Personnel Files
  - Wage
  - Staffing/Assignment
  - Education
  - Certification

- **Patient Data**
  - My Goals
  - My Data
  - Genomics
  - Immunizations

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

Interoperability occurs when information flows freely across organizational, supplier and geographic barriers.
Connecting **Quality**, **Safety** and **Staffing** to Improve Outcomes

HL7® FHIR

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

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**

Value = \( \frac{\text{Quality}}{\text{Price}} \)

**Health care model**

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

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
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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