The CNE and the Big Data Revolution

Session ID
Presenters

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Disclosures

None
Objectives

• Describe the potential impact of Big Data Science on nursing operations, nursing practice and research, and health outcomes

• Describe a leadership role for CNEs in guiding the application of Big Data Science in Nursing to support care delivery and population management across the care continuum

• Discuss key strategies and actions outlined on a CNE “big data” checklist and road map for implementing Big Data Science in Nursing
How We Got Together

University of Minnesota
Big Data Science Conference

2014 Project 2:
Co-Leaders:
Connie W. Delaney, PhD, RN, FAAN, FACMI
Bonnie L. Westra, PhD, RN, FAAN, FACMI

Chief Nurse Executives Work in a World of Data

Daily, Weekly, Monthly, Quarterly Reports

- Financial data
- Operational data
- Human resources data
- Clinical data
Data-Driven Decision-Making

Traditional Approach

- Financial Data
- Operational Data
- Human Resources Data
- Clinical Data

Findings

Manual Synthesis

Decision
Limitations of the Traditional Approach

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

• Variables important to nursing often missing from the data
There has to be a better way!
After all . . .

A new style of IT emerging

Every 60 seconds

- 98,000+ tweets
- 695,000 status updates
- 11 million instant messages
- 698,445 Google searches
- 168 million+ emails sent
- 1,820TB of data created
- 217 new mobile web users
Big Data Defined

Definitions Vary

- High volume, variety, and potential for the rapid accumulation
- Defies the application of traditional statistical analysis
- Focus on correlation not causation
- Tolerance for imprecise measurement

- Volume
- Variety
- Variability
- Velocity
Big Data Promise

Big Data has the potential to:

- Facilitate the continuously Learning Health System
- Propel the transformation from volume-based care to value-based care
- Improve enterprise operating and financial performance, nursing practice and patient outcomes
The Learning Health System
A Continuous Cycle of Data, Information, Learning, and Improvement
Transform Health Care
The Transformation to Value-based Care is Built on Big Data Analytics

• Descriptive Analytics: What has happened
  Electronically generated reports about events that have already occurred

• Predictive Analytics: What is probably going to happen
  Access to real time data at point of care for nimble clinical and financial decision making

• Prescriptive Analytics: Provide the capability to do something about a predicted, upcoming event
  Integrated analytics that advance the quality, timeliness and cost effectiveness of care delivery and population management across the care continuum
Transform Health Care

Big Data Analytics & Evolving Population Management

- Identify how many patients are living with a chronic disease (patient registries) and the progress of the disease state
- Benchmark quality and financial outcomes against voluntary accreditation and government population management expectations
- Isolate opportunities for improvement on specific population clinical quality measures or other aspects of care
- Identify resources consumed to care for select populations including the optimal settings for care based on population health outcomes
Transform Health Care

Big Data Analytics & Evolving Population Management

• Generate predictive risk scores that help to prevent suicides, increase watchfulness in the ICU, highlight those most at risk of being readmitted to the hospital or developing costly chronic diseases

• Identify patients with genomic disorders and personalize treatment

• Decrease and prevent hospital acquired infections by highlighting which ICU patients are most vulnerable to infection based on their vital signs, identifying the specific nurses caring for those patients who may spread the infection and providing education and retraining on hand hygiene and, reassessing the need for a more comprehensive antibiotic stewardship program
Big Data Impact on Nursing
Operations, Practice, Research, Outcomes

- Care model will change from respond and repair to manage and prevent
- Hospital use will decline
- Treatment variations will be understood and best practices will be established
- Genomic data will personalize treatments improving life expectancy, quality of life, and cost
- Psychological and social drivers of variability will be identified to improve health and avoid disease progression
- Specialty care need will decline
- Overuse of health services will decline

AND

- Patients will experience better outcomes and dramatically improved care experience
CNE Role: Visionary and Big Data Architect

- Recognize the value
- Set strategic priorities
- Support the team
- Translate the findings into meaningful insights and action

The Chief Nurse Executive Big Data Checklist

*Preparing the nursing enterprise for Big Data*

- Creating a data culture
- Developing Big Data competencies
- Creating an operational infrastructure
CNE Checklist
Create a Data Culture

✓ Incorporate data-driven decision-making into clinical and operational processes
✓ Create continuous, timely feedback loops from data to decision-maker
✓ Drive access to data to all levels of the organization
✓ Define the nursing terms needed in the existing data systems
✓ Adopt standard nursing taxonomies to structure and codify and enable external benchmarking
✓ Assemble nursing terms diverse data systems into a common platform for analysis
CNE Checklist

Develop Big Data Competencies

✓ Secure access to critical informatics and data analytics skills

✓ Establish the data and informatics competencies for each nursing role and create a path to achieving those competencies
CNE Checklist
Create Operational Infrastructure

✓ Establish a governance structure
✓ Align the nursing data agenda with the overall informatics strategy for the organization
✓ Enforce Big Data, nursing business intelligence and clinical data usage, and establish data security
✓ Assure that information is integrated across silos
Example
Departmental Dashboard Combines Multiple Data Sources

- Clinical Indicators
- Scheduling Metrics
- Patient Survey Data
- Labor Metrics
- Financial Metrics
- Human Resources Data
The Team

New skills and perspectives

Business owner: CNE
Data scientist
Statistician (s)
Data owners
Data visualization specialist
Project manager

- Chief nursing informatics officer
- Nursing informatics specialist
- End users
The Problem
Establishing accountability for nursing performance at the unit level

• Performance metrics are distributed in a variety of systems with different data definitions, timelines, etc.

• Some measures of performance appear to be in conflict with each other

• Some concepts important to nursing performance are not measured or reported on a regular basis

• Understanding unit performance is complex and time-consuming for directors and officers
Nursing Strategy: Nursing Unit Dashboard Goal

**Current State**
- Average staff engagement
- Standard availability of information
- Quality care
- Does not reflect the experience of every patient
- Average satisfaction

**Future State**
- More engaged staff
- More informed care
- Higher quality of care
- Higher patient satisfaction

**Current State**
- Static performance picture
- Decentralized data sources
- High volume of isolated reports
- Overarching action plans
- Push reporting; reactive approach; management responsible for performance

**Future State**
- Visibility of improvement trends
- Centralized summary data with navigation to source
- Actionable data with improved access
- Proactive unit-based care approach
- Management accountability for performance

**More effective management**
Nursing Unit Portal

PROBLEM:
• Need nursing unit accountability for performance results in a variety of areas

SOLUTION:
• Create a unit level dashboard showing performance in key metrics

BENEFIT:
• Targets unit improvement to specific areas and supports strategic management decisions
Nursing Data Portal: Descriptive Statistics
Tools for Nursing Action: Prescriptive Analytics

Descriptive
What is Happening?

Predictive
What is going to happen?

Prescriptive
What should we do?

Go make rounds on these patients!
Nursing Data Portal: Reuse of EHR data

<table>
<thead>
<tr>
<th>Last Data Refresh: 2/11/2016</th>
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### Monthly Nursing Data Portal

#### Unit Characteristics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>Learning</td>
<td></td>
</tr>
<tr>
<td>Transforming</td>
<td></td>
</tr>
<tr>
<td>Leading</td>
<td></td>
</tr>
<tr>
<td>My Unit</td>
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</table>

#### Performance Summary

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>Average Hours on Catheter</td>
<td>68.3</td>
</tr>
<tr>
<td>Average Hours on Restraints</td>
<td>128.1</td>
</tr>
<tr>
<td>Modified Early Warning Score %</td>
<td>55.7</td>
</tr>
<tr>
<td>Percent Discharged within 2 Hours of...</td>
<td>39.8</td>
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</tbody>
</table>

#### Success Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>OT Hours/Total Hours</td>
<td>94.9</td>
</tr>
<tr>
<td>RN Hours per Equivalent Patient</td>
<td>93.6</td>
</tr>
<tr>
<td>Contract Hours/Total Hours</td>
<td>92.6</td>
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#### Opportunity Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
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<tbody>
<tr>
<td>Pain Management Topbox %</td>
<td>0.0</td>
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<tr>
<td>Average Hours on Restraints</td>
<td>4.3</td>
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<tr>
<td>Nurse Communication Topbox</td>
<td>10.0</td>
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#### Average Hours on Catheter Trending over the Last 12 Months

![Graph showing the trend of average hours on catheter over the last 12 months.](image)
The Future: Individual accountability for practice

Welcome to the Nursing Insight Dashboard Series

Our mission is to provide HCA’s organizational leaders with insight into high-level nursing trends, and also to equip our facility leaders with actionable knowledge, tailored to their staff, on their floors, in their hospitals.

Below, you will see different views for each of our areas of focus. The Enterprise View gives a snapshot of aggregate unit, facility, and division level statistics and trends. The Detail View gives a granular level of detail for individual patients and nurses. NOTE: This data is for MedSurg only.

To navigate to a particular view for one of these areas, simply click the corresponding image below.
Conclusions

• We are further along than we think

• We have to come together as a profession and adopt national standards to create Big Data for nursing
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Post inspiring moments from the conference to the mobile app!
#AONE2016