Appendix D

Slide Presentations

Nursing Knowledge: Big Data & Science for Transforming Health Care

Delivered June 5 & 6, 2014
Vision of Nursing & Big Data Science

Nursing Knowledge: Big Data & Science for Transforming Health Care Conference 2014
2014 June 5

Connie White Delaney
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University of Minnesota
School of Nursing Professor & Dean
Academic Health Center
Director, Biomedical Health Informatics (BHHI)
Associate Director, CTSI-BMI
Acting Director, of the Institute for Health Informatics (IHI)
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It is Nursing’s time - with leadership & partnership

- Decades of hard work
- Growth in our science
- Linkage of academic-service technology with the human condition
- Health policy reinvigorate our purpose for being nurses
- Societal revolution of communication and information technologies and informatics
- Societal revolution in research & scholarship infrastructure
- Redefine meaningful health knowledge within an environment of information overload
Data-Enabled Science
- getting closer to “real” -
- data in motion -

- Volume
- Velocity
- Variety
- Veracity
- Value

- Analytics
- Visualization

• Genome
• Symptome
• Exposome
• Behavior
… and more

“…is not about analyzing small data sets that can be easily dealt with by using conventional statistics or even manually….the goal is to make sense of big data.”

What is Big Data?
(NIH)

Opportunities and challenges in accessing, managing, analyzing, and integrating datasets of:

- diverse data types [e.g., imaging, phenotypic, molecular, exposure, health, behavioral, other biological and biomedical and behavioral data]
- increasingly larger, more diverse, and more complex
- exceed the abilities of currently used approaches to manage and analyze effectively.
CTSA is a national Clinical and Translational Science Award (CTSA) consortium created to accelerate laboratory discoveries into treatments for patients. The CTSA program is led by the National Institutes of Health's National Center for Research Resources.
Clinical and Translational Science Awards (CTSAs)

- Program creates a definable academic home for clinical and translational research.
- CTSA institutions work to transform the local, regional, and national environment to increase the efficiency and speed of clinical and translational research across the country.


UMN CTSI Biomedical Health Informatics

Tools
- CTMS
- Experts@Minnesota
- ResearchMatch
- Redcap
- Analytical tools
- Natural Language Processing;
- MN Supercomputer Institute (MSI) Tunnel
- Genotype/phenotype mapping

Data
- AHC IE Clinical Data Repository
- QID cohort-discovery tool
- MN Death Index
- Dental EHR
- Imaging: Center for Magnetic Resonance Research (CMRR) clinical images
- UMN Biospecimen Enterprise Storage initiative & data: Enterprise storage initiative, Biomedical Genomics Center

Services
- Informatics Consulting Service
- AHC IS
- CTSI Portal
- Front Door

Community
- Greater Plains Collaborative (PCORI)
- Hennepin County Medical Center (NSF grant)
- CTSA Collaborations

Education
- Generalist
- Informaticians
- IH – MPH, MS and PhD
- SON – DNP-NI, PhD-NI
- SPH – MPH-Informatics
- UMN Biomedical Informatics & Computational Biology Graduate degrees
Clinical Data Repository of +2 million patients

Cohort discovery /recruitment: i2b2 cohort discovery
- Requesting further information for a cohort identified via i2b2
- Advanced cohort discovery, for criteria not available via i2b2

Observational studies
- Requesting a large dataset for direct analysis (e.g., retrospective cohort, cross-sectional study)

NURSING KNOWLEDGE:
Big Data & Science for Transforming Health Care

Data available to UMN researchers via the clinical data repository
Campaign for Action

Everyone in America can live a healthier life, supported by a system in which nurses are essential partners in providing care and promoting health.

Areas of Focus

Education  Practice & Care  Leadership

Interprofessional Collaboration  Diversity  Data
Increase Education Level of Nurses

Prepare nurses to deliver more efficient, coordinated care.

- Increase the proportion of nurses with BSN and higher degrees.
- Increase the number of nurses with doctorates.

**Big Data Link:**

- Skills to manipulate and analyze large, complex data sets.
- Statistics knowledge.

Remove Barriers to Practice and Care

**Nurses provide an immediate and cost-effective solution to care shortages.**

- Remove barriers that limit APRNs (and all nurses) from expanding access to care.
- Right care, by the right clinician, at the right time, in the right place.

**Big Data Link**

- Help demonstrate impact of nursing care on patient outcomes.
Promote Nurse Leadership

Nurses bring a unique perspective to management and policy discussions.

- Nurses spend the most time with people receiving health services.
- Nurses are the largest segment of the health care workforce.
- Nurses are vital to improving quality.
- Yet nurses account for only 6% of hospital board positions.

**Big Data Link:**
- Nurse leaders can promote use of EHRs that produce interoperable data.

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Foster Interprofessional Collaboration

**HRSA's National Center for Interprofessional Practice & Education**

**Big Data Link:**
National Center Data Repository will show relationship of interprofessional education and practice to:
1. Improve patient care experience.
2. Improve population health.
3. Reduce per capita health care costs.
Promoting Workforce Diversity

Nurses should reflect the population in terms of gender, race and ethnicity.

- Recruit nursing workforce of the future.
- All nurses should provide culturally competent services and care.
- Greater workforce diversity may help to reduce health disparities.

Big Data Link:

- Potential for identifying trends and health problems affecting certain populations.

Improve Workforce Data Collection

Need accurate workforce data on numbers and types of health professionals.

National effort to get state Boards of Nursing to collect standardized data:

- Survey conducted as part of license renewal.
- Short set of questions on employment and education.
- NCSBN could compile data.
Indicator #1: Education

Indicator #2: Education
Indicator #3: Removing Barriers

Indicator #4: Interprofessional Collaboration
Indicator #5: Leadership

Indicator #6: Workforce Data
Supplemental Indicators

- Tracking 17 supplemental indicators.
- Example: number of people receiving doctoral degrees annually.

We Need Your Support

www.campaignforaction.org
Leveraging CTSI Infrastructure & Data
- PCORI -

- **USA Patient-Centered Outcomes Research Institute (PCORI)**
  - Research Priorities - http://www.pcori.org/research-we-support/priorities-agenda/
  - PCORI has approved 279 awards totaling more than $464.4 million to fund patient-centered comparative clinical effectiveness research projects to date (12/2013).

- **UMN in PCORI**
  - **Greater Plains Collaborative - Network**
  - 10 Sites
    - Kansas - University of Kansas Medical Center (PI);
    - Missouri, Iowa, Wisconsin (3), Minnesota, Nebraska, Texas (2)
  - ~$7M/1.5 years
  - Building Research Network
Leveraging CTSI Infrastructure & Data
- NCATS -

- U MN one of 13 CTSA sites nationally selected for Stage 1 Cohort Exploration
  - “Increase Accrual to the Nations Highest Priority Clinical Trials.”
  - i2b2 with frequent downloads
  - SHRINE installation and operational capacity

Leveraging CTSI Infrastructure & Data
Optum Labs/School of Nursing Partnership

- **Optum Labs Data Warehouse (OLDW)**
  - * reflects the linkage of large claims data sources
  - * provide detailed health care services information
  - * privately-insured & electronic health record data
- **Optum Labs Data Warehouse Population**
  - 100 Million Persons with Coverage
  - 93 Million Persons with Medical Coverage
  - 66 Million Persons with Medical and Pharmacy Coverage
- **Medicare Part C – Advantage**
  - Timeframe 2006-2013
  - 5.7 Million Medical Coverage
  - 4.3 Medicare Part D
- **Humedica (Electronic Health Record – EHR)**
  - 30 Million persons with EHR data
Optum Labs Partners

- Optum
- Mayo Clinic
- AARP (formerly the American Association of Retired Persons)
- American Medical Group Association
- Boston University School of Public Health
- Lehigh Valley Health Network
- Pfizer
- Rensselaer Polytechnic Institute (RPI)
- Tufts Medical Center
- University of Minnesota School of Nursing
- Boston Scientific

Clinical + Claims – Healthcare Data Evolution

- Person level de-identification algorithm
- Person linked claims/EHR
- EHR Only
NINR Research Centers
CDEs Inform Big Data for Symptom/Symptom Cluster Science

Dr. Donna Jo ("DJ") McCloskey
Email: mccloskd@mail.nih.gov

NINR Research Methodologies Boot Camp to Explore Big Data

The Nexus

Creating the Transformational Nexus for Health
- Improved Health and Community Outcomes
- National Arms / Triple Arm

The Nexus: Collaborative linking of academia and the practice of health care.

Team-based Care

Health Professions Education
- Orientation and essential skills

Senior Leadership
- Faculty, Practitioners, and Practitioners
- Operations

Practice Community
- Earning integrated health systems
NCDR coupled with large data

- Analyze existing big databases and troll for successful patterns of impacts related to interprofessional activity
  - CMII
  - VA
  - Medicare/Medicaid databases—national
  - HCCI private sector databases

Nursing Minimum Data Sets

- Three minimum data sets represent nursing and the context of nursing care
  - USA Nursing Minimum Data Set (NMDS)
  - USA Nursing Management Minimum Data Set (NMMDS)
  - International Nursing Minimum Data Set (iNMDS)
Nursing Minimum Data set (NMDS)
National Standard – SnomedCt, LOINC
slide credit - BWestra


Nursing Management Minimum Data Set (NMMDS)
National Standard – LOINC
slide credit - BWestra

Standardized Terminologies

The ICN eHealth Programme encompasses:

- **International Classification for Nursing Practice (ICNP®)** an international standard to facilitate the description and comparison of nursing practice locally, regionally, nationally and internationally;
- **ICN Telenursing Network** aims to involve and support nurses in the development and use of telehealth technologies; and
- **Connecting Nurses** initiative which provides an online forum for nurses worldwide to share ideas, advice and innovations.
International Classification for Nursing Practice (ICNP®)

**Vision**

- ICNP® is an integral part of the global information infrastructure informing health care practice and policy to improve patient care worldwide.

**Strategic Goals**

- Serve as a major force to articulate nursing’s contribution to health and health care globally.
- Promote harmonization with other widely used classifications and the work of standardization groups in health and nursing.

Contact: Amy Amherdt. ICN eHealth Programme, amherdt@uwm.edu

**ICNP® Research & Development Centres**

- **Australia**
  - Canberra Hospital, Research Centre for Nursing and Midwifery Practice
  - Flinders University, Disaster Nursing Centre
- **Austria, Germany, & Switzerland**
  - German Speaking ICNP User Group with National Nurses Associations
- **Brazil**
  - Federal University of Paraíba, Post-Graduate Program in Nursing
- **Canada**
  - Registered Nurses’ Association of Ontario
- **Chile**
  - University of Concepción, Department of Nursing
- **Iran**
  - Iranian Nursing Organization
- **Korea**
  - Seoul National University, College of Nursing
- **Poland**
  - Medical University of Łódź, Nursing and Midwifery
- **Portugal**
  - Porto Nursing School
- **USA**
  - University of Minnesota, School of Nursing
Vision of Nursing & Big Data Science

Nursing Knowledge:
Big Data & Science for Transforming Health Care Conference 2014
2013 Actions
American Nurses Association

Cheryl A. Peterson, MSN, RN
June 5, 2014

ANA’s Framework for Measuring Nurses’ Contributions to Care Coordination

- Evidence-based measurement framework that reflects the contributions of registered nurses in care coordination
  - Structural components
  - Measurement context
  - Visual representation of the framework
  - Summary of the literature
- Inform National Quality Measurement Enterprise
  - Provides a roadmap for prioritizing existing measures and concepts for new measure development
  - Inform work to broaden existing low level measures
- Inform Prioritization/Measure Gap Work
  - Inform NQF draft framework revision
  - NDNQI transition of care measures for the ambulatory setting
ANA’s Pressure Ulcer Cumulative Incidence eMeasure (ePressUlcerCI)

\[
ePressUlcerCI = \frac{\text{Number of hospital acquired pressure ulcers}}{\text{number of discharged patients}} \times 1,000
\]

Pressure Ulcer eMeasure purpose:

• Determine the incidence of pressure ulcers using data from the Electronic Healthcare Record (EHR).
• Determine the rate and timing of skin and pressure ulcer risk assessment performance and prevention using EHR data.
• Explore the relationships among nursing assessments performed, intervention plans in use, and pressure ulcer development.

DRAFT ANA PS on Standardization & Interoperability

DRAFT to be considered by the Board on June 12, 2014.

• ANA believes that electronic health records (EHRs) and other HIT solutions used to document, manage, and report nursing care in all phases and settings should promote the accurate capture and standardized representation of nursing knowledge, data collected by nurses in the context of patient care, and contributions to outcomes across the nursing process.

• Further, these systems should be interoperable within and among all vendors’ products. Achievement of such standardization and interoperability will improve patient outcomes, enhance nurse work satisfaction, support the exchange and use of nursing knowledge, and promote nursing participation in the development, growth, and maturation of a continuous rapid learning health care system.
DRAFT ANA PS on Standardization & Interoperability

• In order to achieve this, ANA will work with the nursing informatics community, Office of the National Coordinator for Health Information Technology, and the EHR and health IT vendor community to:

1. Promote the adoption and implementation of standardized nursing data capture within all vendor products.
2. Advocate for standardized nursing data capture throughout the nursing process and across all settings of care.
3. Promote standardization of installed vendor products as a strategic imperative to support interoperability.
4. Advocate for a feedback loop to inform direct care interventions.
5. Collaborate with data standards groups and others to assure the inclusion of standardized nursing data in continuity of care documents.

HIMSS CNO-CNIO Vendor Roundtable

Gail Latimer, MSN, RN, FACHE, FAAN
Joyce Sensmeier MS, RN-BC, FHIMSS, FAAN
June 5, 2014
Purpose & Objectives

• To optimize health engagement and care outcomes through IT by leveraging the thought leadership of HIT vendor nurse executive leaders
  – Serve as an advocate and leader for the nursing community
  – Provide guidance on informatics competencies for nursing
  – Provide guidance on EHR related topics including analytics, interoperability, usability, terminology, workflow, quality and outcomes

Accomplishments

• Nurse Executive Leadership Workgroup
  – Define the nurse vendor leadership role, identify competencies and value to the profession
• Human Factors, Usability, Safety Workgroup
  – Identify resources and opportunities to improve knowledge re: human factors, usability & safety
• Big Data Position/Principles Workgroup
  – Draft a white paper/position statement re: the nurse vendor’s stance on nursing terminology
Big Data Workgroup Position Statement – Draft Outline

• Executive Summary/Purpose Statement
  – Need for alignment of industry standards, scales and tools
• Identify big data principles
• Barriers and challenges
  – Licensing of multiple standards/scales
  – Need to communicate across settings
  – Lacking level of specificity
  – No agreement on taxonomies and ontologies

Big Data Workgroup Position Statement – Draft Outline

• Develop framework for universal requirements
  – Map it consistently
• Identify critical differences that are relevant in the context of nursing outcomes
• Impact of software versions/configurations
• Variation in quality e-measures across time
• Implementation challenges
• Conclusion/analysis/recommendations
AHRQ and Health Services Research in Nursing

2014 Nursing Knowledge: Big Data & Science for Transforming Healthcare Conference

Erin Grace
June 5, 2014

AHRQ Mission

To produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable, and to work with the U.S. Department of Health and Human Services (HHS) and other partners to make sure that the evidence is understood and used.

AHRQ’s priority areas of focus are:
1. Produce evidence to improve health care quality
2. Produce evidence to make health care safer
3. Provide evidence to increase access to health care
4. Produce evidence to improve health care affordability, efficiency, and cost transparency
Sample Grants/Contracts

- Using an EHR to Examine Nurse Continuity and Pressure Ulcers (R36 HS23072)
- Impact of Health IT on Delivery and Quality of Patient Care (R36 HS021988)
- Nurses’ Information Needs while Caring for Hospitalized Children (R36 HS21075)*
- Improving Medication Management Practices and Care Transitions through Technology (R18 HS17837)
- Health IT Support for Safe Nursing Care (R01 HS015054)*
- Using Evidence-Based Nursing Practices and EHR CDS to Reduce Fall-Related Patient Injuries in Acute Care (Contract # 290-06-00016-2)*

*Indicates some data standardization work as part of the grant/contract

AHRQ and Nursing Research

- Health IT and Nursing
  [http://healthit.ahrq.gov](http://healthit.ahrq.gov)
- Health Services Research and Nursing
- AHRQ Funding Opportunity Announcements
- AHRQ’s Senior Advisor for Nursing
  Beth A. Collins Sharp, PhD, RN, FAAN
  Beth.CollinsSharp@ahrq.hhs.gov
The American Academy of Nursing: The Expert Panel on Nursing Informatics and Technology

Lillee Gelinas, MSN, RN, FAAN
System Vice President and Chief Nursing Officer
CHRISTUS Health, 919 Hidden Ridge, Irving, TX

Accomplishments: Publish, Disseminate, Align & Advance

- **Publish:**
  - A Call to action: Engage in Big Data Science was published in the January 2014 edition of Nursing Outlook.

- **Disseminate 2013 Big Data Conference Findings:**
  - An conference call for all expert panel members was conducted in June 2013 to update members on the objectives being advanced as a result of conference.
  - Co-chairs presented the objectives and strategic plan developed at the 2013 Big Data Conference to the Expert Panel on Nursing Informatics and Technology at the AAN Annual Conference in October 2013.

- **Align Strategy and Advance the Recommendations:**
  - Expert Panel members supported advancing the objectives and aligning AAN with the BDC recommendations through the 2014 Expert Panel Action Plan.
Recommendations

1. Implement strategies that advance the adoption of standardized terminologies for clinical documentation by nurses in electronic health records.
2. Conduct two policy updates via conference call/webinar for the expert panel membership (June 2014 and September 1, 2014) following the Big Data Conference.

Exemplars Advancing Sharable/Comparable Data

Kathleen A. McCormick, Ph.D., R.N., FAAN, FACMI, FHIMSS
SCIMIND, LCC
June 5, 2014
## MODELS NEEDED TO MAKE NURSING DATA ACTIONABLE TO MOVE BIG DATA TO IMPLEMENTATION OF QUALITY -SciMind,LLC

<table>
<thead>
<tr>
<th>ICNP/ICD Structured</th>
<th>International</th>
<th>Universal Health</th>
<th>Global</th>
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<tr>
<td>Structured</td>
<td>Federated</td>
<td>Population</td>
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<td>IHE</td>
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<td>Regional</td>
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<td>Networked Healthcare</td>
<td>Multi-Groups</td>
<td>Multi-Hospital/ Affiliates/ Communities</td>
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<td>Large Academic</td>
<td>Group</td>
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<td>Any ANA Approved</td>
<td>Communities of practice</td>
<td>Individual</td>
<td>Local</td>
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### Recommendations

- Policies and Research funding are needed to support further Exemplars in multiple settings within local, regional, national, and international settings.
- National policies are required to support the steps in harmonizing nursing content into national and international standards and need consensus within the nursing profession nationally and internationally.
- Models are needed that can make data actionable responding to realistic timelines and continual regulatory changes that are dependent on national and global economic conditions.
AMIA Nursing Informatics Working Group

Laura Heermann Langford PhD, RN
Intermountain Healthcare
June 5, 2014

AMIA NIWG - Accomplishments

• Adopting common terminologies and standards
  – Continued engagement of membership in standards development activities.
    • LOINC, IHTSDO, HL7, IHE, S&I Framework, NQF, NDNQI,
      – Matney, Heermann Langford, Kennedy, Weaver, Warren and many more!!!

• Shaping policy
  – Participation in calls for public comment
    • MU
    • ATA Telemedicine

– Sustained participation in S&I Framework activities
  • Data Access Framework, Data Provenance, HealthDecisions, Structured Data Capture, Transitions of Care, Clinical Quality Framework, Longitudinal Care Coordination, Clinical Element Data Dictionary

– Participation in AMIA Annual Invitational Policy Discussion Patient-Centered Care, Collaboration, Communication and Coordination, Dec 18-19, 2013
Accomplishments

- **Educating nurses, nurse faculty, nurse executives, nurse informaticians and interprofessional care disciplines**
  - Strategic use of webinars to reach membership and non members to promote informatics competencies.
    - Webinar to NOA: *Informatics Strategies and Tools to Link Nursing Care with Patient Outcomes*, (Dykes, Kennedy, Murphy, Womack), March 31, 2014
    - Webinar: *Communicating with Policymakers about Nursing Research and Informatics* (Margo Edmunds, PhD), May 14, 2014
  - Scholarly Initiative
    - To promote Nursing Knowledge through integration of Nursing Informatics Science into education, research and practice to ensure optimal health and well being of people
    - To determine optimal communication about NI Science to promote dissemination and use
    - Much accomplished in the modeling. In Phase II of the work.
  - Invitation for focused report out at the Fall Symposium Sunday Event, “What’s Hot in Nursing Informatics: Big Data Nursing Research” (Westra) Nov 17, 2013
  - A lead, and financial supporter of ANI (Tiger Initiative)

Recommendations:
**Outreach (Part of the Action Plan)**

Academia

Clinicians, care delivery and public health

Patients

Consumers

Health IT and Other Industry
Recommendations

• Continuation of our activities towards the previous priority actions
  • Including informatics and about strategies for integrating informatics competencies in education and practice
  • Implement Scholarly Initiative Action Plan: Education, collaboration, consultation, innovation, and dissemination

• NIWG recognizes the need for continued engagement in the development of standards to support nursing. - Repeat the survey (was last done in 2011)

• Under Consideration within NIWG
  • Write a white paper focusing on the call for national standards for exchange of nursing data.
  • Make a call for the creation of a national central nursing content repository.

Lightning Talk:
Laying the Infrastructure for Nursing Knowledge using Health IT

Judy Murphy, RN, FACMI, FHIMSS, FAAN
Deputy National Coordinator for Programs & Policy
Office of the National Coordinator for Health IT
Department of Health & Human Services
Washington DC

June 5, 2014
Accomplishments

• EHR Adoption has exploded – MU Stage 1
  – **91%** of eligible hospital and **68%** of eligible providers have been paid in the EHR Incentive Program (Medicare/Medicaid), with over $22.9B being paid out as of March 2014

• Stage 2 Progress is beginning
  – Requires enhanced capabilities for interoperability, patient engagement and quality measures
  – 893 certified products as of May 2014
  – 8 hospitals and 252 providers have attested as of May 2014

• Stage 3 measures are being finalized

• ONC held first (annual) Nursing Summit
  – 239 attendees; 80% from frontline nursing roles

Recommendations

• The HIT Policy and Standards Committees are re-organizing their WGs – goal is to have a nurse on every WG (12)

• Discover more nurses and nurse practitioners to include in the ONC Fellows Program

• Hold annual ONC Nursing Summit and quarterly webinars, keeping focus on frontline nursing staff attendance by working with nursing organizations

• Establish better working relationships with the NP community, including their organizations AANP and NNCC
LOINC and Nursing Assessments

Bonnie L. Westra, PhD, RN, FAAN, FACMI
Susan A. Matney, MSN, RN, PhD-C, FAAN
Jung In Park, BSN
June 5, 2014

Accomplishments
Appendix D
Nursing Knowledge: Big Data & Science for Transforming Health Care

Recommendations

• Complete an evaluation of LOINC to identify gaps
• Create teams to work on specific areas
  – Include domain experts
  – Recommend assessments for inclusion in LOINC
  – Code assessments and submit for approval
• Disseminate content using the framework for integration into EHRs
• Develop communication plan

Commission on Accreditation for Health Informatics and Information Management Education

• Mission is to serve the public interest by establishing and enforcing quality accreditation standards for HI and HIM educational programs
• Accredited by the Council for Higher Education and Accreditation (CHEA)
• HI and HIM professionals are on the Board, plus a public member
  – Judith Warren is a board member
• Members of CAHIIM
  – AHIMA
  – AMIA, in application process
• Members are responsible for developing competencies and participating in the development of accreditation standards
• www.cahiim.org
Accomplishments

- **2012** - Planned, implemented and evaluated a QSEN Nursing Informatics Deep Dive Pilot Workshop (DDW) for school of nursing faculty and health system educators.
- **2013** - Surveyed faculty regarding resources needed to teach nursing informatics for pre-licensure nursing students.
- **2014** – Submitted a grant and secured funding to develop resources and make them available at a national level.
Recommendations

• **June 2014** - Develop an Advisory Board for grant

• **May 2014** - Develop a crosswalk that links the AACN Essentials for Information Management and Technology with QSEN Knowledge, Skills and Attitudes and TIGER nursing informatics competencies for students and nurses.

• **July 2014** – Complete a nursing informatics course curriculum for pre-licensure nursing students.

• **August 2014** - Complete an on-line course and instructor manual Provide a workshop at the AACN Baccalaureate Education

• **November 2014** –Conference in Baltimore, MD

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**Big Data and Nursing Business Intelligence**

John M. Welton, PhD, RN
University of Colorado College of Nursing
June 5, 2014
Accomplishments

• **Key Issues**: Unable to define/measure nursing value due to a lack of standardized or consensus metrics for nursing cost, intensity measures; need to benchmark nursing within/across settings; data in EHR can provide more granular and real-time information about nursing performance, efficiency, effectiveness, quality, outcomes, value.

• **Progress to Date**:
  1. Testing of new model for evaluating nursing costs and assignment (Jenkins & Welton, 2014)
  2. Development of national research strategy and framework Colorado Collaborative for Nursing Research (Welton, 2014)


Recommendations

1. Develop a national consensus model to measure patient level nursing intensity and costs and produce metrics to benchmark nursing care economics combined with clinical care to estimate nursing value.

2. Develop new business intelligence and analytic tools that will utilize the rich clinical, operational, financial, and outcomes data currently available within the EHR and deploy across many different health care settings.

3. Develop and test new nursing finance models that can be used in Accountable Care Organizations (ACO), value-based purchasing, and pay for performance programs.
Recommendations for Use of Standard Nursing Terminology in Minnesota

Marty LaVenture, PhD, MPH, FACMI
Office of Health IT & e-Health
Minnesota Department of Health

Bonnie L. Westra, PhD, RN, FAAN, FACMI
University of Minnesota, School of Nursing, Minneapolis, MN;

Accomplishments

• **No national standard or tool** for mapping nursing terminologies & few resources for mapping exist.

• **Minnesota e-health Advisory committee** advises Commissioner of Health, since 2004

• **Workgroup consulted with nursing** informatics experts and health practitioners from multiple settings 2013 - 2014

• **Recommendations were endorsed** by Advisory Committee in May, 2014
Selected Recommendations
Nursing Terminology in Minnesota (1 of 2)

• All settings should create a plan for implementing an American Nursing Association-recognized Nursing Terminology within their EHR

• Each setting type should achieve consensus on a standard terminology that best suits their needs and select that terminology for their EHR

• Develop education and guidance for selecting the nursing terminology standard that suits the needs for a specific setting

Selected Recommendations
Nursing Terminology in Minnesota (2 of 2)

Recommendations (cont.):

• When exchanging a C-CDA with another setting for problems and care plans, SNOMED-CT and LOINC should be used for exchange

• The Omaha system for exchange between public health or community-based settings for reporting of results should be used where appropriate
Nursing Management Minimum Data Set (NMMDS)

Jung In Park, BSN, RN
Bonnie L. Westra, PhD, RN, FAAN, FACMI
Connie W. Delaney, PhD, RN, FAAN, FACMI
Tyler Wagner, MHI; Susan Matney, PhD-C, RN, BC, FAAN; Colleen Hart, MSN, RN; Mary Jo Swanson, DNP, RN

June 5, 2014

Accomplishments

NMMDS 2007

• 10 Nursing delivery unit/service accreditation
• 11 Management demographic profile
• 12 Staff demographic profile
• 07 Clinical decision making complexity
• 08 Environmental complexity

Updated NMMDS & LOINC

• 10 Accreditation/ Certification/ Licensure
• 19 Nurse demographics per unit or service
• 20 Clinical mental work
• 21 Environmental condition
• 22 EHR implementation stages
Recommendations

- Finalize LOINC coding updated NMMDS data elements
- Target dissemination strategy for sharing all NMMDS data elements with
  - Workforce data collection through State Boards of Nursing to support the Future of Nursing requirements
  - NDNQI
- Disseminate to others through
  - Professional organizations
  - Software vendors
  - Policy makers

Interprofessional Education National Center Data Repository

Connie White Delaney, PhD, RN, FAAN, FACMI
Professor & Dean, School of Nursing, U of Minnesota

Judith M. Pechacek, DNP, RN, CENP
Assistant Clinical Professor, School of Nursing, U of Minnesota

2014 June 5
Accomplishments:
- Established NCDR architecture & data base
- Created 7 surveys
- Implemented NCDR 4/7 sites
- Established NCDR Mappings
- Established initial NCDR Standard Analyses
- Engaged with HRSA, NINR, CMII, etc - expansion

Recommendations
- Implement NCDR across all National Center Incubator Sites
- Expand NCDR to collaborations, including funding agencies
- Publish first summary of IPP&E
- Extend NCDR to nursing specialty organizations
- Prepare NCDR for analysis and potential inclusion in LOINC
Alliance for Nursing Informatics

Joyce Sensmeier MS, RN-BC, FHIMSS, FAAN
June 5, 2014

Accomplishments

• Shared Big Data Conference recommendations with ANI Governing Directors at Town Hall mtgs.
• Shared news items about sharable/comparable data via ANI list serv
• Westra and Sensmeier presented “Call to Action: Realize Sharable, Comparable Big Data” at HIMSS14 Conference in Orlando, FL
• Participated in ANA Tipping Point meetings
• Published article in CIN: ANI Connections on Big Data Conference outcomes/recommendations
Recommendations

• Received support from ANI Governing Directors for use of ANA recognized terminologies; SNOMED-CT and LOINC for information exchange
• Tipping Point - Encourage use of ANA standardized terminologies for quality measures
• Tipping Point - Require nursing standardized language for Stage 3 Meaningful Use

Academic/Corporate Research Collaborative: Big, Big Data

Thomas Clancy, MBA, PhD, RN, FAAN
Clinical Professor and Assistant Dean
Practices, Partnerships and Professional Development
School of Nursing, University of Minnesota
June 5, 2014
Accomplishments

Optum Labs Data Warehouse

The Optum Labs Data Warehouse (OLDW) reflects the linkage of large claims data sources that provide detailed health care services information about privately-insured and electronic health record data.

Population
- 120 million lives (claims data)
- 30 million lives (electronic health record data)
- 20 years of longitudinal data

Research Collaborative Agreement (2013)

Mayo Clinic, AARP, American Medical Group Association, Boston University School of Public Health, Lehigh Valley Health Network, Pfizer, Rensselaer Polytechnic Institute (RPI), Tufts Medical Center, University of Minnesota School of Nursing, and Boston Scientific.

Model:
- Federated portal network
- Statistically de-identified data inputs
- Secure access through Optum Labs (Sandbox)

Recommendations

- Illustrates how corporations and nursing schools can partner to conduct big data research on a national level.
- Goal: conduct cutting edge research aimed at investigating and finding solutions to some of the most pressing issues in healthcare.
  - Longitudinal (impact of nursing interventions over time)
  - Variation in treatment patterns (IPE, care coordination)
  - Behavioral and policy research (Staffing & cost of care)
  - Comparative effectiveness (APRN and nurse led clinics)
Moving on in Practice
Visualizing the Nursing Problem List

Deborah Ariosto, PhD, MSN, RN
Vanderbilt University Medical Center, Nashville, TN
June 6, 2014

Accomplishments

• Implemented Clinical Care Classification Model concepts (V.Saba, et al)
  – Diagnosis/Problem list
  – All Teaching interventions
  – Skin integrity and Safety interventions
• Respiratory, Activity, Self-care, Nutrition in development
• Integrated nursing problems within team summary
• Graphical display of coded priority problems
  – Longitudinal patient lifetime
  – Unit based visualization
A New Approach to the Plan of Care
How prioritization, standardized terminology, and better visualization transformed process and outcomes

CONTEXT
Transforming and integrating paper based care plans into the electronic health record (EHR) used a simple structured problem list approach based on the Clinical Care Classification (CCC) System for Nursing Diagnoses (Saba, et al.). The initial focus was on inpatient, however this problem list has applicability across the patient care continuum and should well support care transitions.

PROCESS
Nurse’s enrich and personalize the diagnosis or procedure based plan of care by identifying 2-4 physiological, functional or psychosocial “Priority Problems” from 21 Care Categories guided by patient, nurse and team priorities.

Short term goals are set and measured every shift. These goals and outcomes are seen in multiple EHR Views such as Team Summary, Overview of Patient Care, and the graphical lifetime Care Plan Dashboard (shown below)

OUTCOMES

Priority Problems – Unit dashboard

Team Summary

Pathway Name: Burn ICU Pathway

Patient indicator detail

Appendix D
Nursing Knowledge: Big Data & Science for Transforming Health Care

54
Recommendations

• Include coded nursing diagnosis in a shared interdisciplinary problem list in all vendor EHR applications.
• Establish a web based repository of nursing problems in the public domain.
  – Identify top 10 problems – identify a core set of interventions and desired outcomes and begin the next phase of the analyses of preferred terms that support and inform evidence-based practice.

Public Health Initiatives

Lisa V. Klotzbach, RN, BS, BAN, MA, LHIT
Olmsted County Public Health Services
Friday June 6, 2014
Public Health Documentation

electronic health records (EHR) **universal**

**use of standards** within EHRs not universal

**Omaha System** an embedded standard

---

Accomplishments

Omaha System in **C-CDA**

- problems & results

sharing with medical community

picture of **public health** services

- issues & outcomes
### Problems

<table>
<thead>
<tr>
<th>OMAHA Domain</th>
<th>Problem description</th>
<th>First Reported</th>
<th>Last Reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVIRONMENTAL</td>
<td>01. Income</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>ENVIRONMENTAL</td>
<td>04. Neighborhood/Workplace safety</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>PSYCHOSOCIAL</td>
<td>09. Interpersonal Relationship</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>PSYCHOSOCIAL</td>
<td>12. Mental Health</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>PSYCHOSOCIAL</td>
<td>14. Caretaking/Parenting</td>
<td>01/15/13</td>
<td></td>
</tr>
<tr>
<td>PSYCHOSOCIAL</td>
<td>16. Abuse</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>HEALTH-RELATED BEHAVIORS</td>
<td>35. Nutrition</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>HEALTH-RELATED BEHAVIORS</td>
<td>37. Physical Activity</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>HEALTH-RELATED BEHAVIORS</td>
<td>39. Substance Use</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>HEALTH-RELATED BEHAVIORS</td>
<td>40. Family Planning</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>HEALTH-RELATED BEHAVIORS</td>
<td>41. Health Care Supervision</td>
<td>08/02/12</td>
<td>01/15/13</td>
</tr>
<tr>
<td>PHYSIOLOGICAL</td>
<td>48. Pregnancy</td>
<td>08/02/12</td>
<td></td>
</tr>
<tr>
<td>PHYSIOLOGICAL</td>
<td>49. Postpartum</td>
<td>01/15/13</td>
<td></td>
</tr>
</tbody>
</table>

### Results

<table>
<thead>
<tr>
<th>INCOME : OMAHA SYSTEM</th>
<th>System</th>
<th>First Reported</th>
<th>Last Reported</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>01. low/no income</td>
<td>Sign/Symptom</td>
<td>08/02/12</td>
<td>01/15/13</td>
<td>Present</td>
</tr>
<tr>
<td>03. difficulty with money management</td>
<td>Sign/Symptom</td>
<td>08/02/12</td>
<td>01/15/13</td>
<td>Present</td>
</tr>
<tr>
<td>KNOWLEDGE on a scale of 1 - 5 where 5 is best</td>
<td>Outcome</td>
<td>3</td>
<td>3</td>
<td>Stable</td>
</tr>
<tr>
<td>BEHAVIOR on a scale of 1 - 5 where 5 is best</td>
<td>Outcome</td>
<td>4</td>
<td>4</td>
<td>Stable</td>
</tr>
<tr>
<td>STATUS on a scale of 1 - 5 where 5 is best</td>
<td>Outcome</td>
<td>3</td>
<td>3</td>
<td>Stable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NEIGHBORHOOD/WORKPLACE SAFETY : OMAHA SYSTEM</th>
<th>System</th>
<th>First Reported</th>
<th>Last Reported</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>04. physical hazards</td>
<td>Sign/Symptom</td>
<td>08/02/12</td>
<td></td>
<td>Absent</td>
</tr>
<tr>
<td>KNOWLEDGE on a scale of 1 - 5 where 5 is best</td>
<td>Outcome</td>
<td>4</td>
<td>3</td>
<td>Declining</td>
</tr>
<tr>
<td>BEHAVIOR on a scale of 1 - 5 where 5 is best</td>
<td>Outcome</td>
<td>3</td>
<td>4</td>
<td>Improving</td>
</tr>
<tr>
<td>STATUS on a scale of 1 - 5 where 5 is best</td>
<td>Outcome</td>
<td>3</td>
<td>5</td>
<td>Improving</td>
</tr>
</tbody>
</table>
Recommendations

1. Follow the MN e-Health recommendation with the support and resources necessary to make it possible for all LPHAs to comply with the recommendation to use OMS terminology in their EHRs and for HIE.

Lisa Klotzbach
Klotzbach.lisa@co.olmsted.mn.us
507/328-7457
### Moving On in Practice

Ann O’Brien RN MSN CPHIMS  
Kaiser Permanente  
June 6, 2014

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### HIMSS EMR Adoption Model

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cumulative Capabilities</th>
<th>2013 Q4</th>
<th>2014 Q1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 7</td>
<td>Complete EMR, CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, IP</td>
<td>2.9%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Stage 6</td>
<td>Physician documentation (structured templates), full CDSS (variance &amp; compliance), NH R-PACS</td>
<td>12.5%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Stage 5</td>
<td>Closed loop medication administration</td>
<td>22.0%</td>
<td>24.2%</td>
</tr>
<tr>
<td>Stage 4</td>
<td>CPOE, Clinical Decision Support (clinical protocols)</td>
<td>15.5%</td>
<td>15.7%</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Nursing/clinical documentation (flow sheets), CDSS (veril checking), PACS available outside Radiology</td>
<td>30.3%</td>
<td>27.7%</td>
</tr>
<tr>
<td>Stage 2</td>
<td>CDR, Controlled Medical Vocabulary, CDSS, may have Document Imaging, HIE capable</td>
<td>7.6%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Stage 1</td>
<td>Ancillaries - Lab, Rad, Pharmacy - All Installed</td>
<td>3.3%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Stage 0</td>
<td>All Three Ancillaries Not Installed</td>
<td>5.8%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

Data from HIMSS Analytics9 Database ©2012  
N = 9466  
N = 8449
Model for Clinical Transformation

- Build evidence out of practice
- Leverage analytics to extract actionable knowledge
- Focus on “Making it Easy to do the Right Thing”
- Collaborate to foster knowledge translation

NURSING KNOWLEDGE:
Big Data & Science for Transforming Health Care

CDS > Documentation > Outcomes

*All improvements in pressure ulcer prevention outcomes are the result of a comprehensive and multi-pronged approach to performance improvement.*
The Value of Integrating Nursing Data

<table>
<thead>
<tr>
<th>Health IT Action</th>
<th>KP Location</th>
<th>Benefit Realized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Sign On to EHR</td>
<td>Northwest region</td>
<td>8 seconds/log on X 100 log on's/day = 13 min direct care back and improved documentation at the point of care.</td>
</tr>
</tbody>
</table>
| Evidence-based bundles for nursing documentation in EHR in combination with Real-time Clinical Care Dashboard | All hospital regions | Improved documentation compliance and quality outcomes. Fall Rate steadily decreased after implementation of fall bundle: Dec 2012 Rate 1.0  
Dec 2013 Rate 0.04  
HAPU Incidence Dec 2011 1% Dec 2013 0.04%

IOM: Best Care at Lower Cost

**Recommendations**

1. Improve the capacity to capture clinical, care delivery process, and financial data for better care, system improvement, and the generation of new knowledge.
2. Involve patients and families in decisions regarding health and health care, tailored to fit their preferences.
3. **Accelerate integration of the best clinical knowledge into care decisions.**
4. Continuously improve health care operations to reduce waste, streamline care delivery, and focus on activities that improve patient health.
5. Improve coordination and communication within and across organizations.

**NURSING KNOWLEDGE:**

Big Data & Science for Transforming Health Care

*September 2012*
Accomplishments

- Collaborating with Epic and CPMRC on aligning mapping of nursing interventions to LOINC and SNOMED
- Leveraging KP’s Convergent Medical Terminology tools to map nursing flowsheet rows and nursing observations/interventions
- Contributed a leadership exemplar in the TIGER Leadership Imperative: Recommendations for Integrating Technology to Transform Practice and Education
- Contributed to: Chow, M., Cipriano, P., Cromwell, T., Murphy, J., O’Brien, A., Sensmeier, J., Westra, B. *A Blueprint for Action: Demonstrating Quality Measures Across all Settings with Health Information Technology. Journal of Health Information Management. Summer 2013*
- Published: Harrison, Tonya: “Beyond Data Entry; Leveraging Data to Enable Actionable Clinical Intelligence for Nursing” Journal of Health Information Management: Summer 2013

Recommendations

- Develop a national library for evidence based quality bundles for open sharing
- Standardize and develop processes for updating nursing evidence based content
- Collaborate to accelerate integration of the best clinical knowledge into care decisions
- Support the advancement of predictive analytics to support the triple aim
- Leverage vendor partnerships
- Advance the role of nursing informatics as key leaders in care delivery transformation
Nursing eMeasures for Meaningful Use of EHRs

Judith J. Warren, PhD, RN, FAAN, FACMI
June 4, 2014

Accomplishments

• Developed a process for converting NDNQI quality indicators into eMeasures as specified by NQF and CMS—Meaningful Use
• Developed a data dictionary and two submission containers for Pressure Ulcer data plus a web site for submission
• Conducting reliability, validity and feasibility studies for pressure ulcer indicators required for NQF endorsement
  – 3 EHR vendors
  – 9 hospitals
Pressure Ulcer eMeasure - Foundations

• HL7 Pressure Ulcer Prevention Domain Analysis Model
• NPUAP/EPUAP and WOCN Pressure Ulcer Prevention Guidelines
• Pressure Ulcer Incidence Value Set
  – Mapped to SNOMED CT
  – Submitted to Value Set Authority Center at the National Library of Medicine
• Measure specifications in the NQF/CMS Measure Authoring Tool based on the Quality Data Model
• Follows NQF Criteria for eMeasure endorsement

Pressure Ulcer eMeasure - Development

• Guidelines for Submission
  – Includes Pressure Ulcer eMeasure Data Dictionary
• Export Database Containers
Pressure Ulcer eMeasure - The Data

- Clinical data captured in:
  - the EHR
  - other related healthcare databases
- Extracted monthly from discharge records
  - Extracted at the end of each month
  - Extracted from the electronic records of patients who were discharged from the facility during that month
- Data from patient admission to discharge will be extracted

Recommendations

- Continue the reliability, validity, and feasibility studies for Pressure Ulcer eMeasures; enroll 2 EHR vendors and 3 hospitals
- Apply the identified eMeasure process to the remaining NDNQI indicators (long term)
- Support the ANA in the political work of insuring the adoption of NDNQI’s eMeasures
  - NQF: National Priorities Partnership and Measure Applications Partnership
  - CMS Patient Safety measures and AHRQ-PSI
- Encourage vendors and EHR users to implement NDNQI eMeasures
Questions

• Please contact
  – Judith Warren, jjwarren@live.com
    • NDNQI Consultant
  – Nancy Dunton, ndunton@kumc.edu
    • NDNQI Director

Nursing Problem Subset of SNOMED CT

Susan A. Matney, MSN, RN, PhDc, FAAN
Judith J. Warren, PhD, RN, FAAN, FACMI
June 5, 2014
Nursing Problem Subset Content

• The SNOMED CT nursing problem subset:
  – Contains only SNOMED CT codes that have a mapping in UMLS to other nursing terminologies;
  – Contains only concepts from the Clinical Findings hierarchy
  – Supports Meaningful Use problem list criteria
  – Coordinates with the Data Elements for the HL7 Patient Plan of Care

Subset Development Process

• The UMLS Metathesaurus was queried to create an initial nursing problem list subset using the versions of SNOMED CT and the nursing terminologies available in the 2012AA version of the UMLS Metathesaurus.
• The subset is distributed through the UMLS following the model used for distributing the CORE Problem List Subset of SNOMED CT.
• The subset is rebuilt with each updated version of each terminology (now in version 2 with 3 coming).
Resources Used

• No resources from IHTSDO requested.
• Susan Matney and Judy Warren led the project
• Vivian Auld coordinated and provided liaison to the NLM.
  – Initial set obtained by UMLS query.
• Small group reviewed and did the clean-up
  – Susan Matney, Judy Warren, Jonathan Evans, Amy Coenen, Claudia Bartz, Tae Youn Kim, Vivian Auld

Results

• 714 Rows in spreadsheet from UMLS
• 591 Unique CUI’s
  – Included some Interventions and Outcomes
• Final Number in the subset of SNOMED CT Nursing Diagnosis
  – Version 1 = 370
  – Version 2 = 417
Recommendations

• The nursing problem list of SNOMED subset should be used in addition to the Core Problems list subset to populate the value set for problem list selection and data exchange.

• Mappings between SNOMED CT nursing problems and other nursing diagnostic terminologies should be obtained by querying the UMLS.

• Nursing terminologies that contain nursing diagnoses should maintain their terminology in the UMLS in order to facilitate mapping and interoperability.

• When nursing diagnoses are found missing, the UMLS administrators should be notified.

IHTSDO News Release

SNOMED CT — Supporting Meaningful Use

Introduction
SNOMED CT is a comprehensive clinical terminology that is freely available for use in the U.S. through the National Library of Medicine (NLM).

Meaningful Use Stage 2 Rules
The Office of the National Coordinator for Health Information Technology (ONC) and CMS have adopted SNOMED CT as one of the three validated lists for Meaningful Use Stage 2, EHR certification, and health information exchange.

SNOMED CT has been specified in the federal regulations published in September 2012 (see Federal Register Vol. 77, No. 57), in which it is recommended for documenting patient problems, encounter diagnoses, interventions, family health history, and smoking status.

Meaningful Use Objectives Supported
1. Maintain an up-to-date problem list of current and active diagnoses
2. Record pertinent family health history as structured data
3. Identify and report cancer cases to a state cancer registry
4. Record clinical lab changes in vital signs
5. Record smoking status
6. Provide a summary care record for each transition of care

Resources for Implementation of SNOMED CT — encoded problem lists
SNOMED CT — encoded problem lists have been developed for implementation of SNOMED CT in meaningful use. The resources are available online at the following link: http://ihtsdo.org/fileadmin/user_upload/Docs_01/Publications/SNOMED_CT/SnomedCt_MeaningfulUse_20140219.pdf

Nursing Problem List Subset

Nursing Problem List Subset of SNOMED CT is intended to facilitate the use of SNOMED CT as the primary coding terminology for nursing problems used in care planning, problem lists or other summary-level clinical documentation.
Appendix D
Nursing Knowledge: Big Data & Science for Transforming Health Care

6/25/2014

Susan Matney
samatney@mmm.com

Questions

Susan Matney
samatney@mmm.com
Harmonising ICNP® with other Health Terminologies

Amy Coenen, PhD, RN, FAAN
International Council of Nurses

Big Data Conference
5-6 June, 2014
University of Minnesota, USA

Accomplishments:
Harmonizing ICNP® with other Health Terminologies

• ICNP Catalogues
• ICNP is a related classification in the WHO Family of International Classifications (ICD, ICF, ICHI)
• Harmonisation agreement in place with IHTSDO (SNOMED-CT)
• Collaborative agreement in place with Sabacare Inc (CCC)
Harmonization: ICNP Catalogues

- Catalogues (ICNP subsets) enhance participation of clinical experts, facilitate evidence-based content and field testing  

- Harmonising with local and national terminologies  
  - Scottish NHS Community Dataset  
  - Canadian Health Outcomes for Better Information and Care (HOBIC)

ICNP & WHO
Family of International Classifications

- **ICF**: Harmonising ICF & ICNP  

- **ICHI**: ICNP is the content source for nursing in the development of WHO International Classification for Health Interventions (ICHI)  
  - WHO FIC Family Development Committee meeting in Chicago (AMA) June 2014  
  - Field testing of ICHI content used by nurses in Porto Portugal (2014 - 2015)
ICNP & SNOMED CT

• 2013 Equivalence Table
  – 436 pair-wise mappings between ICNP diagnoses/outcomes and SNOMED CT findings (59% of ICNP diagnoses).
  – Download is available at the ICN website and at UMLS
    • Click on “online form”, complete form and select options to download
  – References

• Current IHTSDO Work Plan: IHTSDO Nursing SIG and ICN
  – Focus on “nursing problems”
  – Approximately 400 concepts had equivalence in ICNP and SNOMED CT.
    • Approximately 150 concepts under review for submission to IHTSDO to include in SNOMED CT new release.
  – Future work will focus on Outcomes and Interventions.

ICNP & CCC

• Nursing Diagnoses (Problems)
  – All CCC problems have an equivalent semantic match with an ICNP concepts (and resulting map to SNOMED CT)
  – Additional (unmapped) ICNP problem diagnoses are linked to CCC Care Component

• Nursing Interventions
  – Fewer CCC interventions have an equivalent concepts in ICNP, but most (unmapped) ICNP interventions are linked to CCC Care Component

• Outcomes
  – Plan for post-coordination of ICNP and mapping to CCC Care components

Appendix D
Nursing Knowledge: Big Data & Science for Transforming Health Care
Recommendations

• The aim of harmonization is to allow terminologies to co-exist. Harmonization is key to:
  – Interoperability
  – Mutual enhancement of terminologies
  – Comprehensive representation of nursing practice in EHR
  – Inter-professional collaborating
  – Translations
  – United voice for Nursing

• Continue ICNP Harmonization efforts (as multiple terminologies will always exist)
  – among local and national projects to share internationally (e.g. Scottish Community Nursing Dataset, C-HOBIC)
  – across nursing terminologies (e.g. ICNP, CCC, PNDS), and
  – with other health care terminologies (e.g. SNOMED-CT, ICHI, LOINC).

HL7 Patient Care Working Group
Care Plan Initiative
Interprofessional Continuity of Care

Laura Heermann Langford PhD, RN
Intermountain Healthcare
Co-Chair, HL7 Patient Care Working Group
June 7, 2014
Recent HL7 Care Coordination Activities

- Patient Care Work Group
  - Care Plan Domain Analysis Model
- Patient Care and Service Oriented Architecture Workgroups
  - Care Coordination Service
- Structured Document Workgroup
  - Care Plan Document Type for C-CDA
- FHIR (Fast Health Interoperable Resources)
  - Care Plan Resource

Logical Information Model
Care Coordination Services (CCS)

- Care Plan initiation and implementation requires complex negotiations and coordination
  - A set of CCS functional capabilities are developed to support these requirements
SDWG – C-CDA

- Review of S&I Framework, IHE and DAM recommended data for Care Plan
- Review of existing C-CDA Sections and Entries
- Additions made to C-CDA Sections and Entries
- Care Plan Data type added

FHIR

- New in the last year
- Recently assigned to Patient Care Workgroup for oversight and maintenance
- Investigating trial and testing methods
What’s Next: HL7 Care Coordination

• Update Care Plan DAM and CCS in accordance to approved ballot comment dispositions
  – Publish Informative Care Plan DAM Document
  – CCS: Draft Standards Trial
• C-CDA
  – Publish updated standard/DSTU
• FHIR
  – Continue refining resources
  – Trial “clinical” use case implementation

Questions?
AMIA–NIWG’s NI Scholarship Initiative

Charlotte Weaver RN, PhD, FAAN
Gentiva Health Services
June 6, 2014

Task Force Participants

Patricia Flatley Brennan
Jane Carrington
Connie Delaney
Patricia Dykes
Brian Gugerty
Rosemary Kennedy
Susan Matney
Jacqueline Moss
Judith Warren
Charlotte Weaver
Betsy Weiner
Bonnie Westra
Heimar Marin (International)
NI Scholarship Focus

- To promote the creation, development, testing, and application of Nursing Knowledge through Integration of Nursing Informatics Science into education, research and practice to ensure optimal health and well being of people
- To determine optimal communication about NI Science to promote dissemination and use

In Search of an Operationalized Framework

- **Bottoms-Up Model**
  - Reflects historical beginnings and evolution linked to development, implementation and servicing of acute care EHR systems
- **Top-Down Model**
  - Translational research starting from basic bench methodologies and filtering down to clinical knowledge, education and practice
- **Middle and Contextual**
  - Recognize that the need and question asked drive methodology
  - Multiple and simultaneous research agendas needed
Bottoms-Up Model

Reflects tasks of building, implementing, testing, and evaluating EHR systems to support nursing

- Knowledge framework requiring standards for:
  - Terminology – definitions, domain and reference structures
  - Quality measures
  - Data exchange
- Enables ease of querying clinical practice data, generation of quality outcomes, and discovery of best practices
- Makes like comparison to other organizations’ outcomes nationally and internationally possible
- Informs clinical practice, new knowledge for educational curriculum, and research directions

Nursing Knowledge: Big Data & Science for Transforming Health Care
**Demonstrating Value Proposition**

- Use case of Pressure Ulcer Assessment and Orders based on collaborative work of Kaiser Permanente and VA
- Recommendations:
  - Data standards for assessments and interventions are vendor neutral
  - Specific standards proposed are:
    - HL-7 for domain model
    - SNOMED-CT/LOINC for terminology
    - NDNQI metrics put into HL-7 for standardization & validation
    - NQF’s quality data model v2 authoring tool for quality measures
    - QRDA structured document for data exchange
  - Be developed for international context to enable data exchange, measure comparisons and research collaborations

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**Top Down – Translational Model**

- Applying research methods to different levels of inquiry
- Overview of scholarship endeavors – range from basic bench research to health services improvement – big data projects.
- Reflects domains that NI researchers currently work in today
- Not sequential – findings from one level may inform an inquiry at a different level, iteratively
Appendix D
Nursing Knowledge: Big Data & Science for Transforming Health Care
83
Middle and Contextual

Bakken et al 2008  NI’s Research Agenda

- Presents the areas where NI research is currently in process and needed in future
- Shows NI research as a process:
  - New knowledge is discovered from research
  - Disseminated in academic, education, policy
  - Embedded in care delivery
  - Outcomes evaluated, validated and outstanding questions identified
2008 – 2018 NI Research Agenda


NURSING KNOWLEDGE:
Big Data & Science for Transforming Health Care

Action Plan

• NIWG Leadership doing Phase II work

• What’s missing

• What strategies needed to communicate this to other nurses and informatics colleagues?
Knowledge Discovery Data Analytics Methods

Karen A. Monsen, PhD, RN, FAAN

June 6, 2014

mons0122@umn.edu

Big Data Laboratory

- 2010: Dean Delaney invited the Omaha System Partnership for Knowledge Discovery and Healthcare Quality within the University of Minnesota Center for Nursing Informatics
  - Scientific teams
  - Affiliate members
  - Data warehouse
Using a Logistical Mixed-effects Model with Nursing Data

- How do nurses and interventions contribute to variability in patient and population health?
  - Nurse (17%)
  - Client (50%)
  - Problem (17%)
  - Intervention (17%)

  \[
  Y_i \sim \text{Bernoulli}(\theta_i), \quad \log(\theta_i) - \log(1 - \theta_i) = \beta_0 + \beta_1 \text{Age} + U_i
  
  U_i \sim N(0, \sigma^2),
  \]

- Age was significantly positively associated with knowledge benchmark attainment in all models

This research is partially supported by the National Science Foundation under grant # SES-0851705, and by the Omaha System Partnership. Monsen, K. A., Chatterjee, S. B., Timm, J. E., Poulsen, J. K., & McNaughton, D. B. (in review). Public health nurse, client, and intervention factors contribute to variability in health literacy outcomes for disadvantaged families.

Using Data Visualization to Detect Client Risk Patterns

Each image (sunburst) was created in d3 from public health nursing assessment data for a single patient. Data were generated by use of the Omaha System signs and symptoms and Problem Rating Scale for Outcomes.

Key:
- Colors = problems
- Shading = risk
- Rings = Knowledge, Behavior, and Status
- Tabs = signs/symptoms

Documentation patterns suggest a comprehensive, holistic nursing assessment.

Kim et al. found that the presence of mental health signs and symptom tends to be associated with more diagnostic problems and worse patient condition.

Using Generalized Estimating Equations for Cohort Comparison

- Mothers with intellectual disabilities have twice as many problems as mothers without intellectual disabilities
- Receive more public health nursing service
  - Twice as many encounters and interventions
- Show improvement in all areas
  - Do not reach the desired health literacy benchmark in Caretaking/parenting


Using Graphing Methods with Multilevel Kway Partitioning to Form Non-Overlapping Intervention Clusters

This research was supported by a Midwest Nursing Research Society New Investigator Seed Grant. Monsen, K. A., Banerjee, A., & Das, P. (2010). Discovering client and intervention patterns in home visiting data. Western Journal of Nursing Research, 32(8), 1031-1054. doi:10.1177/01939445910370970
Using Kaplan-Meier Curves to Depict Problem Stabilization

This research was supported by the National Institute of Nursing Research (Grant #P20 NR008992; Center for Health Trajectory Research). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Nursing Research or the National Institutes of Health. Monsen, K. A., McNaughton, D. B., Savik, K., & Farri, O. (2011). Problem stabilization: A metric for problem improvement in home visiting clients. Applied Clinical Informatics, 2, 437-446. http://dx.doi.org/10.4338/ACI-2011-06-RA-0038

Using Data Visualization to Detect Nursing Intervention Patterns

Each image (streamgraph) was created in d3 from longitudinal public health nursing intervention data for a single patient. Data were generated by use of the Omaha System in clinical documentation.

Key:
- Colors = problems
- Shading = actions (categories)
- Height = frequency
- Point on x-axis = one month

From 403 images, 29 distinct patterns were identified and validated by clinical experts.

Documentation patterns suggest both a unique nurse style and consistent patient-specific intervention tailoring.

Monsen, K. A. et al., 2014
Using Inductive and Deductive Approaches to Create Overlapping Intervention Groups

Relationships between four intervention grouping/clustering methods for wound care.


Using Receiver Operating Curves to Understand Model Fit

• Comparison of Intervention Modeling Approaches and Hospitalization Outcomes for Frail and Non-frail Elderly Home Care Patients

Using Logistic Regression to Associate Home Care Interventions and Hospitalization Outcomes

• Too little care may result in hospitalization when patients have more intensive needs
  – Frail elders are more likely to be hospitalized if they have low frequencies of four skilled nursing intervention clusters


Using Pattern Comparison Pre- and Post-Intervention to Demonstrate Intervention Effectiveness

Knowledge scores across problems over time
  – Pre-intervention, patterns by race/ethnicity
  – Post-intervention, patterns by problem

Further Research

- Examine associations between intervention patterns and client outcomes
  - Is there differential effectiveness of intervention patterns for similar client profiles?
  - What is optimal intervention tailoring?
  - What is the nurse effect?

- Evaluate patterns across agencies and programs
  - Do patterns persist across agencies?
  - What aspects of nursing interventions are similar across programs and populations?
  - How does individualized care relate to evidence-based practice?

Monsen, K. A. et al., 2014

Recommendations

- Expand the development of data analytics methods to incorporate nursing and interprofessional datasets and encompass all standardized terminologies and structured data.
- Continue to develop and test new methods on existing datasets.
Nursing and CTSA/ PCORI Informatics Research

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June 6, 2014

Accomplishments

• Involved in two grants –
  – Clinical Translational Science Award (CTSA)
  – PCORI grant – Great Plains Collaborative (GPC) Clinical Data Research Network

• Collaborate
  – Common Data Model
  – Standardization of nursing and other health data
CTSA

- PI- Bruce Blazer, Co-PI for BMI - Connie Delaney, University of Minnesota
- Purpose – to **improve human health** by
  - Streamlining science,
  - Transforming training environments and
  - Improving the conduct, quality and dissemination of clinical and translational research
- Building an information infrastructure – Academic Health Center Information Exchange
  - 8 hospitals, 40+ primary and specialty care clinics
  - Extend a common data model used for i2b2 by adding flowsheet data from an EHR

PCORI - GPC

- PI- Russ Waitman, University of Kansas Medical Center; Co-PI-Connie Delaney, University of Minnesota
  - 10 institutions, 7 are CTSA funded, use 3 different EHRs
- Purpose - comparative effectiveness research
  - breast cancer, ALS, obesity
- Requires a common data model and data standards to build the information infrastructure to support the research
CTSA Pilot Project

• Began with a pilot project to evaluate factors influencing clinical documentation
  – Prevention of pressure ulcers, falls, venous thrombosis embolism (VTE), and catheter associated urinary tract infections (CAUTI), pain management

• Lessons learned
  – Policies, procedures, and standards require translation for database queries
  – Data for quality measures are not linked in the database
  – Data normalization needed - duplicate measures for similar concepts in flowsheets
  – Quality measures require knowledge of nursing and other terminologies

Next Steps

• 200,000 flowsheet measures, 66,000 patients
• Evaluating 5 quality measures
• Developing data normalization methods
  – Creating an ontology for use in i2b2/ data queries
  – Coding of flowsheet data – SNOMED CT and LOINC
• Integrating ontology into i2b2
• Share process
Recommendations

- Finalize the ontology for the 5 clinical quality measures and add i2b2
- Extend the ontology for flowsheet data
- Develop a method for consistent coding of flowsheet data using SNOMED CT and LOINC
- Collaborate with CTSA partners, EHR user groups, others
- Create a common communication mechanism for sharing collaborative efforts to prevent duplication across researchers health systems and EHR vendors.