

Appendix C

Abstracts Submitted Prior to the Conference

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



AHRQ and Health Services Research in Nursing

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Agency Information:

The Agency for Healthcare Research and Quality (AHRQ) funds and conducts health services research and is part of the U.S. Department of Health and Human Services. AHRQ's current Director, Richard Kronick, PhD, established a new mission and priority areas for the agency in November 2013. AHRQ has a health IT portfolio that, among other goals, funds research to produce the evidence on how to leverage health IT to improve health care quality. AHRQ has funded some research that specifically addresses nursing and nursing practice, including the impact of health IT on nursing practice. AHRQ also has a Senior Advisor for Nursing. Information about the types of grants and contracts that the Agency has funded related to nursing can be found online in several places, including:

Recommendations

1. Know AHRQ priority focus areas.
2. Review funding announcements - <http://healthIT.ahrq.gov>.
3. Review call for proposals - <http://gold.ahrq.gov>.
4. Contact the Senior Advisor for Nursing Informatics.

**American Academy of Nursing
Expert Panel on Nursing Informatics and Technology**

Lillee Gelinas, MSN, RN, FAAN¹, Kathryn H. Bowles, PhD, RN, FAAN, FACMI², Thomas R. Clancy, MBA, PhD, RN, FAAN³, Ida Androwich, PhD, RN-BC, FAAN⁴, Michelle Troseth, RN, DPNAP, FAAN⁵, Jane Englebright⁶, PhD, RN, CENP, FAAN⁶.

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The American Academy of Nursing (AAN) serves the public and the nursing profession by advancing health policy and practice through the generation, synthesis, and dissemination of nursing knowledge. Expert panels represent the working groups of the Academy and review the current research and needs within their field to make recommendations on projects or initiatives the Academy should undertake to transform health care policy and practice.

Key members on the AAN Expert Panel for Nursing Informatics and Technology attended the First Annual Big Data Conference in 2013 and made a commitment to publish “A Call to Action” in Nursing Outlook and advance the strategic objectives of the conference. Since the conference a Call to Action: Engage in Big Data Science was published in the January 2014 edition of Nursing Outlook. In addition, an open conference call to all expert panel members was conducted in June 2013 to update members on the objectives being advanced as a result of the Big Data Conference. Finally, at the October 2013 Annual AAN Conference the expert panel reviewed the objectives and strategic plan developed at the 2012 Big Data Conference and supported advancing them through the 2014 Expert Panel on Nursing Informatics and Technology Action Plan.

Recommendations:

The 2014 Expert Panel on Nursing Informatics and Technology’s Action Plan includes specific objectives to:

1. Implement strategies that advance the adoption of standardized terminologies for clinical documentation by nurses in electronic health records.
2. Conduct two policy update phone conferences or webinars for the expert panel membership (June 2014 and September 1, 2014) following the Big Data Conference
3. Conduct an open “Policy Dialogue” entitled “Putting the Health Back in Electronic Health Records” at the 2014 Annual AAN Conference in October 2014.

Exemplars Advancing Sharable/Comparable Data

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Accomplishments in Last year:

Exemplars were summarized from research projects supported by AHRQ at Partners, Kaiser Foundation and the VA, and Intermountain Healthcare that demonstrated that within multiple settings, data had to be harmonized and standardized in order to determine the quality and efficiency of care in areas such as pressure ulcers, pain, and falls. These distributed, multi-site hospital environments demonstrated that each environment had to begin with evidence, a model of care, and 10 steps in harmonizing data. These networks represented national healthcare networks, multi-hospital community networks, and a large regional network. Since different individual settings used different terminologies, these national groups harmonized on SNOMED-CT and LOINC.

The healthcare environment is national and comprised of multiple organizational types and global networks comprised of multiple healthcare organizational structures and financing models. The healthcare environment can be perceived as three dimensional at a minimum. Standards need to be identified that are best fits for different environments, harmonized into nationally recognized standards where applicable, and harmonized into internationally recognized standards for universal health and global comparisons. National policies are required to support the steps in harmonizing nursing content into national and international standards. Research to support exemplars in each of these environments is needed. In order to make data actionable, developers of EHRs and IHEs are responding to continual regulatory changes and are working in national and global environments with varying economic conditions. Timelines for adoption of standards need to be both realistic and achievable.

Recommendations:

1. Research funding is needed to support further Exemplars in multiple settings within regional, national, and international settings.
2. 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.
3. Models are needed that can make data actionable responding to continual regulatory changes and are dependent on national and global economic conditions.

AMIA Nursing Informatics Working Group

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Accomplishments in Last year:

The Nursing Informatics Working Group (NIWG) of the American Medical Informatics Association (AMIA) embraced the 2013 National Action Plan in many ways. Towards *Adopting common terminologies and standards* NIWG has continued to monitor nursing engagement in standards development activities at several standards development organizations such as LOINC, IHTSDO, HL7, IHE, S&I Framework, NQF, and NDNQI. The NIWG has continued to participate in *Shaping policy* responding to several calls for public comment contributing responses representing the nursing perspective, having members with sustained participation in several of the ONC Standards & Interoperability Framework Initiatives. *Educating nurses, nurse faculty, nurse executives, nurse informaticians and interprofessional care disciplines* has been an area of significant focus for NIWG. NIWG has sponsored multiple webinars reaching their membership and non-members to promote many areas of interest to the 2013 National Action Plan. NIWG has continued work on the Scholarly Initiative promoting nursing knowledge through integration of nursing informatics science into education, research and practice to ensure optimal health and well being of people as well as continuing to be a lead and financial supporter of the ANI Tiger Initiative.

Recommendations:

1. Continuation of activities towards the 2013 National Action Plan
2. Repeat the NIWG Nurses Engaged in Standards Survey last done in 2011.
3. Consider methods toward calls for national standards for exchange of nursing data and the creation of a national central nursing content repository.
4. Engage NIWG members in implementation of the Scholarly Initiative's education, collaboration, consultation, and dissemination plan

Laying the Infrastructure for Nursing Knowledge using Health IT

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Office of the National Coordinator for Health IT
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Accomplishments in Last year:

- 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:

1. The HIT Policy and Standards Committees are re-organizing their WGs – goal is to have a nurse on every WG (12)
2. Discover more nurses and nurse practitioners to include in the ONC Fellows Program
3. Hold annual ONC Nursing Summit and quarterly webinars, keeping focus on frontline nursing staff attendance by working with nursing organizations
4. Establish better working relationships with the NP community, including their organizations AANP and NNCC

Harmonizing Nursing Assessments with LOINC

**Bonnie I. Westra, PhD, RN, FAAN, FACMI¹; Susan A. Matney, MSN, PhD-C, RN, FAAN²;
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¹University of Minnesota, School of Nursing, Minneapolis, MN; ²3M Healthcare, Salt Lake City, UT

Accomplishments in Last year:

One of the recommendations from the 2013 National Action Plan was to use SNOMED-CT for nursing diagnoses, interventions, and outcomes and LOINC for nursing assessments to support health information exchange.

The problem is that there is no “gold standard” or framework identifying a standard list of assessments nor is it known what nursing assessments exist in LOINC. An initial framework was developed comparing the high level categories for nursing diagnoses, since diagnoses are conclusions from assessments. The Clinical Care Classification (CCC) was selected and modified to include a component for Environment. This framework was used subsequently to explore LOINC panels and surveys for nursing assessments. The investigators identified a target population of non-critical care adults receiving nursing care in any setting. The team found that there were few panels and surveys in LOINC codifying nursing assessments. Exceptions were OASIS, Minimum Data Sets, and interRAI which are assessments for home care and nursing homes. There are many individual measures that can be compiled into a panel representing assessments used by nurses. This project is in its early stage and significant work is needed to use LOINC for representing nursing assessments for health information exchange.

Recommendations:

1. Complete an evaluation of LOINC to identify gaps
2. Create teams to work on specific areas
 - a) Include domain experts
 - b) Recommend assessments for inclusion in LOINC
 - c) Code assessments and submit for approval
3. Disseminate content using the framework for integration into EHRs
4. Develop communication plan

CAHIIM – Accreditation of Health Informatics Programs

Judith J. Warren, PhD, RN, FAAN, FACMI

Warren Associates, LLC, Plattsmouth, NE

Accomplishments in Last year:

One of the recommendations from the 2013 National Action Plan was to support the work of the Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM) and to get a nurse on the Board of Directors. CAHIIM began accrediting health information management programs in 2005 (prior accreditation of these programs was by American Health Information Management Association) and health informatics programs in 2009. It was accredited by Council on Higher Education Accreditation (CHEA) in 2012.

- Judith Warren Appointed to CAHIIM Board of Directors
- Engaged American Medical Informatics Association (AMIA) in membership discussion
 - AMIA would become the professional member to establish informatics competencies

Recommendations:

1. Encourage nursing informatics faculty to become site visitors.
2. Encourage nurse members of AMIA to run for CAHIIM liaison positions upon AMIA becoming a member of CAHIIM.
3. Encourage nursing and health informatics graduate programs to become CAHIIM accredited
 - a. In addition to CCNE accreditation, use the model developed by nurse midwife and anesthesia programs
4. Determine if a professional nursing organization should apply for membership in CAHIIM.

**Quality and Safety Education for Nurses (QSEN)
Nursing Informatics Deep Dive Workshop**

**Thomas Clancy, MBA, PhD, RN, FAAN
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Responding to requests by participants attending the QSEN Institute Workshops from 2010 – 2011, to provide more information regarding nursing informatics, the University of Minnesota School of Nursing, University of Maryland and the American Association of Colleges of Nursing collaborated on providing a pilot workshop (October 2012) on nursing informatics to 150 nursing school faculty and health educators working in the Greater San Francisco Bay Area. The pilot workshop, funded by the Gordon and Betty Moore Foundation (GBMF), exposed participants to a broad range of topics and resources from national leaders in nursing informatics.

In 2013 QSEN consultants evaluated the outcomes of the QSEN Institutes and pilot workshop, at 6 months (site visit) and one year (survey) and noted significant improvements in the integration of QSEN KSA's for nursing informatics in participating nursing schools curriculum. Results of the site visit and survey indicated that resources most useful to faculty include: an on-line nursing informatics course for pre-licensure students with an instructor manual, a series of webinars and webex's on specific topics in nursing informatics, a series of workshops focused on nursing informatics content and teaching methods. Based on the success of the pilot DDW, the GBMF provided funding to the University Of Minnesota School Of Nursing in 2014 to facilitate the development of these resources and make them available at the national level.

Recommendations:

1. Develop an advisory board of key leaders in nursing informatics to build consensus around a standard curriculum for nursing informatics aimed at pre-licensure nursing students.
2. Develop a crosswalk between the AACN Essentials for Information Management and Technology, QSEN KSA's for Nursing Informatics and the TIGER competencies for clinical nurses and nursing students.
3. Develop the resources as outlined in the grant by the Moore Foundation to fill gaps not being provided through existing professional organizations.
4. Provide the first workshop as a pre-conference at the AACN Baccalaureate Education Conference scheduled for November 2014 in Baltimore, MD.

Big Data and Nursing Business Intelligence

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Accomplishments in last year:

One of the key issues facing health care and nursing in particular is the ability to define and measure value. Barriers to implementing a value-based approach in nursing as well as developing real-time nursing business intelligence and analytics tools from large data sets is due to: 1. a lack of standardized or consensus metrics to derive patient level nursing costs and intensity measures and analytic approaches to identify high value nursing care; 2. need to develop methods to benchmark nursing within/across settings; and 3. ability to utilize data in EHRs to provide more granular and real-time information about nursing performance, efficiency, effectiveness, quality, and outcomes. In this past year, we have begun a systematic program of research housed within the Colorado Collaboration for Nursing Research at CUCON to develop and test new models for deriving patient level nursing costs and intensity and develop a national research strategy and framework to address ways to measure and benchmark nursing care within and across different health care settings using current and emerging business intelligence and analytic tools. We have published two preliminary articles on this work. We are currently submitting several research proposals to implement this research strategy and disseminate results and are building a sustainable research infrastructure through self-funding from partner institutions.

Recommendations:

1. Develop a national consensus model to measure patient level nursing intensity and costs and produce metrics to benchmark nursing care finance 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 in the EHR and be deployable 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

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Accomplishments in Last year:

Patient-centric care includes incorporating nursing terminologies for better assessment, diagnosis, and treatment of individual patients. There is no national standard or tool for mapping nursing terminologies and few organizations have the resources for terminology mapping.

In 2014, Minnesota e-Health Advisory Committee convened meetings and consulted with nursing informatics experts and health practitioners from multiple settings in the state and formulated recommendations related to the use of standard nursing terminology in Minnesota.

Selected Recommendations

1. All health settings should create a plan for implementing an American Nursing Association (ANA) recognized terminology within their electronic health record (EHR).
2. Each setting type should achieve consensus on a standard terminology that best suits its needs and select that terminology for its EHR...
3. Education should be provided and guidance developed for selecting the terminology standard that suits the needs for a specific setting.
4. When exchanging a C-CDA with another setting for problems and care plans, SNOMED-CT and LOINC should be used for exchange.
5. 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, RN¹; Bonnie I. Westra, PhD, RN, FAAN, FACMI¹; Connie W. Delaney, PhD, RN, FAAN, FACMI¹; Tylor Wagner, MHI²; Susan Matney, PhD-C, RN, BC, FAAN³; Colleen Hart, MSN, RN¹; Mary Jo Swanson, DNP, RN³

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Accomplishments in Last year:

As an effort to follow the 2013 National Action Plan of using LOINC for standardization, the Center for Nursing Informatics at the University of Minnesota completed updating the Nursing Management Minimum Data Set (NMMDS) elements and is completing coding these in LOINC. The NMMDS was developed to provide a standardized set of essential data elements describing contextual factors influencing nursing work in any setting. The NMMDS environmental and nurse resources have been harmonized with other national data collection efforts. NMMDS elements #10 was renamed as Accreditation/Certification/Licensure, including existing accreditation, certification, and licensure organizations. NMMDS elements #19, Nursing Demographics, has replaced previous elements #11 and #12 for nurse staff and manager demographic profiles. This data clarifies State Boards of Nursing data collection requirements. NMMDS #7 clinical decision making complexity has been replaced by #20 Clinical Mental Work. NMMDS #8 environmental complexity has been replaced by #21 Environmental Condition and #22 EHR Implementation Stages.

Recommendations:

1. Finalize LOINC coding updated NMMDS data elements
2. Target dissemination strategy for sharing all NMMDS data elements with
 - a) Workforce data collection through State Boards of Nursing to support the Future of Nursing requirements
 - b) National Database for Nursing Quality Indicators (NDNQI)
 - c) Disseminate to others through professional organizations, software vendors, and policy makers

Interprofessional Education National Center Data Repository

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Abstract

Purpose: The purpose of this activity was to create a national data repository for

Relate Activity to National Action Plan:

The University of Minnesota (UMN) is nationally-recognized for developing new models of interprofessional development programs, essentially setting the course for educating our nation's health professionals. The UMN is the coordinating center that will provide national leadership in the field of interprofessional education and collaborative practice among health professionals. Part of the leadership is creation of a database for research and evaluation of interprofessional education and models of care. Accomplishments this year include: 1) established NCDR architecture & data base; 2) created seven surveys, 3) implemented national center data repository (NCDR) 4/7 sites, 4) established NCDR Mappings, 5) established initial NCDR standard analyses, and 6) engaged with HHRSA, NINR, CMII, etc - expansion

Recommendations:

1. Implement NCDR across all National Center Incubator Sites
2. Expand NCDR to collaborations, including funding agencies
3. Publish first summary of IPP&E
4. Extend NCDR to nursing specialty organizations
5. Prepare NCDR for analysis and potential inclusion in LOINC

Alliance for Nursing Informatics

Joyce Sensmeier, MS, RN-BC, CPHIMS, FHIMSS, FAAN¹

¹ Alliance for Nursing Informatics, co-sponsored by: HIMSS, Chicago, IL and AMIA, Bethesda, MD

Accomplishments in Last year:

The [Alliance for Nursing Informatics](#) (ANI), co-sponsored by AMIA & HIMSS, advances nursing informatics leadership, practice, education, policy and research through a unified voice of nursing informatics organizations. We transform health and healthcare through nursing informatics and innovation. ANI is a collaboration of organizations that represents more than 5,000 nurse informaticists and brings together 30 distinct nursing informatics groups globally. ANI crosses academia, practice, industry, and nursing specialty boundaries and works in collaboration with the more than 3 million nurses in practice today.

ANI agrees that to advance the vision of a transformed health system, we need a more coordinated structure where information can be easily and safely shared among patients, consumers, clinicians and providers to enable improved outcomes, quality of care and lower costs. This vision requires access to real-time, accurate, and actionable health information. In support of this vision, ANI has accomplished the following activities in the past year:

- Shared Big Data Conference recommendations with ANI Governing Directors at Town Hall meetings
- Shared news items about sharable/comparable data via the 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 an article in Computers Informatics Nursing Journal: ANI Connections on the first Big Data Conference outcomes/recommendations

Recommendations:

1. Received support from ANI Governing Directors for use of ANA recognized terminologies; and SNOMED-CT and LOINC for information exchange
2. Support Tipping Point recommendation to encourage use of ANA standardized terminologies for quality measures
3. Support Tipping Point recommendation to require nursing standardized language for Stage 3 Meaningful Use

**Academic/Corporate Big Data Research Collaborative
Optum Labs**

**Thomas Clancy, MBA, PhD, RN, FAAN
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In 2013 the University Of Minnesota School Of Nursing signed an agreement with Optum Labs, a company of UnitedHealthcare, as a partner in an academic/corporate research partnership. The collaboration represents one example of how corporations and nursing schools can partner to conduct big data research on a national level. The Optum Labs Data Warehouse (OLDW) has over 150 million lives of claims and electronic health record data spanning a period of 20 years. It is one of the largest repositories of private insurance and electronic health records data in the US.

Optum Labs goal is to conduct cutting edge research aimed at investigating and finding solutions to some of the most pressing issues in healthcare. The Optum Labs research collaboration is currently limited to select partners that each bring a different lenses to their research. These partners include: 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. Access to the database for partners is through a secure federated portal network located in Optum Labs. Data entering the OLDW is statistically de-identified prior to its storage and never leaves the database. Partners can mine the data for research purposes within the secure confines of an OLDW “sandbox”. In exchange for access to the database and technical support, the partners must submit a minimum number of research studies to an Optum Labs research committee annually which is comprised of members from each of the partners. The research committee then reviews the submissions and determines which have merit to advance. The partnership provides members a rich, diverse and ongoing pipeline of research studies and offers the UM School of Nursing the opportunity to conduct big data research on key national nursing issues.

The Future of Nursing and the Need for Sharable and Comparable Nursing Data for Big Data Science

Susan B. Hassmiller, PhD, RN, FAAN¹

¹Robert Wood Johnson Foundation

The Future of Nursing: Campaign for Action, a joint initiative of the Robert Wood Johnson Foundation and AARP, seeks to improve health through nursing by implementing the Institute of Medicine report recommendations from *The Future of Nursing: Leading Change, Advancing Health*. Efforts to generate sharable and comparable nursing data to demonstrate the valuable contribution of nursing for transforming the health care system closely align with the Campaign's goals to strengthen nursing education, remove scope-of-practice barriers, promote nursing leadership, foster interprofessional collaboration, improve workforce diversity and build an infrastructure for the collection of workforce data.

Recommendations:

Nursing leaders and researchers who are working on “big data” initiatives in the nursing field should find a meaningful way to connect with *The Future of Nursing: Campaign for Action*.

American Nurses Association Update

Cheryl A. Peterson, MSN, RN

Senior Director, Nursing Programs
American Nurses Association

Accomplishments in Last year:

One of the recommendations from the 2013 National Action Plan was for ongoing development of standards to ensure that patient-centric values and needs expressed through the nursing's voice is heard as technologies are developed and implemented. Technology designed for nursing practice won't work unless practicing nurses help guide its development.

ANA continues its efforts to promote an exemplar for quality measures using data collected through electronic health records (EHR) in the course of care delivery. Specifically, ANA developed a pressure ulcer incidence and prevention eMeasure – Pressure Ulcer Cumulative Incidence eMeasure (ePressUlcer^{CI}) – that is built exclusively for use in EHRs. This development positions nursing well as the Office of the National Coordinator for Health Information Technology (ONC) continues its move toward the seamless use of eMeasures regardless of EHR vendor. ANA is also promoting its *Framework for Measuring Nurses' Contributions to Care Coordination* across the Centers for Medicare and Medicaid (CMS), the Agency for Healthcare Quality and Research (AHRQ), the National Quality Forum (NQF) and ONC. In particular, ANA has been advocating for the incorporation of elements of the framework into NQF's framework, which is currently under development. Care coordination is also an ONC priority area for measure development, particularly with regard to eMeasure development for inclusion in the [Meaningful Use](#) programs.

DRAFT Recommendations

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, FAAN¹; Joyce Sensmeier, MS, RN-BC, CPHIMS, FHIMSS, FAAN²

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Accomplishments in Last year:

In response to recommendations made during the 2013 Nursing Knowledge: Big Data & Science for Transforming Healthcare Conference, hosted by the University of Minnesota, School of Nursing, HIMSS CNO-CNIO Vendor Roundtable was established. The Roundtable is sponsored by HIMSS and facilitated by Gail E. Latimer, MSN, RN, FACHE, FAAN and Roy Simpson, DNP, RN, DPNAP, FAAN. Participants include HIMSS Corporate Diamond or Platinum member nurse executives. Participants are “thinkers” in their organization; work in revenue driven organizations; and are committed to participating in an open dialogue in the spirit of HIMSS volunteer committee operating guidelines.

The purpose of the Roundtable is to optimize health engagement and care outcomes through IT by leveraging the thought leadership of vendor nurse executive leaders. The objective of participation is to:

- Serve as an advocate and leader for the nursing community;
- Provide guidance on informatics competencies for nursing; and,
- Provide guidance on EHR related topics including analytics, interoperability, usability, terminology, workflow, quality and outcomes.

Three workgroups have been established. They are each working on specific deliverables which will be vetted by the Roundtable and disseminated. The Nurse Executive Leadership Workgroup will define the nurse vendor leadership role and identify competencies and value to the profession. The Human Factors, Usability, Safety Workgroup will identify resources and opportunities to improve knowledge regarding human factors, usability & safety. The Big Data Position/Principles Workgroup will draft a position statement regarding the nurse vendor’s stance on nursing terminology. This position statement will identify big data principles, barriers and challenges; develop a framework for universal requirements; identify differences in the context of nursing outcomes; address the impact of software versions/configurations; analyze the variation in quality measures; and discuss implementation challenges.

Recommendations:

Vet the Big Data Workgroup Draft Position Statement with the 2014 Nursing Knowledge: Big Data & Science for Transforming Healthcare Conference attendees and disseminate the final statement with the Conference proceedings.

Moving on in Practice: Visualizing the Nursing Problem List

Deborah Ariosto, PhD, MSN, RN

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Accomplishments:

VUMC organized inpatient nursing documentation using the Clinical Care Classification (CCC) framework and corresponding SNOMED-CT codes. The CCC terminology was chosen because it was freely available in the public domain, limited in number of concepts, and easily understood by nursing staff. Nursing care plans use CCC Nursing diagnoses (acute pain) & 3 basic outcomes (improved, stabilized, decline supported). CCC Interventions (acute pain control) are modified using 4 action types (assess, care, teach, manage) and are partially implemented as part of routine documentation outside of the care planning process.

Nursing diagnoses are known at VUMC as ‘Priority Problems’ – and are the anchors by which shift goals are set and help focus supportive documentation. Problems and outcomes are visualized in a common view within the team summary as well as in graphical views. Implementing priority problems was relatively easy since they replaced paper care plans. However, replacing current assessments and interventions is difficult due to the existing structure of the e-documentation templates. However, as requests for new documentation arise, we take these opportunities to revise the each assessment section to reflect the CCC structure. We have done this for the skin integrity and safety/injury prevention sections due to the high visibility of pressure ulcers and patient falls. We also have included all of the CCC teaching concepts across all categories.

Transforming the current state of nursing documentation into structured, coded terminology and usable in the workflow is a long unpaved road which should be approached in realistic phases. Introducing the nursing problem list was a worthwhile first step. However the list of assessment and interventions are complex and many. We are looking at strategies to accelerate the timeline. Local informaticians need help from practical academia in terms of understanding the value of pursuing standards as well as those starting new with vendor supplied starter sets.

Recommendations:

1. As there is more and more focus on measuring outcomes, and limited resources, it is prudent that we start with coded problems, not the solutions (interventions). My recommendation is to set the wheels in motion to include nursing diagnosis in a shared interdisciplinary problem list in all vendor EHR applications.
2. 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, Rochester, MN

Accomplishments in Last year:

Local public health agencies (LPHA) are beginning to exchange electronic health information in the form of a C-CDA using a standardized nursing terminology, Omaha System (OMS). LPHA use of electronic health records (EHR) is nearly universal and OMS is embedded in almost all of those EHRs. Actual use of OMS agency to agency is not consistent, but ever growing and poised to become more widespread as LPHAs begin using health information exchange (HIE) to coordinate their clients' care with other providers. OMS terminology clearly and concisely communicates public health clients' health related issues and status of change. Last summer, LPHAs in southeast Minnesota made client C-CDAs available by request from known partners in peer-to-peer HIE. LPHA staff, EHR vendors, and nursing informatics experts collaborated and considered input from the medical community, before deciding OMS terminology belongs in the Problems and Results sections of the C-CDA. OMS problems are listed in the Problem section with the OMS domain and dates of assessment. OMS problems are further described in the Results section with signs/symptoms; knowledge, behavior and status outcome ratings; description of change; and dates of assessment. These LPHAs are in good position to comply with the recent recommendation by the Minnesota e-Health Initiative for all health care settings to plan to implement an American Nursing Association-recognized nursing terminology in their EHR, and specifically for LPHAs to exchange health information using OMS terminology.

Recommendations:

Follow the Minnesota e-Health Initiative 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.

Bringing Order out of Chaos

Leveraging Standardized Terminology and Clinical Decision Support to Improve Nursing Care and Quality Outcomes

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Healthcare is undergoing an exhilarating and tumultuous evolution. There is a gradual realization that transformational change is required in order to cut costs and improve quality. Use of Health Information Technology (HIT) has been promoted as an opportunity to improve quality, safety and efficiency. Nurses are the largest group of health care professionals and the largest users of HIT. The advancement of the electronic health records (EHR) and HIT have not however enhanced excellence in the delivery of nursing care. Nursing information is not captured in ways that make it sharable and comparable which is essential for quality improvement. According to HIMSS EMR Adoption Model only 16% of U.S hospitals have reached the top levels of adoption: Stage 6 (13.3%) and Stage 7 (3.1%). That means that 84% of hospitals are still implementing EHRs. This provides a golden opportunity for nursing to develop a set of recommendations that can be utilized by CNOs and CNIOs during implementation/optimization to enhance the ability to share and compare nursing data, support nursing critical thinking and improve patient outcomes.

Accomplishments:

- 1) Collaborating with Epic and CPMRC on aligning mapping of nursing interventions to LOINC and SNOMED
- 2) Leveraging KP's Convergent Medical Terminology tools to map nursing flowsheet rows and nursing observations/interventions
- 3) Contributed a leadership exemplar in the TIGER Leadership Imperative: Recommendations for Integrating Technology to Transform Practice and Education
- 4) Published: Chow.M., Cipriano, P, Cromwell, T, Murphy, J, OBrien, 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
- 5) Published: Harrison ,Tonya: "Beyond Data Entry; Leveraging Data to Enable Actionable Clinical Intelligence for Nursing" *Journal of Health Information Management*. Summer 2013

Recommendations:

- 1) Develop a national library for evidence based quality bundles for open sharing across health care organizations and vendors
- 2) Standardize and develop processes for updating nursing evidence based content in EHRs
- 3) Collaborate with EHR and content vendors to accelerate the integration of best clinical knowledge into nursing workflows, interventions and documentation
- 4) Support the advancement of predictive and prescriptive analytics to support the Triple Aim
- 5) Leverage vendor partnerships and international standards organizations to ensure consistent nursing information models and standardized mapping of nursing assessments and interventions to LOINC and SNOMED CT
- 6) Declare a national recommendation to utilize LOINC and SNOMED CT as the standardized terminologies for nursing mapping within EHRs.
- 7) Leverage current work such as the ANA Position Statement on Standardization and Interoperability of HIT, The Tipping Point recommendations, LOINC and SNOMED nursing workgroups and data models to align recommendations and socialize a consistent message
- 8) Advance the role of nursing informaticians as key leaders in care delivery transformation

Nursing eMeasures for Meaningful Use of Electronic Health Records (EHRs)

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Accomplishments in Last year:

Designated an National Database on Nursing Quality Indicators (NDNQI) staff member to be active in Health Level 7 (HL7), be a member of the Clinical Quality Information (CQI) workgroup and monitor the development of the Health Quality Message Format (HQMFM) and Quality Reporting Document Architecture (QRDA). Joined the Quality Data Model User Group.

- Rosemary Kennedy

Designated an NDNQI staff member to monitor the work of the National Committee on Vital and Health Statistics, the Standards and Interoperability (S&I) Framework, the National Library of Medicine's and the Center for Medicare and Medicaid Service's (CMS's) work on Meaningful Use of Electronic Health Records . Joined the Quality Data Model User Group.

- Judith Warren

There were designated ANA staff members who monitored the work of the two Office of the National Coordinator committees (Health Information Technology Policy and Health Information Technology Standards), National Quality Forum's (NQF) National Priorities Partnership and Measure Application Partnership, and CMS's work on Meaningful Use of EHRs.

- Darryl Roberts and Maureen Dailey

Conduct reliability, validity, and feasibility studies for a suite of Pressure Ulcer eMeasures, to include three EHR vendors and nine hospitals; lead development of these eMeasures, their submission to NDNQI, and the indicator analysis and benchmarking

- Sandra Bergquist-Beringer
- Completed one EHR vendor and enrolled six hospitals

Recommendations:

1. Continue the reliability, validity, and feasibility studies for Pressure Ulcer eMeasures; enroll two EHR vendors and 3 hospitals
2. Support the ANA in the political work of insuring the adoption of NDNQI's eMeasures
 - a) NQF: National Priorities Partnership and Measure Applications Partnership
 - b) CMS Patient Safety measures and Agency for Healthcare Research and Quality's Patient Safety Indicators
3. Encourage vendors and EHR users to implement NDNQI eMeasures
4. Apply the identified eMeasure process to the remaining NDNQI indicators (long term)

Nursing Problem Subset of SNOMED CT

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One of the recommendations from the 2013 National Action Plan was to use SNOMED CT for nursing diagnoses to support health information exchange. In addition, SNOMED CT has been mandated for meaningful use coding of problems on the patient problem list. The nursing problem list subset of SNOMED CT was created to be an interoperable set of nursing diagnoses for use in the patient problem list. It was developed by a subgroup of the SNOMED CT Nursing SIG developed the Nursing Problem Subset. The National Library of Medicine's (NLM) Unified Medical Language System (UMLS) Metathesaurus was used as the authoritative source for terminology sampling. Queries for nursing diagnostic concepts were executed against the UMLS Metathesaurus to retrieve all nursing diagnoses across four nursing terminologies where the concept was also represented in SNOMED CT. A candidate data set was retrieved and included the nursing diagnoses and corresponding SNOMED CT concepts. There were 714 concepts returned in the initial query. Duplicates were removed resulting in 591 unique concepts. After cleaning the dataset so all concepts met criteria for inclusion, the final count of SNOMED CT concepts in version two of the Nursing Problem List Subset is 417. A nursing problem list subset has been created for use on patient problem lists and can be downloaded from the NLM website, http://www.nlm.nih.gov/research/umls/Snomed/nursing_problemlist_subset.html.

For information about the process see: Matney, S.A., Warren, J.J., Evans, J.L., Kim, T.Y. Coenen, A., & Auld, V.A. (2012). Development of the nursing problem list subset of SNOMED CT[®]. *Journal of Biomedical Informatics*, 45(4), 683-688.

Recommendations:

1. 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.
2. Nursing terminologies that contain nursing diagnoses should maintain their terminology in the UMLS in order to facilitate mapping and interoperability.
3. Mappings between SNOMED CT nursing problems and other nursing diagnostic terminologies should be obtained by querying the UMLS.
4. When nursing diagnoses are missing on the nursing problem list subset, the UMLS administrators should be notified.

Harmonizing ICNP® with other Health Terminologies

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International Council of Nurses, Geneva Switzerland and University of Wisconsin-Milwaukee College of Nursing, Milwaukee, WI USA

Accomplishments in Last year:

Harmonization is essential to allow for a range of health terminologies to co-exist and to make them compatible with one another. The International Classification for Nursing Practice (ICNP®) is a terminology Developed and maintained by the International Council of Nurses (ICN). ICN has formal working relationships with other terminology development organizations and entities to facilitate harmonization efforts to represent nursing practice in eHealth. The purpose of this presentation is to update the participants on current and ongoing ICNP harmonization activities. Examples of ICN projects with National Nurses Association members, Health Ministries, the World Health Organization, International Health Terminology Standards Development Organization (IHTSDO) and SNOMED CT, and SabaCare (Clinical Care Classification) will be highlighted.

Recommendations:

Continue ICNP Harmonization efforts:

- a) among local and national projects to share internationally (e.g. Scottish Community Nursing Dataset, C-HOBIC, Portuguese NMDS)
- b) across nursing terminologies (e.g. ICNP, CCC, PNDS), and
- c) with other health care terminologies (e.g. SNOMED-CT, ICHI, LOINC).

HL7 Care Plan – Interprofessional Continuity of Care

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Several workgroups at HL7 have recent or in progress projects related to care coordination. The Patient Care Workgroup (PCWG), Service Oriented Architecture Workgroup (SOAWG), Structured Documents Workgroup (SDWG) and FHIR (Fast Health Interoperability Resources) all have projects either recently balloted or about to go to ballot. The Patient Care Workgroup at HL7 has had an interest in the Patient Centered Care Plan for many years. In 2010, the PCWG recognized the need to explore, explain and define the domain of the care plan. The multiple uses, stakeholders and settings of the care plan was noted, a goal was set to articulate these differences and determine if an information model could be created to support them all. This project has garnered a significant amount of interest worldwide and has had wide participation from HL7 membership. The goals of the Domain Analysis Model included building a common understanding of terminology and artifacts created and used during care coordination and to create an information model describing generic care concepts applicable for use in all care plan needs including interoperability and reconciliation/synchronization. The scope of the project is to address general care coordination needs for individual patients involving various disciplines, settings and care coordination needs. The project used an HL7 approach to describing domains of care called the “Domain Analysis Model”. This approach includes the creation and use of narrative Storyboards describing the topic at hand in a clinically understandable manner. Conceptual diagrams are used as needed to describe the domain, as are logical information models. The Care Plan DAM has followed the HL7 ballot and review process recently completing the 2nd round of balloting. Comments from this round of ballots will be addressed prior to publishing the informative document at HL7 later this year. Future work in the area will include deeper investigation and description of Care Plan reconciliation and tracking. The Structured Documents Workgroup has spent a significant amount of time enhancing the Consolidated Clinical Document Architecture (C-CDA). Balloted in September 2013, the latest C-CDA specification addressed several gaps related to the use of the architecture for care plans. Recommendations for these changes came from several sources including the S&I Framework, Patient Care Coordination Technical Committee of Integrating the Healthcare Enterprise (IHE) and the PCWG Care Plan DAM. A new initiative at HL7, Fast Health Interoperability Resources (FHIR) also includes a resource for Care Plan. This initiative “combines the best features of HL7’s Version 2, Version 3 and CDA® product lines while leveraging the latest web standards and applying a tight focus on implementability”¹. Development and refinement of standards related to care coordination at HL7 is an ongoing effort. There are many opportunities for interested parties to be involved, provide input and influence. If interested please see the authors, or contact the co-chairs of any of the workgroups listed at [www.HL7.org](http://www.hl7.org).

¹<http://www.hl7.org/implement/standards/FHIR-Develop/summary.html>. (Accessed 5/20/14)

AMIA-NIWG's NI Scholarship Initiative

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Abstract: NI Scholarship Initiative

In the fall of 2011, a group of senior informatics leaders in the Nursing Informatics Working Group (NIWG) of the American Medical Informatics Association (AMIA) convened at the invitation of the NIWG chair to address how best to illuminate the value of nursing informatics scholarship. The initial body of work was presented at the fall AMIA 2013 meetings and this presentation highlights the summary of the conceptual models used in NI research with recommendations. The three model presented cover implementation and system build processes with the prerequisite standards; translational research that range from basic bench methodologies and filter down to clinical knowledge, education and practice; and lastly, based on Bakken et al.'s (2008) NI research agenda forecast, the contextual model states that the need and question asked drives methodology, and that we need multiple and simultaneous tracks. The value proposition from NI research is based on providing the infrastructure needed for development of nursing content, quality reporting and outcome comparisons nationally and internationally; and aggregation of clinical data that enables research and clinical education.

Knowledge Discovery Data Analytics Methods

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Accomplishments in Last year:

A Big Data laboratory within the University of Minnesota Center for Nursing Informatics (the Omaha System Partnership for Knowledge Discovery and Health Care Quality) continued to advance the science of knowledge discovery data analytics methods for standardized terminologies. In April 2013, an international conference presented to 88 attendees from five countries highlighted data analytics methods currently in use in research and industry. Presentations on methods covered diverse topics from qualitative analysis and mixed methods to standard descriptive and inferential statistics to data visualization and data mining methods. Further development of methods continues, including evaluation of empirical methods for data standardization across terminologies.

Recommendations:

Expand the development of data analytics methods to incorporate nursing and interprofessional datasets and encompass all standardized terminologies and structured data.

Nursing and CTSA/ PCORI Informatics Research,
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Accomplishments:

A major purpose of shareable comparable nursing data is the ability to conduct big data science. A common data model linked to standardize terminologies is essential for comparative effectiveness research across health systems and academic institutions. At the University of Minnesota (UMN), we are involved in two major grants that reuse electronic health record (EHR) data, building on a common data model, and data standardization. One of these is a PCORI grant – Great Plains Collaborative (GPC) Clinical Data Research Network, and another is Clinical Translational Science Award (CTSA). The UMN is one of two CTSA funded academic health centers that are extending their clinical data models with the inclusion of nursing data documented most often in the flowsheet data.

Under the CTSA grant, we conducted a pilot project to evaluate documentation practices influencing the capture of clinical quality measures that are largely documented in flowsheets. Specifically, we are addressing the prevention of pressure ulcers, falls, venous thrombosis embolism (VTE), and catheter associated urinary tract infections (CAUTI) as well as pain management. A database of 200,000 flowsheet measures representing 66,000 patients has been created. Developing a method to create an ontology for flowsheet data, beginning with these five quality measures, is underway. Additionally, we are working with our major health system partner (8 hospitals, 40+ primary and specialty care clinics) and their software partners to code flowsheet data using SNOMED CT and LOINC.

Several lessons have been learned from this pilot project to date, including:

1. Policies, procedures, and standards don't readily translate into clinical database queries. It requires domain experts and computer scientists to collaborate on the translation of these to create usable data for research.
2. Data for quality measures are not linked in the database such as assessing pain providing pain medication and reassessing pain. Pain medications must be translated from the actual medication to categories of medication. Therefore nurses must be experts in code systems beyond nursing terminologies.
3. Quality measures require knowledge of nursing and other terminologies. Pain management requires knowledge of standards for medications as well as nursing assessments, diagnoses, and additional interventions
4. There are duplicate measures for similar concepts within flow sheets. Examples include pain assessments for pediatrics versus adults, or multiple measures for blood pressure. Upgrades to the EHR may result in retiring some measures and replacing them with new measures. Moreover, some measures are part of the base package and may never have been implemented. Consequently, ongoing attention to normalizing data to create usable data for research.

Recommendations:

Our goal is to create sharable/ comparable data that extends traditional common data models used for CTSA and PCORI grants. Flowsheet data represents a significant source of nursing documentation and quality measures that are useful for comparative effectiveness research.

Recommendations for future work include:

1. Finalize the ontology for the five clinical quality measures and add these in i2b2 for de-identified cohort queries; this supports feasibility data needed for the submission of research grants.
2. Extend the ontology for flowsheet data to other clinical topics significant to nurse practice and science.
3. Develop a method for consistent coding of flowsheet data using SNOMED CT and LOINC.
4. Collaborate with CTSA partners to extend the common data model with the inclusion of extended (nursing) data across CTSA's to support nurse researchers to do big data science.
5. Collaborate with other health systems through EHR user groups to assure that similar methodology and coding are used for the same vendor.
6. Create a common communication mechanism for sharing the collaborative efforts to prevent duplication across researchers health systems and EHR vendors.