Clinical Data Analytics  
Annual Report 2018 – 2019

Project Team:

Co-Leader:  
Lisiane Pruinelli, PhD, RN  
Assistant Professor, University of Minnesota, School of Nursing

Co-Leader:  
Bonnie L. Westra, PhD, RN, FAAN, FACMI, Associate Professor Emerita, University of Minnesota, School of Nursing, Co-Director, Center for Nursing Informatics

Subgroup: Population Health Informatics  
Co-Leader: Alvin Jeffrey  
Co-Leader: Sharon Hewner

Subgroup: Validation of Information Models  
Co-Leader: Kay Lytle  
Co-Leader: Bonnie Westra

Subgroup: Data Science  
Co-Leader: Steven Johnson  
Co-Leader: Lisiane Pruinelli

Meeting Dates 2018-2019:

<table>
<thead>
<tr>
<th>Population Health Informatics (PHI)</th>
<th>Validation of Information Models (IM)</th>
<th>Data Science</th>
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<tbody>
<tr>
<td>Three times</td>
<td>Every other week from 6/23/18 – 5/31/19</td>
<td>Biweekly from 06/21/18 – 05/21/2019</td>
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Attendees/Members:

<table>
<thead>
<tr>
<th>Mischa Adams IM</th>
<th>Stephanie Hartleben IM, DS</th>
<th>Lisiane Pruinelli PHI, DS</th>
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<tbody>
<tr>
<td>Mari Akri IM</td>
<td>Sharon Hewner PHI</td>
<td>Tari Rajchel IM</td>
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<tr>
<td>Samira Ali IM, PHI</td>
<td>Laura Holbrook PHI</td>
<td>Jethrone Role DS</td>
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<tr>
<td>Marlene Alonso DS</td>
<td>Mary Hook IM</td>
<td>Sarah Collins Rossetti IM, DS</td>
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<tr>
<td>Kenrick Cato DS</td>
<td>Alvin Jeffery PHI, DS</td>
<td>Martha Sylvia PHI</td>
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<tr>
<td>Cynthia Coviaim DS</td>
<td>Steve Johnson IM, DS</td>
<td>Mary Anne Schultz DS</td>
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<tr>
<td>Christopher Cruz DS</td>
<td>Janice Kelly Mikyoung Lee PHI, DS</td>
<td>Tess (Theresa) Settergren IM</td>
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<tr>
<td>Fabio D'Agostine DS</td>
<td>Deborah Lekan PHI, DS</td>
<td>Christine Spisla</td>
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<tr>
<td>Janet Cuddigan</td>
<td>Sheng-Chieh Lu DS</td>
<td>Suzanne Sullivan DS</td>
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<tr>
<td>Thompson Forbes III DS</td>
<td>Kay Lytle IM</td>
<td>Bonnie Westra IM</td>
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<tr>
<td>Meg Furukawa IM</td>
<td>Jung In Park DS</td>
<td>Luann Whittenburg IM</td>
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<tr>
<td>Grace Gao PHI</td>
<td></td>
<td>Dana Womack DS</td>
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<td>Lynda Hardy DS</td>
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Overall Purpose:

Demonstrate the value of sharable and comparable nurse-sensitive data to support practice and translational research for transforming health care and improving patient quality and safety. The subgroups are: Data Science, Population Health Informatics, and Validation of Information Models.
**Population Health Informatics Subgroup:**

The purpose is to document the extent to which nursing data is used in population health analytics today and determine nursing care related data points that can be used to inform this process. This is informed by the larger analytic workgroup (the variables and models they are validating). Another focus is to trial new analytic methods (non-hypothesis based) for using this data in combination with traditional data sources and population health analytic processes with new nursing care related data points. Subsequently, the group will evaluate opportunities to also include the patient voice in their own care with standardized coding.

**Accomplishments:**

Completed publication on risk assessment with implications for nurses’ role.

**Next Steps:**

- This subgroup is now complete

**Validation of Information Models (IM) Subgroup:**

Disseminate the Pain IM model concepts and value sets validated across 10 organizations: University of Minnesota, School of Nursing/ Fairview Health Services; Partners Healthcare Systems; Kaiser Permanente; UCLA Health; Aurora Health Care; Duke University Health System; Cedars-Sinai Health System; Allina Health; North Memorial Medical Center; and Bumrungrad International. Validate the Genitourinary and Fall Prevention information models.

**Accomplishments:**

- Results of the pain IM were published
- Revised the process for validation of information models.
- Incrementally developed and used FloMap software for validation of the Genitourinary and Fall Prevention Models across 10 organizations.
- Collaborated with the Encoding and Modeling Workgroup to provide clarification and rationale for concepts and values for the Pain IM.
- Developed an internet-based survey methodology for obtaining broader validation of information models.
- Collaborated with nursing informatics groups to obtain broader validation of the GU IM.
- Presented information on the work of the IM Validation group on Pain Management.
- Submitted an abstract to present at AMIA.
- Articles in process on Revised Method for Genitourinary Model and Overview with Pain, GU and Falls

**Next steps:**

- Complete validation of additional information models from flowsheet data i.e. Genitourinary and Fall Prevention
- Publish results of the Genitourinary and Fall Prevention Validation
• Initiate development of a VTE information model.

• Collaborate with the Admission Assessment Task Force to translate their work to an information model.

Overall Presentations - Publications:

Data Science Subgroup

Apply data science methods, using validated information models derived from diverse sources of health care data, to address nurse-sensitive research questions that have the potential to inform nursing and multidisciplinary approaches for better patient care and outcomes

Accomplishments:

• Developed and conducted three “hands-on/interactive” workshops on Data Science. We presented one at the AMIA 2019 Informatics Summit (~ 120 participants), one at the 2019 Nursing Knowledge Big Data Conference in June (Pre-Conference Track 1) and we will be presenting the third at MedInfo 2019 in August.

• A Data Science Environment was setup for all of the workgroup members to use for learning data science techniques. The Environment was loaded with the MIMIC III EHR data and uses the Google Big Query database. Data is accessed via Colaboratory and Jupyter notebooks. The environment is paid for via a grant from the University of Minnesota School of Nursing.

• Award: Improving Population Outcomes Using Data Science: A Roadmap for Nurse Leaders School of Nursing Foundation, University of Minnesota, Award Dates: January 31, 2018 - January 30, 2019. Funded Amount: $3,000.00

• The Data Science Roadmap developed by the group has been included as part of national and international presentations. 1) The Potential of Using EHR data for Big Data Science Addressing Complex Conditions – Big Ten Broadcast via WebEx (Pruinelli, April 2019). 2) Nursing in the Big Data Era, Opening Speech at the 30th Scientific Nursing Week at Hospital de Clinicas of Porto Alegre, Brazil (Pruinelli, May 2019).

Next Steps:

• The group is identifying a research question to answer using the EHR nursing data in the Data Science Environment. We will develop an observational study design, perform background research and choose the best analytic techniques to address the research question.

• We will use the Data Science Environment to answer the clinical research question and publish a paper with our findings.

• We will also publish a description of our collaborative process for data science using nursing data and practices we learned while undertaking the clinical research project.

Presentations


Poster Presentation


Publications


Concerns/Support Needed:

- Bandwidth with volunteers to keep momentum going.
- Recruitment of other organizations to increase the generalizability of the work we are doing.