Toward Sharable and Comparable Nurse Data Across the Care Continuum

Context of Care Workgroup

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2016 Achievement

Developed a test Big Data set created from authentic health care data, including nursing workforce data, that expressed nursing management knowledge and the context of care across the care continuum and specified the requirement for clinical information as data elements of the NMMDS
2017 Goal

Continue development of the 2016 test Big Data set using the Kruchten 4+1 Model and Unified Modeling Language (UML) to introduce an integrating and harmonizing framework for sharable and comparable nurse data across the care continuum that incorporates the Nursing Minimum Management Data Set (NMMDS) and links key Workgroup activities.
2017 Deliverables

• Model representation of an integrating framework, with explicit operating assumptions, for sharable and comparable nurse data across the care continuum and all care transitions that incorporates the Nursing Management Minimum Data Set (NMMDS)

• Conceptualization and diagram of the foundational data structure that supports the sharable and comparable nurse data integrating structure
Sharable and Comparable Nurse Data Integrating Model: Operating Assumptions

• Aggregation and application of a “big data” set for creating, accessing and using nurse sensitive data from enterprise information systems across the care continuum and across care transitions in all settings where nurses provide care needs to be tested.

• Data that defines the contribution of nursing to patient, family, health system and community outcomes needs to be isolated and captured in this era of Big Data Science.

• Utilization of standardized nursing languages, nursing taxonomies and nursing “big data” needs to be validated for incorporation into health system and public policy “big data” repositories.

• Together, nurses at the side of the patient, nurse researchers, nurse educators and nurse leaders need to develop, test and build consensus and support for a Detailed Clinical Model (DCM) and foundational, usable, actionable nurse sensitive “big data” set that captures the value of nursing.
Sharable and Comparable Nurse Data Integrating Model

Model Representation
Sharable and Comparable Nurse Data Integrating Model

Input = All Kinds of Data

Process = Kruchten 4+1 Model

Output = Observations in Support of Quadruple Aim

NMMDS

Nurse Generated Data & Data Generated About Nurses

Environment of Care/System Data

Patient/Client Data

Logical View

Development View

Process View

Physical View

Scenarios

• End User Functionality
• Process View

• System Engineers
• Topology
• Communications

• Programmers
• Software Mgmt

• Integrators
• Performance
• Functionality

• More Satisfied Pts/Families
• Measure of Better Care
• Lower Costs
• More Satisfied Providers

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## Test Kitchen Example

### Assessment & Core Screening

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the resident have a fall any time in the last month prior to admission/entry or reentry?</td>
<td>No, Yes, Unable to determine</td>
</tr>
<tr>
<td>Did the resident have a fall any time in the last 2-6 months prior to admission/entry or reentry?</td>
<td>No, Yes, Unable to determine</td>
</tr>
<tr>
<td>Did the resident have any fracture related to a fall in the 6 months prior to admission/entry or reentry?</td>
<td>No, Yes, Unable to determine</td>
</tr>
</tbody>
</table>

### Any Falls Since Admission/Entry or Reentry or Prior Assessment (OBRA or Scheduled PPS), whichever is more recent.

- Has the resident had any falls since admission/entry or reentry or the prior assessment (OBRA or Scheduled PPS), whichever is more recent?
- 10 - Skip to K5000, Stabilizing Disorder
- 22 - Continue to J5000, Number of Falls Since Admission/Entry or Reentry or Prior Assessment (OBRA or Scheduled PPS), whichever is more recent;

### Number of Falls Since Admission/Entry or Reentry or Prior Assessment (OBRA or Scheduled PPS), whichever is more recent.

- None
- One
- Two or more

### Injuries

- Minor injury - skin tears, abrasions, lacerations, superficial injuries, hematoma and sprains, or any fall-related injury that causes the resident to complaint of pain.
- Major injury - bone fractures, joint dislocations, closed head injuries with altered consciousness, subdural hematomas.

### Care Area Assessment (CAA) Summary.

- Falls
- Falls Prevention
- Pain

### Plan of Care Synopsis: Falls Prevention Intervention Synopsis: Falls Prevention

- No, Yes, NA
- No, Yes, NA

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Sharable and Comparable Nurse Data Integrating Framework

*Foundational Data Structure*
Figure 1: Use Case for the integration of the NMMDS data elements into information system
Context of Care Workgroup: Assumption 1: Assume NMMDS/IG alignment has been imposed that informs the models and structures.

Figure 1: Use Case for the integration of the NMMDS data elements into information system

- HL7 TermInfo
- CIMI
- SemanticHealthNet [Euro]
- OWL-XMI
- OWL DL
- OWL>RFD>FHIR
Context of Care Workgroup: Assumption 2: Assume interoperability of a system, based upon the purpose of sharable and comparable nursing data and advance use of data for analytics and big data science.

Assume a “Model Driven Architecture” with a Reference Model of Open Distributed Processing (RM-ODP) or similar.

Helps to inform “2 Level Modeling”:

- Detailed Clinical Model
- Terms/Coding
- Knowledge
- Data Entry/Presentation
- Data Storage/Retrieval
- Communication

MDA: CIM, PIM, PSM with UML diagrams

UML Diagrams provide structured view of the Domain and System Levels for “Use Case”

Results: Data Quality Management with:
1. Structured Clinical Knowledge Specification
2. Data Elements Specification [Classes/Domains]
3. Meta-Data Specification for ongoing work/versioning

Context of Care Workgroup: Assumption 2: Assume interoperability of a system, based upon the purpose of sharable and comparable nursing data and advance use of data for analytics and big data science.

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Images were obtained from the URL links in the diagram names. Retrieved on March 15, 2016. Images are source documents from these references and copyrighted.
Context of Care Workgroup: Assumption 3: *Assume “Framework” is Required* for NMMDS implementation, that allows unstructured, native data use by semantic interoperability.

Clinical Quality Framework Implementation Guide

G.6 Knowledge Artifact Distribution

One of the primary goals of the Clinical Quality Framework is to enable the sharing and distribution of computable clinical knowledge artifacts:

Content Producers

- EHR and Content Vendors
- Hospitals and Institutions
- Medical Societies and Associations
- Quality Reporting Agencies

Shareable Knowledge Artifacts

- EHR with Internal CDS Engine
- CDS Service
- Health Dataset w/ Analytics Engine
- Quality Reporting Service

Content Consumers

https://hl7-fhir.github.io/cqif/cqif-knowledge-artifact-distribution.html

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Test Kitchen Anticipated Outcomes

• A road map for implementing the Sharable and Comparable Nurse Data Integrating Model, the NMMDS, NMDS, NVDS and select social behavioral determinants of health across the care continuum
• Identified gaps and semantic differences across care settings
• Capacity of the Sharable and Comparable Nurse Data Integrating Framework, the foundational test “big data” set and the evolving Detailed Clinical Model (DCM) to cover multiple transitions in care including identified gaps and semantic differences across care settings
Questions & Answers