"If you cannot name it, you cannot control it, finance it, research it, teach it, or put it into public policy."

Norma Lang, PhD, RN, FAAN, FRCN (1990)

Classification for Nursing Practice," *International Nursing Review,* 39
 no. 4, (1992): 109-112.

Nursing Knowledge: Big Data Science Vision Statement

"We share a vision of better health outcomes resulting from the standardization and integration of the information nurses gather in electronic health records and other information systems, which is increasingly the source of insights and evidence used to prevent, diagnose, treat, and evaluate health conditions. The addition of contextual data, including environmental, geographical, behavioral, imaging, and more will lead to breakthroughs for the health of individuals, families, communities, and populations."

http://www.nursingbigdata.org/Home

NKBDS Workgroups*

- ## Care Coordination
  - To identify nursing-sensitive essential shareable/ exchangeable & comparable data elements to support care coordination activities & improve patient outcomes; identify gaps/missing information needed to individualize care.

- ## Data Science & Clinical Analytics
  - To apply data science and clinical analytics methods, incorporating validated information models derived from diverse sources of health care data to address nurse-sensitive clinical research questions that have the potential to inform & educate nursing & multidisciplinary approaches for better patient care & outcomes.

*Current as of August 2021

NKBDS Workgroups*

- Context of Care
  - Demonstrate sharable and comparable nurse data across the care continuum by capturing nursing "big data" in the Nursing Management Minimum Data Set (NMMDS), the Nursing Minimum Data Set (NMDS) and the Nursing Knowledge: Big Data Science Conference Nursing Value Data Set (NVDS) to increase nurse data usability, provide patient, family and community centric data and, fortify data generated by nurses, about nurses and nursing care across the care continuum and across care transitions in all settings where nurses provide care.

*Current as of August 2021

NKBDS Workgroups*

- Education
  - To ensure a competent nursing workforce capable of using digital technology to innovate, create efficiencies, & generate knowledge. Collaborate with other workgroups & organizations, develop tools & strategies for increasing competency of nursing professionals, faculty & students; disseminate information & provide trainings.

- Encoding & Modeling
  - Curate LOINC and SNOMED CT mappings for nursing-specific value sets, submit requests for new codes where appropriate, & incorporate the content & standards into a framework & repository for dissemination.

*Current as of August 2021

NKBDS Workgroups*

- Knowledge Modeling
    - Validate previously developed information models using flowsheet data to extend national standards with nurse-sensitive data; continuously improve & adapt the knowledge model validation & creation process using flowsheet data & other nurse-sensitive information.

- Mobile Health for Nursing
    - Explore the use of mobile health (mHealth) data by nurses including both nursing-generated data & patient-generated data. Identify & support activities & resources to address unmet needs & create opportunities to utilize mHealth data within nursing workflows.

*Current as of August 2021

NKBDS Workgroups*

- Nursing Value
  - Continue development & testing of a Nursing Value Model, with respect to a broad definition of value. Explore value in reference to nursing with quantitative metrics such as cost & available resources; also, more holistic & qualitative metrics related to values such as caring, engagement, connectedness & spirituality. Employ artificial intelligence methodologies to further define the application of nursing value/values in service to health & health care.

*Current as of August 2021

NKBDS Workgroups*

- Policy & Advocacy
  - Elevate the voice and visibility of each workgroup's nurse-led Big Data initiatives, lend advocacy recommendations to support the endorsement of leading-edge collateral, deliverables, & work products.

- Social Behavioral Determinants of Health
  - Support the inclusion, interoperability, & use of Determinants of Health (DOH) by nurses/for nurses in EHRs & digital health tools to empower nurses to partner with patients, families, & communities & interprofessional colleagues/care teams for whole person care...

*Current as of August 2021

NKBDS Workgroups*

- Transforming Documentation
  - Explore ways to decrease the nursing documentation burden & serve up the information already in the EHR at the right time in the workflow to support evidence-based and personalized care. Elevate purpose-driven, role-based, patient-centric, evidence-informed documentation transformation to capture nurse observations & interventions & drive purposeful secondary-use & precision nursing. Transformation supports enhanced data utilization to drive & measure improvement in patient outcomes & illuminate nursing's value & contribution in healthcare.

*Current as of August 2021

Encoding-Modeling Work Group

Florence Nightingale, 1863

In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purpose of comparison. If they could be obtained they would enable us to decide many other questions besides the one alluded to. They would show the subscribers how their money was being spent, what good was really being done with it, or whether the money was not doing mischief rather than good.
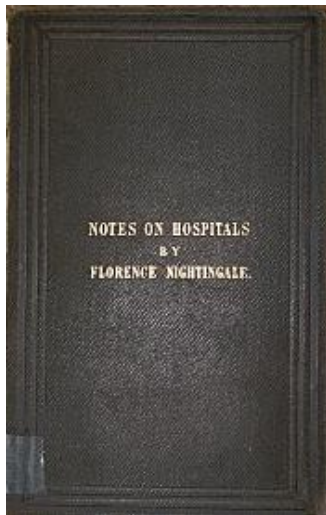
Nightingale, F. (1863). Notes on Hospitals. London; Longman, Green, Longman, Roberts, & Green, p. 176
Re-used from J. Warren 2014 presentation

Standardized Data: Benefits

- Measure the contributions of nursing within the interprofessional team context

- Support 'Value of Nursing' measurement

- Enable eCQMs

- Enhance care coordination across the continuum

- Enable cross-institutional nurse-sensitive outcomes studies and quality improvement initiatives

- Reuse instead of reinvent, including clinical decision support tools.

Nursing Terminology: Standards, Policies, Resources

Interoperability Standards Advisory

Section I: Vocabulary/Code Set/Terminology Standards and Implementation Specifications

▸ Allergies and Intolerances

▸ Clinical Notes

▸ Cognitive Status

▸ Demographics

▸ Dietary and Nutritional Needs

▸ Emergency Medical Services

▸ Encounter Diagnosis, Assessment and Plan

▸ Family Health History

▸ Functional Status/Disability

▸ Goals

▸ Health Care Providers, Family Members, and Other Caregivers

▸ Imaging (Diagnostics, Interventions and Procedures)

▸ Immunizations

▸ Industry and Occupation

▸ Laboratory

▸ Medications

▸ Nursing

Includes nursing

The Office of the National Coordinator for
Health Information Technology

2021 Interoperability Standards Advisory

Reference Edition

- https://www.healthit.gov/isa/

ISA 2021: Nursing

- Clinical/Nursing Assessments
  - Standard for Observations: LOINC®
  - Standard for Observation Values (answers): SNOMED CT® (exception: standardized scale values are coded in LOINC®)

- Nursing Interventions
  - SNOMED CT®

- Outcomes for Nursing
  - Observation values that are measurements: LOINC®
  - Observation values that are observed assessment ('improved') or assertions ('normotensive'): SNOMED CT®

- Patient Problems for Nursing
  - SNOMED CT®

https://www.healthit.gov/isa/sites/isa/files/inline-files/2021-ISA-Reference-Edition.pdf.

NLM Nursing Resources for Standards and Interoperability

https://www.nlm.nih.gov/research/umls/Snomed/nursing_terminology_resources.html.

NLM Nursing Resources for Standards and Interoperability

NLM web page developed to:

- Describe use of SNOMED CT and LOINC
- Provide information about nursing terminologies
- Demonstrate how to extract synonymy between SNOMED CT, LOINC, and nursing terminologies
- Provide link to additional resources relevant for nursing clinical documentation purposes.

ANA Recognized Terminologies

Acronym	Terminology
CCC	Clinical Care Classification
NANDA-I	NANDA International
NIC	Nursing Intervention Classification
NOC	Nursing Outcome Classification
NMMDS	Nursing Management Minimum Data Set
Omaha System	The Omaha System
PNDS	Perioperative Nursing Data Set
ICNP	International Classification of Nursing Practice
SNOMED CT	SNOMED Clinical Terms
LOINC	Logical Observations Identifiers Names and Codes
ABC Codes	Alternative Billing Codes

Inclusion of Recognized Terminologies Supporting Nursing Practice within Electronic Health Records and Other Health Information Technology Solutions

Purpose:

– Support for the use of recognized terminologies supporting nursing practice

– Promote integration of terminologies into information technology solutions

– Facilitate interoperability between different concepts, nomenclatures, and information systems

https://www.nursingworld.org/practice-policy/nursing-excellence/official-position-statements/id/Inclusion-of-Recognized-Terminologies-Supporting-Nursing-Practice-within-Electronic-Health-Records/.

Inclusion of Recognized Terminologies Supporting Nursing Practice within Electronic Health Records and Other Health Information Technology Solutions

4. When exchanging data with another setting for problems and care plans, SNOMED CT® and LOINC® should be used for exchange. LOINC should be used for coding nursing assessments and outcomes and SNOMED CT for problems, interventions, and observation findings. (ONC, 2018)

Position Statement: April 19, 2018

Alliance for Nursing Informatics

SPONSORED BY AMIA & HIMSS

Mission, Vision and Core Values of ANI

Vision: Transform health and health care through nursing informatics and innovation

Mission: To advance nursing informatics leadership, practice, education, policy, research and leadership through a unified voice of nursing informatics organizations

ONC Interoperability Standards Advisory Feedback was provided by a ANI group led by Sarah Collins, PhD, RN

http://www.allianceni.org

Guiding Principles for Big Data in Nursing

Top 10 Recommendations

Developed by the HIMSS CNO-CNIO Vendor Roundtable

Read the full white paper at www.himss.org/Big10

Promote Standards and Interoperability

1. Nurses should promote the use of standardized and accepted terminologies that address the documentation needs of the entire care team regardless of care setting. All care delivery settings should create a plan for implementing an ANA-recognized nursing terminology that is mapped to national standards i.e. SNOMED CT or LOINC.

2. Nurses should recommend consistent use of research-based assessment scales and instruments that are standardized through an international consensus body. The lack of standardization makes comparison of data challenging and adds to the burden of cost for copyright permissions and/or licensing of such instruments.

3. The ANA-recognized nursing terminologies should be consistently updated and made available to international standards organizations for translation and complete, comprehensive mapping.

4. Minimize use of free text documentation. When 'within defined limits' is used, discrete data elements should be stored within the EHR to enable decision support, research, analytics and knowledge generation.

www.himss.org/big10

HIMSS CNO-CNIO Vendor Roundtable Recommendations

Promote Standards and Interoperability

1) Nurses should promote the use of standardized and accepted terminologies that address the documentation needs of the entire care team regardless of care setting. All care delivery settings should create a plan for implementing an ANA-recognized nursing terminology that is mapped to national standards i.e. SNOMED CT or LOINC (2015)

Encoding-Modeling WG Goals

- Create a framework for organizing nursing data
- Employ ONC standards for nursing data:
    - Map observations/assessments ('questions') to LOINC
    - Map observation values ('answers') to SNOMED CT
    - Map interventions to SNOMED CT
    - Map patient problems to SNOMED CT
    - Map outcomes to LOINC (if measurement) or SNOMED CT (if observed assessments or assertions)
- Determine the LOINC & SNOMED CT coverage; submit new concepts as appropriate
- Develop heuristics for replicability
- Disseminate work products

Westra et al
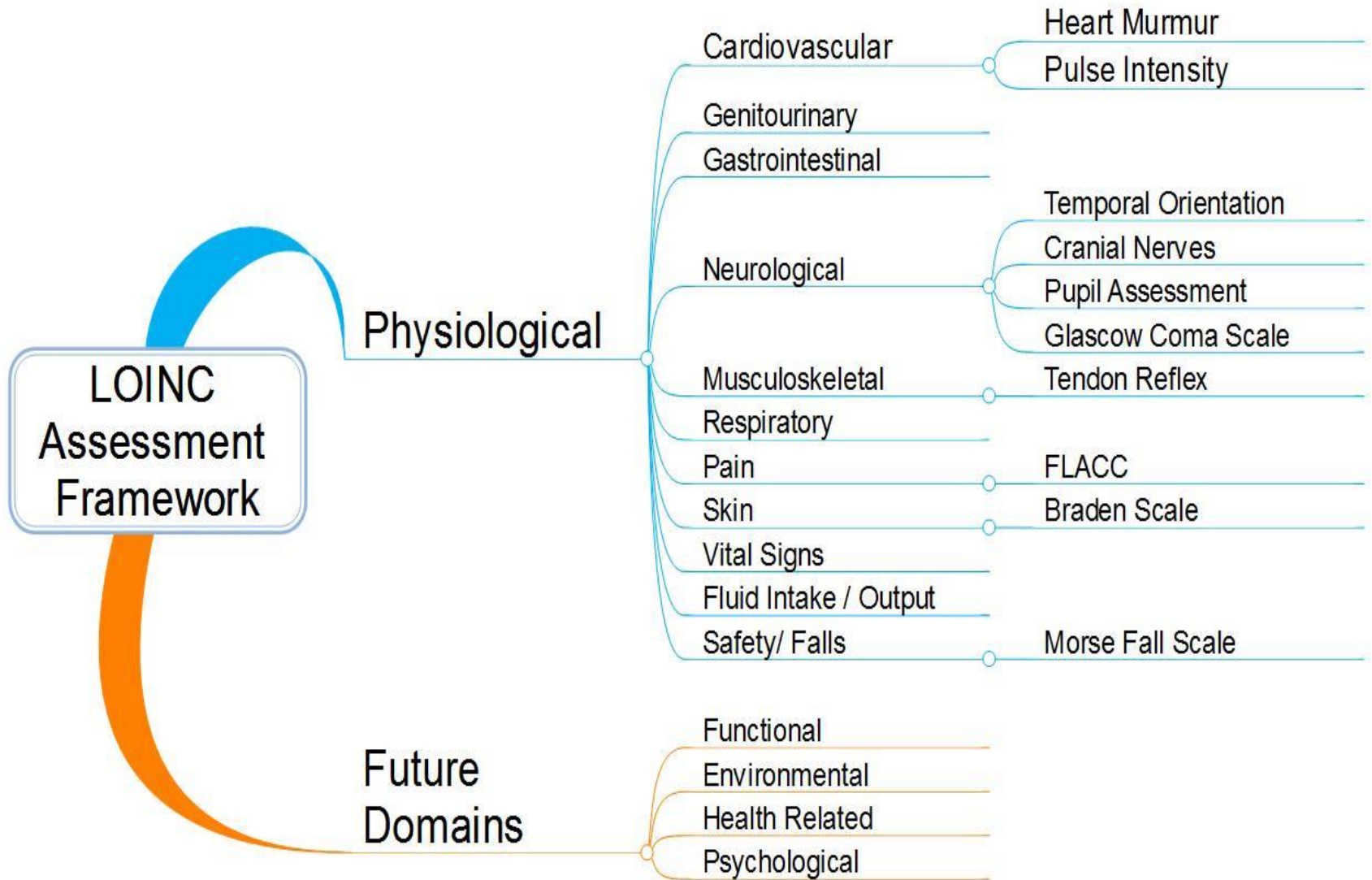
Nursing Physiologic Assessment

- Compared top 100 physiologic assessment measures from six healthcare institutions
  - Each submitted 61 – 128 observations
- 68 unique concepts used by 2 or more sources
- Mapped to LOINC (70%)
- Grouped observations according to physiological system (for Panels and Framework)
- Created assessment panels by system
- Evaluated observations in panels to ensure a nursing assessment minimum data set
- Identified observation values.
- Initial Scope: Med-Surg WDL panels

Nursing Physiologic Assessment

- Each institution locally defines WDL parameters
  - Skin WDL example
    - Skin Color = normal for ethnicity
    - Skin Temperature = Warm
    - Skin Moisture = Dry
- "Impression" codes are used to document a **nursing judgment**.
  - WDL is one value for the impression observation.
  - If there is concerns, risks, etc. this would be documented as text for this code
- When WDL is selected, will the "Defined Limits" name/value pairs store on the back-end?

Project Results

- 15 Standardized Nursing med/surg physiologic assessment panels (86% new LOINC)
- 106 Observations (50% new LOINC)
- 348 Values (20% new SNOMED CT)
- New LOINC codes approved, including "Nursing Impression" for WDL
- New SNOMED CT codes approved
- WJNR article: "Standardizing physiologic nursing assessment data to enable big data analytics" (Matney, Settergren, Carrington, Richesson, Sheide, Westra, 2016) http://wjn.sagepub.com/content/early/2016/07/18/0193945916659471.full.pdf

LOINC Panels (search.loinc.org)

LOINC ⌂ 🔍

LOINC CODE
80346-0

LONG COMMON NAME
Nursing physiologic assessment panel

Panel Hierarchy

Details for each LOINC in Panel   LHC-Forms

LOINC	Name	R/O/
80346-0	Nursing physiologic assessment panel	
34566-0	Vital signs with method details panel	R
8867-4	Heart rate	R
9279-1	Respiratory rate	R
35094-2	Blood pressure panel	
8480-6	Systolic blood pressure	R
8462-4	Diastolic blood pressure	R
8478-0	Mean blood pressure	O
8357-6	Blood pressure method	O
8358-4	Blood pressure device Cuff size	O
8359-2	Peripheral artery measurement site	O
9856-6	Blood pressure device Institution inventory number	O
9857-4	Blood pressure device Vendor model number	O
9858-2	Blood pressure device Vendor serial number	O

Wound Assessment Panel (partial)

Wound Assessment Pnl [39135-9]

Wound # [81666-0] ❓
> Type a value

Wound type [72300-7]
> Select one ▾

Dev or anatom struc vis wnd [89250-5] ❓
> Select one ▾

Condition present on admission [89251-3] ❓
> Select one ▾

Injury cause [11373-8]
> Select one ▾

| 1: Animal bite |
| 2: Device related |
| 3: Disease related |
| 4: Human bite |
| 5: Insect bite |
| 6: Moisture related |
| 7: Pressure point related |
| 8: Self inflicted |
| 9: Shearing force injury |
| 10: Trauma |

Date of condition abatement [88878-4] ❓
> {mm/dd/yyyy}

Photo image [72170-4] ❓

Episode Wnd [89252-1]
> ▾

Trend [89253-9] ❓
> ▾

Date of Onset of Impairment [85585-8]
> {mm/dd/yyyy}

Body site Pnl [72369-2]

Bdy site [39111-0]
> ▾

Bdy location qualifier [39112-8]
> ▾

Anatomic part Laterality [20228-3]
> Select one ▾

Periwnd desc [72301-5] ❓
> Select one ▾

Pressure ulcer stage NPUAP [72527-5] ©
> Select one ▾

Wnd bed+edge pnl [72372-6]

Wound bed panel [89254-7] ❓

Appearance Wnd base [72371-8] ❓
> Select one ▾

Wound bed appear % Area of Wnd base [72370-0] ❓
> Type a number %

Skin Assessment Panel (partial)

Skin Assessment Pnl [72284-3]

Body site Pnl [72369-2]

Bdy site [39111-0] | Select one ▼

Bdy location qualifier [39112-8] | Select one ▼

Anatomic part Laterality [20228-3] | Select one ▼

Color Skin [39107-8] | Select one ▼

Moisture Skin [39129-2] | ▼

Temp Skin [39106-0] | ▼

Turgor Imp Skin [39109-4] ❓ | ▼

Skin integrity [80344-5] | ▼

Pressure points examined Skin [80345-2] | ▼

Mucous membrane integrity [80347-8] | ▼

Skin assessment Imp [80343-7] | Select one ▼

1: Normal
2: Red (erythematous)
3: Mottled
4: Cyanotic
5: Pale
6: Lividity
7: Jaundice
8: Flushed

2021-2022 Mapping Projects

- Continue representation of evidence-based nursing data in LOINC & SNOMED CT:
  - Complete Alleviating & Exacerbating Factors Value Sets mappings to SNOMED CT
  - GU Knowledge Model content analysis, refinement & mapping
  - Falls Knowledge Model content analysis, refinement, & mapping
  - Plan for Nursing Admission History mapping
  - Plan for VTE Knowledge Model mapping

2021-2022 Data Governance

- Update heuristics foundational guide for mapping nursing data to LOINC and SNOMED CT
  - Add new hierarchies that should be used
  - Begin development of intervention heuristics
- Publish project-specific heuristics & artifacts to repository
  - LOINC standardized scale/survey heuristics
  - Heuristics for alleviating & exacerbating factors values sets, including provenance items

Members 2021-2022

Tess Settergren

Mischa Adams

Samira Ali

Lisa Anderson

Roberta Cardiff

Cindy Golubisky

Maria Hendrickson

Luke Jobman

Malin Britt Lalich

Stephanie Hartleben

John Lussier

Kay Lytle

Susan Matney

Christine Spisla

Rachel Tharp

Cyndalynn Tilley

Nikki Vande Garde

Carisa Voightman

Steering Committee Liaison: Laura Heerman Langford