The Office of the National Coordinator for Health Information Technology

Advancing Nursing Terminology

ONC Annual Meeting 2017

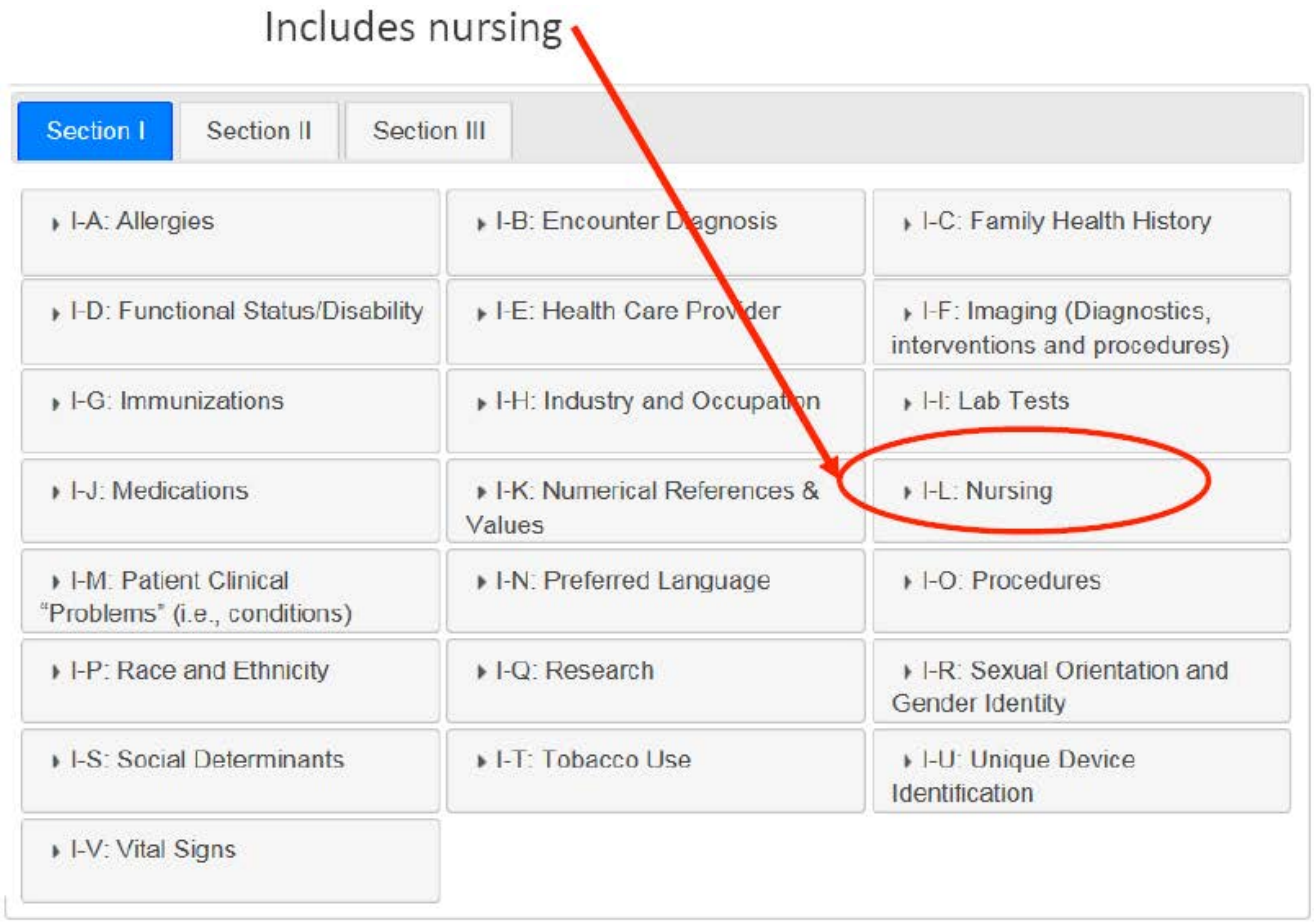
Panelists

- CAPT Alicia A. Morton, DNP, RN-BC, Director, Health IT Certification Program, ONC
- Susan Matney, PhD, RNC-OB, FAAN, FACMI, Consultant Medical Informaticist, Intermountain Healthcare
- Greg Springan, BSN, RN, Clinical Informatics, Epic
- Nikki VandeGarde, BSN, RN-BC, Director of Platform Development, Cerner
- Michelle R. Troseth, MSN, RN, FNAP, FAAN, President, National Academies of Practice

National Interoperability Standards

Susan Matney, PhD, RNC-OB, FAAN, FACMI

Draft 2017 Interoperability Standards Advisory



Interoperability Need: Representing Nursing Assessments							
Type	**Standard/Implementation Specification**	**Standards Process Maturity**	**Implementation Maturity**	**Adoption Level**	**Federally Required**	**Cost**	**Test Tool Availability**
Standard for observations	LOINC®	Final	Production	Feedback requested	No	Free	N/A
Standard for observation values	SNOMED CT®	Final	Production	Feedback requested	No	Free	N/A

Limitations, Dependencies, and Preconditions for Consideration:	**Applicable Value Set(s) and Starter Set(s):**
• Assessments are represented as question/answer (name/value) pairs. They are not represented in other terminologies. • LOINC® should be used for the assessment/observation questions and SNOMED CT® for the assessment/observation answers (value sets, choice lists). • See LOINC projects in the Interoperability Proving Ground.	• Feedback requested

Interoperability Need: Representing Nursing Interventions							
Type	**Standard/Implementation Specification**	**Standards Process Maturity**	**Implementation Maturity**	**Adoption Level**	**Federally Required**	**Cost**	**Test Tool Availability**
Standard for observations	LOINC®	Final	Production	Feedback requested	No	Free	N/A
Standard for observation values	SNOMED CT®	Final	Production	Feedback requested	No	Free	N/A

Limitations, Dependencies, and Preconditions for Consideration:	**Applicable Value Set(s) and Starter Set(s):**
• LOINC® should be used for the assessment/observation questions and SNOMED CT® for the assessment/observation answers (value sets, choice lists). • See LOINC projects in the Interoperability Proving Ground.	• Feedback requested

Interoperability Need: Representing Outcomes for Nursing							
Type	**Standard/Implementation Specification**	**Standards Process Maturity**	**Implementation Maturity**	**Adoption Level**	**Federally Required**	**Cost**	**Test Tool Availability**
Standard for observations	LOINC®	Final	Production	Feedback requested	No	Free	N/A

Limitations, Dependencies, and Preconditions for Consideration:	**Applicable Value Set(s) and Starter Set(s):**
• Other ANA-recognized terminologies should be converted to LOINC® for comparison across health systems and/or transmission. • See LOINC projects in the Interoperability Proving Ground.	• Feedback requested

Interoperability Need: Representing Patient Problems for Nursing							
Type	**Standard/Implementation Specification**	**Standards Process Maturity**	**Implementation Maturity**	**Adoption Level**	**Federally Required**	**Cost**	**Test Tool Availability**
Standard for observation values	SNOMED CT®	Final	Production	Feedback requested	No	Free	N/A

Limitations, Dependencies, and Preconditions for Consideration:	**Applicable Value Set(s) and Starter Set(s):** **Nursing Problem Subset of SNOMED CT**
• Other ANA-recognized terminologies should be converted to SNOMED CT® for comparison across health systems and/or transmission.	• Feedback requested

NLM Nursing Resources for Standards and Interoperability

- NLM a web page developed to:
  - Describe use of SNOMED CT and LOINC in implementing Meaningful Use relevant to the nursing community,
  - Information about nursing terminologies,
  - National and international collaboration efforts to harmonize nursing terminologies and facilitate interoperability,
  - Demonstration of the UMLS to extract synonymy between SNOMED CT, LOINC, and nursing terminologies,
  - Links to additional resources relevant for nursing clinical documentation purposes.

Unified Medical Language System® (UMLS®)

UMLS Quick Start Guide | FAQs | Customer Support

Home > Biomedical Research & Informatics > UMLS > Nursing Terminology Resources

Nursing Resources for Standards and Interoperability

Target Audience: nurses, nursing students, nursing informaticicsts, and those exploring nursing terminologies for systems development or integration purposes. Discover:

- The role of SNOMED CT and LOINC in implementing Meaningful Use (MU) in the United States (US).
- International collaboration to harmonize nursing terminologies and facilitate interoperability.
- How to find Concept Unique Identifiers (CUIs) and extract synonymy from the Unified Medical Language System (UMLS) Metathesaurus between SNOMED CT and other nursing terminologies such as CCC, ICNP, NANDA-I, NIC, NOC, The Omaha System, and PNDS (see 'Other Nursing Terminologies' tab below).
- Additional resources for nursing clinical documentation purposes.

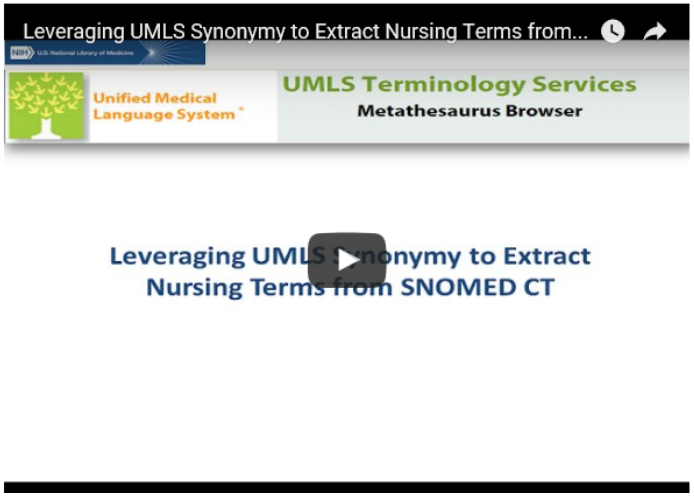
About SNOMED CT | About LOINC | Other Nursing Terminologies

About SNOMED CT

SNOMED Clinical Terms (SNOMED CT) is a standardized terminology used for clinical documentation in electronic health information systems. The International Health Terminology Standards Development Organisation (IHTSDO) owns, maintains, and distributes SNOMED CT. The National Library of Medicine, the United States National Release Center for the IHTSDO, provides access to SNOMED at no cost for use within the US. SNOMED CT is the most comprehensive, multilingual clinical healthcare terminology in the world. The terminology covers a wide range of clinical specialties, disciplines and requirements. This range of coverage allows for wider sharing and reuse of structured clinical information. With over 2 million components in SNOMED CT, domains such as nursing are generally well-covered with concepts specific for nursing diagnoses, interventions, and patient outcomes.

Leveraging UMLS Synonymy to Extract Nursing Terms from SNOMED CT

The video below demonstrates how to use the Metathesaurus to find CUIs and extract concept-level synonyms between SNOMED CT and other nursing terminologies.



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

AMERICAN NURSES ASSOCIATION

Position Statement

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

http://nursingworld.org/MainMenuCategories/Policy-Advocacy/Positions-and-Resolutions/ANAPositionStatements/Position-Statements-Alphabetically/Inclusion-of-Recognized-Terminologies-within-EHRs.html

AMERICAN NURSES ASSOCIATION

Position Statement

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

4. When exchanging a Consolidated Continuity of Care Document (C-CDA) 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.

AMERICAN NURSES ASSOCIATION

Position Statement

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 Document (C-CDA) 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.

The Office of the National Coordinator for Health Information Technology

Perspective

Standard terminologies and structures for nursing

Gregg Springan, BSN, RN | Epic

Interface Terminologies	Minimum Data Sets
1. Clinical Care Classification (CCC) System 2. International Classification for Nursing Practice (ICNP) 3. North American Nursing Diagnosis Association International (NANDA-I) 4. Nursing Interventions Classification System (NIC) 5. Nursing Outcomes Classification (NOC) 6. Omaha System 7. Perioperative Nursing Data Set (PNDS) 8. ABC Codes	1. Nursing Minimum Data Set (NMDS) 2. Nursing Management Minimum Data Set (NMMDS)
	Reference Terminologies
	1. Logical Observation Identifiers Names and Codes (LOINC) 2. SNOMED Clinical Terms (SNOMED CT)

U.S. Department of Health and Human Services. (2017). *Standard nursing terminologies: A landscape analysis*. Washington, DC: Office of the National Coordinator for Health Information Technology. Retrieved from https://www.healthit.gov/sites/default/files/snt_final_05302017.pdf

2, 2, and 2

Problems
Solutions
Terminologies


LOINC
SNT
sustainability
SNOMEDCT
integration
health
PNDS
transitions
objectives
terminology
version
Current
OmahaSystem
associated
NursingOutcomesClassification
Major
NANDAInternational
issues
usage
barriers
ABC
implementation
NursingInterventionsClassificationSystem
update
interoperability
Maintenance
Electronic
NIC
Level
socialdeterminants
SDOH
goals
versioning
Terminology
methodology
timing
CCCSystem
Latest
ICNP
records
release
NOC
future
state
activities
schedules

The Office of the National Coordinator for Health Information Technology

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Standardizing Nursing Data Utilizing Terminologies

Translating Proprietary Codes to Standardized Terminology Codes

Nikki Vande Garde BSN, RN-BC – Director, Platform Development Cerner Corporation

Within Cerner's EHR, a few of my mantras in relationship to patient care discrete questions…

- Questions should be fully defined
- Questions should not be duplicated (or captured in multiple ways that could cause duplicates)
  - » Shared cross venue and discipline when meaning is identical
- Related data must be "married" in the system
  - » O2 Saturation should not be separated from
    - – Oxygen delivery method
    - – Oxygen L/Min
    - – FiO2
- Use the EHR as intended (including the data model)
  - » Lab example - Potassium, Body Fluid…
- Precision of the meaning of each data element important and becoming more and more important

Currently supported nursing terminologies/structures

- Electronic Health Record
  - LOINC & SNOMED
    - Questions & Answers
  - SNOMED, IMO, and more
    - Nursing Problems
  - FHIR
- Population Health & Big Data
  - UMLS Vocabularies + More
  - Utilize standard terminologies to standardize & normalize data from multiple sources including multiple EHRs, claims, pharmacies and more
    - Data standardization - The process of mapping proprietary or unrecognized code values to codes from an industry-standard nomenclature.
    - Data normalization - The process by which standardized attributes are categorized or rolled up into meaningful groupings, such as for display purposes, rules processing, or analytics reporting.

How are we increasing use of standard terminologies

- Electronic Health Record
  - » Ongoing content development
  - » Participating in industry discussions/workgroups to determine necessary development
  - » FHIR use cases driving increased mappings
- Population Health & Big Data
  - » Use cases growing daily driving increased amount of mappings that exist between data sources and standard terminologies
- Cross Platform
  - » Longitudinal patient-centered plan of care
  - » Terminologists submitting many requests to SNOMED for patient specific interventions & outcomes
    - – Instead of: “Teach patient how to…”, shift to: “Learn how to…”

Vision for greater integration

- "Apples" = "Apples" is not good enough
  - When an exact match is not available between a standard terminology and a proprietary code (such as an EHR "question"), is it always OK to use a less specific code?
- For the most part… it can't be "nursing vocabularies"
  - Vocabularies and structures supporting interoperability and big data initiatives must be interdisciplinary
  - Should nursing define the nutrition risk assessment questions, or should we collaborate with the nutrition experts to determine the questions
- Nursing must have input across many disciplines, and many disciplines need to have input for nursing

Challenges

- Lack of all necessary standard terminology codes
- Risk of losing context, and health data has layers of context
- Lack of terminology expertise
- Lack of understanding related to importance of terminologies
- Legacy data
- “Duplicates” exist within LOINC (and they need to exist)
  - Pre versus Post coordination
  - Slightly different wording of questions
- Copyright challenges
  -
  - Not available within LOINC because of additional copyrights
- Standard Terminologies are an “afterthought” when developing assessment tools/scales

Vital Signs – FHIR Profile - 1

build.fhir.org/observation-vitalsigns.html

Mig PH PH-Ed Reg HL7 FHIR MPages Model Concept CKI IP ESH uCern Gen Wiki Temp HIT Core Dmn NLP PMO Sale

10.1.18 Formal View of Profile Content

Vital Signs Profile : Link to the formal definition views for the vital signs listed in this table.

- The table below represents a minimum set of vital sign concepts, the required codes ("magic values"), and UCUM units of measure codes used for representing vital signs observations. These are extensible bindings and require that when a system supports any of these vital signs concepts, they must represent them using these codes. In addition, if you have a blood pressure observation, you must have both a systolic and a diastolic component, though one or both may have dataAbsentReason instead of a value.
- The first column of this table links to the formal views of the individual profile for each vital sign.
- If a more specific code or another code system is recorded or required, implementers must support both the values (LOINC) listed below and the translated code - e.g. method specific LOINC codes, SNOMED CT concepts, system specific (local) codes.
- In addition the implementer may choose to provide alternate codes in addition to the standard codes defined here. The examples illustrate using other codes as translations.
- Other profiles may make rules about which vital sign must be present or must be present as part of a panel or expand the list to include other vital signs. For implementers using LOINC, optional qualifier codes are provided in the notes below.

Profile Name	"Magic Value" (LOINC)	LOINC Name and Comments	UCUM Unit Code	Examples
Vital Signs Panel	85353-1	*Vital signs, weight, height, head circumference, oxygen saturation and BMI panel* - It represent a panel of vital signs listed in this table. All members of the panel are optional and note that querying for the panel may miss individual results that are not part of the actual panel. When used, Observation.valueQuantity is not present; instead, related links (with type=has-member) reference the vital signs observations (e.g. respiratory rate, heart rate, BP, etc.). This code replaces the deprecated code 8716-3 - *Vital signs* which is used in the Argonaut Data Query Implementation Guide.	-	Vital Signs Panel Example
Respiratory Rate	9279-1	*Respiratory Rate*	/min	Respiratory Rate Example
Heart rate	8867-4	*Heart rate* - To supplement this vital sign observation, 8887-2 - *Heart rate device type* MAY be used as an additional observation.	/min	Heart Rate Example
Oxygen saturation	59408-5	*Oxygen saturation in Arterial blood by Pulse oximetry* - This code replaces the deprecated code 2710-2 - *Deprecated Oxygen saturation in Capillary blood by Oximetry* which had been listed in C-CDA.	%	Oxygen Saturation Example
Body temperature	8310-5	*Body temperature* - To supplement this vital sign observation, 8327-9 - *Body temperature measurement site* (oral, forehead, rectal, etc.) and 8326-1 -*Type of body temperature device* MAY be used as additional observations	Cel, [degF]	Body Temperature Example

Vital Signs Profile on FHIR (Current Build)
http://build.fhir.org/observation-vitalsigns.html#vitals-table

Challenges - 1

- Pre and Post Coordination
  - » Translate “Oral Temperature” to “Body Temperature” + “Body Site”?

8331-1 Oral temperature

NAME

	Component	Property	Time	System	Scale	Method
Fully-Specified Name:	Body temperature	Temp	Pt	Mouth	Qn	
Long Common Name:	Oral temperature					
Shortname:						

BASIC ATTRIBUTES

Class/Type:
First Released in Version:
Last Updated in Version:
Status:

35095-9 Body temperature panel

PANEL HIERARCHY (view this panel in the LForms viewer)

LOINC#	LOINC Name
35095-9	Body temperature panel
8310-5	Body temperature
8326-1	Type of Body temperature device
8327-9	Body temperature measurement site
9849-1	Body temperature device Institution inventory number
9850-9	Body temperature device Vendor model number
9851-7	Body temperature device Vendor serial number

Vital Signs – FHIR Profile - 2

build.fhir.org/observation-vitalsigns.html

Mig PH PH-Ed Reg HL7 FHIR MPages Model Concept CKI IP ESH uCern Gen Wiki Temp HIT Core Dmn NLP PMO Sale

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Challenges

- Have we really agreed on what vital signs are?
  - » Do we really agree on the basics, like what is a “heart rate” that should be mapped to LOINC 8867-4 that is part of the FHIR profile for Vital Signs LOINC 85353-1?

8867-4 Heart rate

NAME

Fully-Specified Name:	**Component**	**Property**	**Time**	**System**	**Scale**	**Method**
	Heart rate	NRat	Pt	XXX	Qn	
Long Common Name:	Heart rate					
Shortname:	Heart rate					

EXAMPLE UNITS

Unit	**Source Type**
/MIN	REGENSTRIEF
bpm	REGENSTRIEF
{beats}/min	EXAMPLE UCUM UNITS

UNITS AND RANGE

Range	**Units Type**
/min:[60,100]	

If a heart rate is a measurement of how many beats per minute the heart contracts, and stored as a numeric value with a units of measure = beats per minute, then is it always a heart rate that should be coded to LOINC 8867-4?

LOINC – Heart Rate

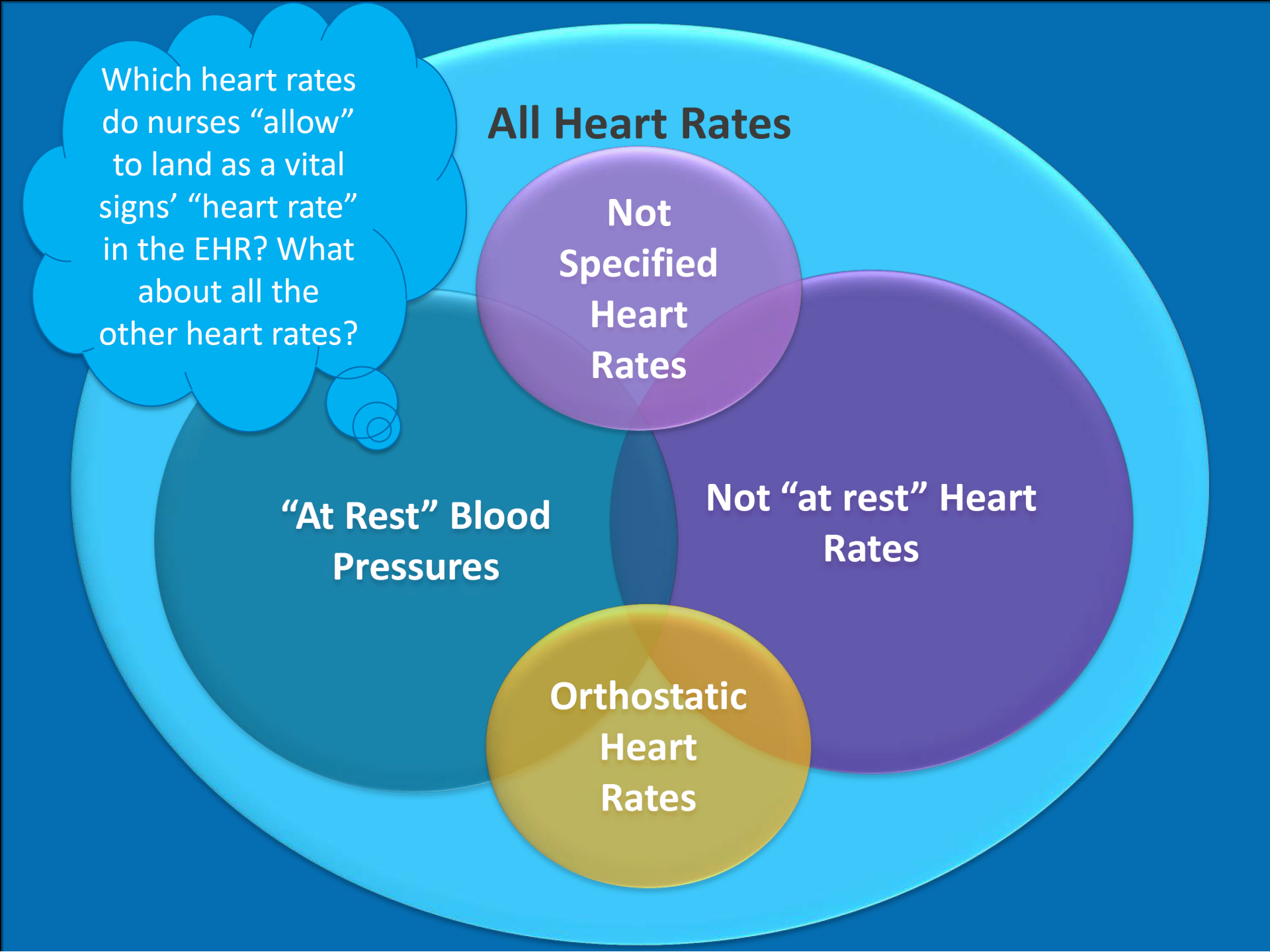
LOINC from Regenstrief

heart rate Search

1 / 2

LOINC	LongName	Component	Property	Timing	System	Scale	Method	exUCUMunits	exUnits	Lforms
76476-1	Heart rate by Transthoracic impedance	Heart rate	NRat	Pt	Heart	Qn	Impedance.transthoracic	{beats}/min	beats/min	
8889-8	Heart rate by Pulse oximetry	Heart rate	NRat	Pt	Capillary bed	Qn	Pulse oximetry	{beats}/min	beats/min	
8867-4	Heart rate	Heart rate	NRat	Pt	XXX	Qn		{beats}/min	beats/min	
76282-3	Heart rate.beat-to-beat by EKG	Heart rate.beat-to-beat	NRat	Pt	Heart	Qn	EKG	{beats}/min	beats/min	
80404-7	R-R interval.standard deviation (Heart rate variability)	RR interval.standard deviation	Time	Pt	Heart	Qn		ms	ms	
8890-6	Heart rate Cardiac apex by Auscultation	Heart rate	NRat	Pt	Cardiac apex	Qn	Auscultation	{beats}/min	beats/min	
8891-4	Heart rate Cardiac apex by palpation	Heart rate	NRat	Pt	Cardiac apex	Qn	Palpation	{beats}/min	beats/min	
60978-4	Heart rate Intra arterial line by Invasive	Heart rate	NRat	Pt	Intra arterial line	Qn	Invasive	{beats}/min	beats/min	
8893-0	Heart rate Peripheral artery by palpation	Heart rate	NRat	Pt	Peripheral artery	Qn	Palpation	{beats}/min	beats/min	
8892-2	Heart rate Peripheral artery by US.doppler	Heart rate	NRat	Pt	Peripheral artery	Qn	US.doppler	{beats}/min	beats/min	
40442-6	Heart rate --post exercise	Heart rate^post exercise	NRat	Pt	XXX	Qn		{beats}/min	beats/min	
67129-7	Heart rate Peripheral artery by palpation --resting	Heart rate^resting	NRat	Pt	Peripheral artery	Qn	Palpation	{beats}/min	beats/min	
40443-4	Heart rate --resting	Heart rate^resting	NRat	Pt	XXX	Qn		{beats}/min	beats/min	
55283-6	Fetal Heart rate	Heart rate	NRat	Pt	^Fetus	Qn		{beats}/min	beats/min	
57068-9	Fetal Heart rate by Auscultation	Heart rate	NRat	Pt	^Fetus	Qn	Auscultation	{beats}/min	beats/min	
11948-7	Fetal Heart rate US	Heart rate	NRat	Pt	^Fetus	Qn	US.measured	{beats}/min	beats/min	
73795-7	Heart rate Blood Postductal Pulse oximetry	Heart rate	NRat	Pt	Bld.postductal	Qn	Pulse oximetry	/min	/min	

Search for "heart disease" at LOINC—
https://search.loinc.org/searchLOINC/search.zul?query=heart+disease


Which heart rates do nurses “allow” to land as a vital signs’ “heart rate” in the EHR? What about all the other heart rates?
All Heart Rates
Not Specified Heart Rates
“At Rest” Blood Pressures
Not “at rest” Heart Rates
Orthostatic Heart Rates

EHR “Questions” mapped to LOINC 8867-4 = Heart Rate

Heart Rate Pre Transfusion & Heart Rate Post Transfusion Reaction
Heart Rate Pre Procedure & Heart Rate Post Procedure
Pulse Rate
Pulse
Pulse Rate Pretreatment RT & Pulse Rate Posttreatment RT
Croup Pulse Rate (beats/minute)
Heart Rate – Anesthesia
Heart Rate - Surgery
Heart Rate Monitored
Heart Rate Monitored, Cuff
Heart Rate-Remote Monitoring
Heart Rate, Apnea
Heart Rate – Pulse Ox
Heart Rate
ED Heart/Pulse Rate
Heart Rate ABD (Apnea/Bradycardia/Desat Episodes)
Rate (BPM)
RVAD Heart Rate
LVAD Heart Rate
Heart Rate-VAD
Dialysis Pulse Rate
RC Pretrial Heart Rate & RC Posttrial Heart Rate
Pre Capping Heart Rate & Post Capping Heart Rate

When an exact code doesn’t exist, the acceptable practice is to map to the less specific.

LOINC 8867-4 is the most generic “heart rate”.

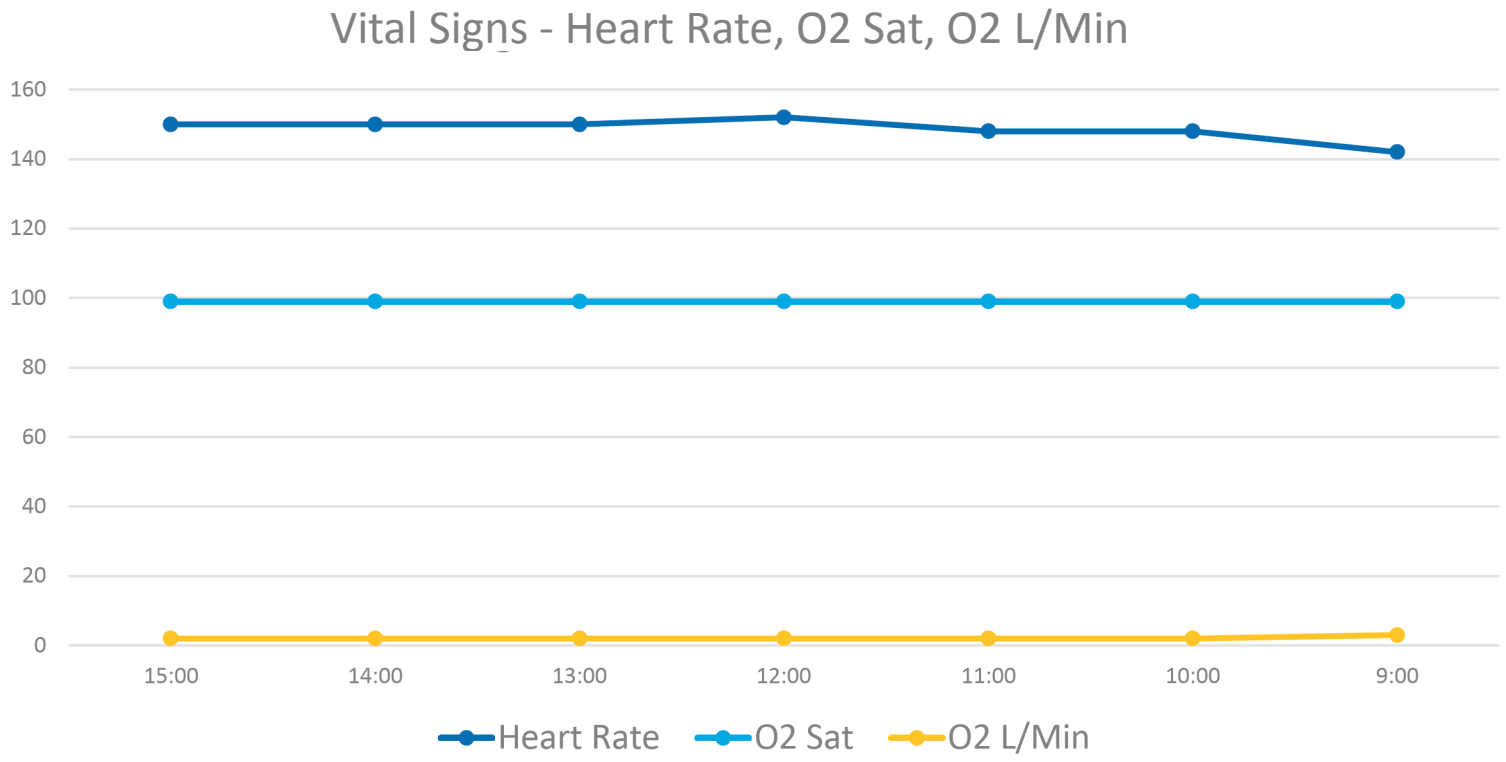
Are these appropriate to represent as the “Vital Signs” heart rate?

Or, is it better to stop picking and choosing heart rates that are considered “Vital Signs”?

Do we even agree that clinicians are picking and choosing which heart rates make it to “Vital Signs” in EHRs today?

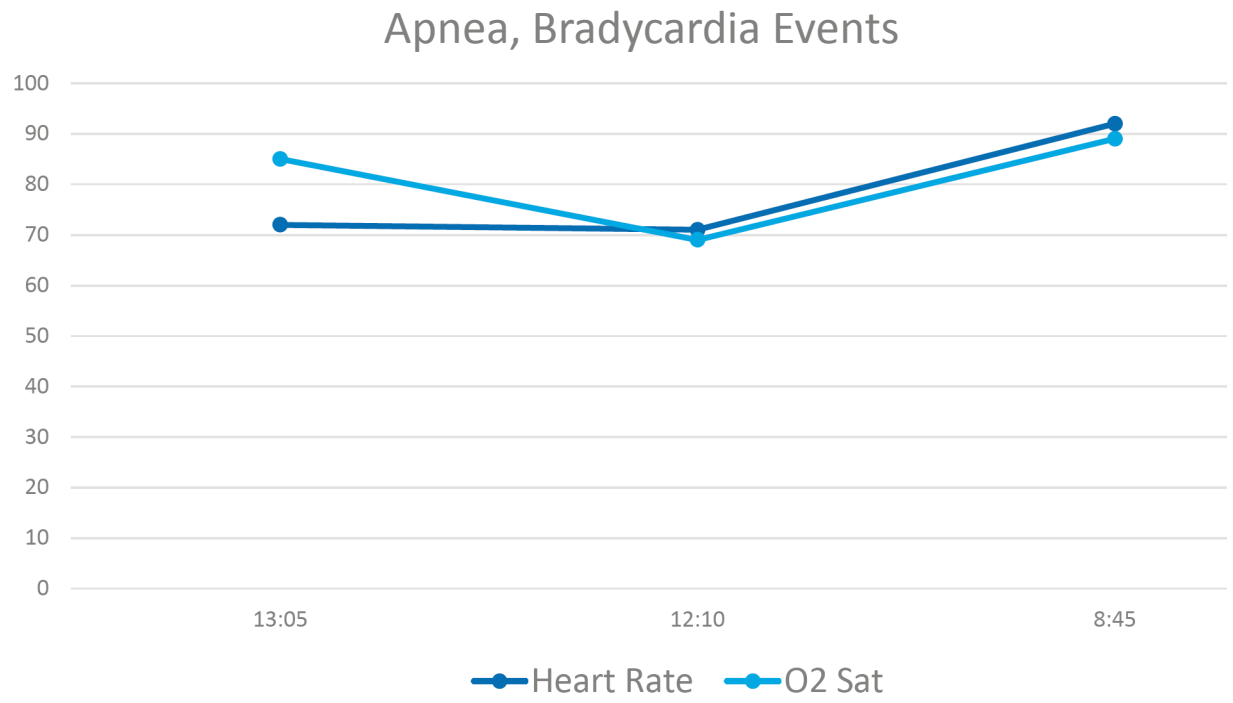
Example “heart rates” NICU patient

Vital Signs							
Time	**15:00**	**14:00**	**13:00**	**12:00**	**11:00**	**10:00**	**9:00**
Heart Rate	150	150	150	152	148	148	142
O2 Sat	99	99	99	99	99	99	99
O2 L/Min	2	2	2	2	2	2	3



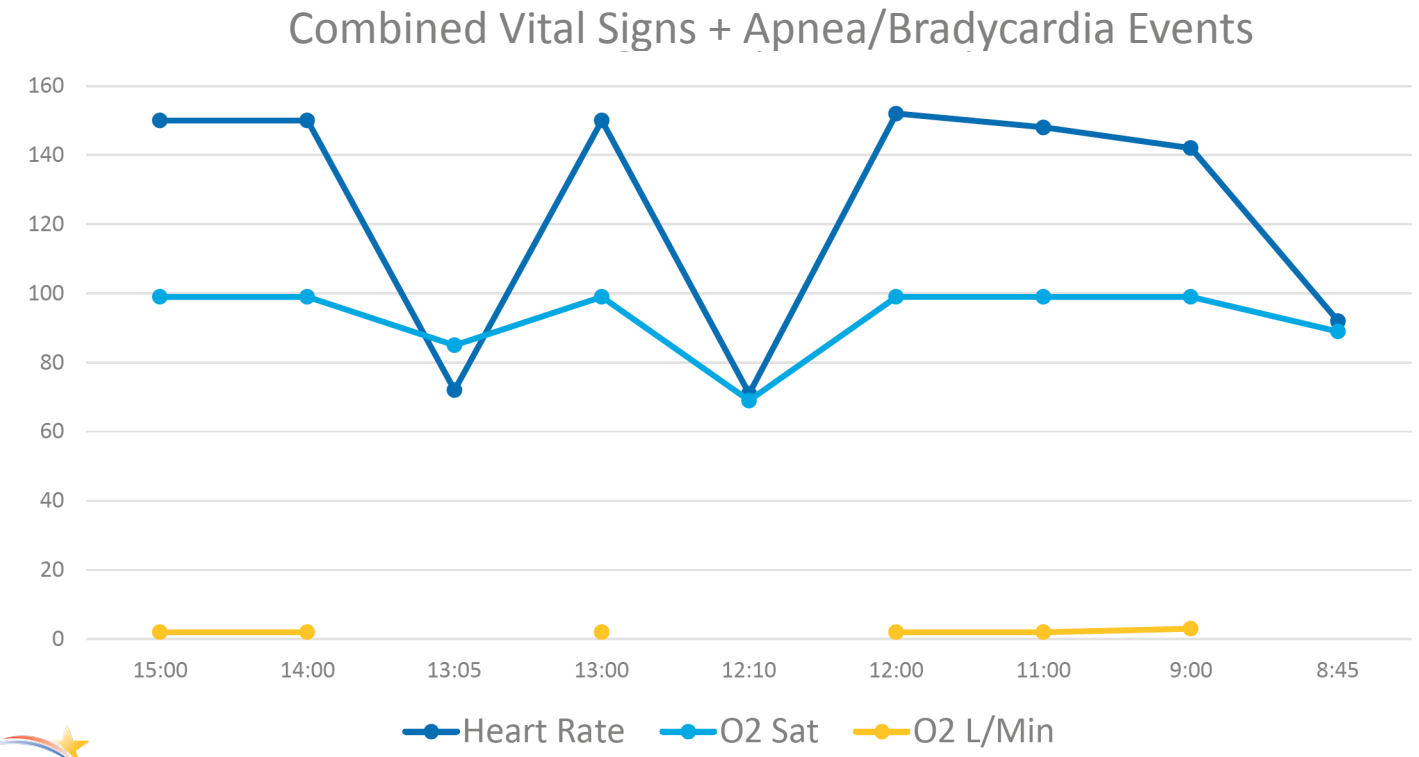
Example “heart rates” NICU patient, continued

Apnea/Bradycardia Events			
Time	**13:05**	**12:10**	**8:45**
Heart Rate	72	71	92
O2 Sat	85	69	89
O2 L/Min			
Event Type	Bradycardia	Bradycardia	Apnea, Bradycardia



Example “heart rates” NICU patient, continued

Combined Vital Signs + Apnea/Bradycardia Events									
Time	**15:00**	**14:00**	**13:05**	**13:00**	**12:10**	**12:00**	**11:00**	**9:00**	**8:45**
Heart Rate	150	150	72	150	71	152	148	142	92
O2 Sat	99	99	85	99	69	99	99	99	89
O2 L/Min	2	2		2		2	2	3	
Event Type	Vital Signs	Vital Signs	Bradycardia	Vital Signs	Bradycardia	Vital Signs	Vital Signs	Vital Signs	Apnea, Bradycardia



The Office of the National Coordinator for Health Information Technology

The Office of the National Coordinator for Health Information Technology

Nikki Vande Garde, BSN, RN-BC

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The Office of the National Coordinator for Health Information Technology

National Academies of Practice (NAP)

Distinguished U.S. Healthcare Professionals

Michelle R. Troseth, MSN, RN, FNAP, FAAN

President

www.napractice.org

National Academies of Practice

Who We Are

- NAP is a nonprofit organization founded in 1981 to advise governmental bodies on our healthcare system. Distinguished practitioners and scholars are elected by their peers from fourteen different health professions to join the only interprofessional group of healthcare practitioners and scholars dedicated to supporting affordable, accessible, coordinated quality healthcare for all.

www.napractice.org

National Academies of Practice

14 Academies

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- Occupational Therapy
- Optometry
- Osteopathic Medicine
- Pharmacy
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- Podiatric Medicine
- Psychology
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- Speech-Language Pathology
- Veterinary Medicine

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Annual Meetings & Forums

2018 April 13-14 Atlanta, GA

2019 March 8-9 Washington, DC

<u>Themes focusing on:</u>

- Leveraging technology
- Collaborative teams
- Advocacy for quality healthcare
- Relationship-centered care

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Practice Interoperability

- Semantic interoperability & beyond
- SNOMED CT & LOINC
- Design thinking & polarity thinking

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Highlights

12 Academies responded
Education (42.4%) Clinical Practice (39%)

22 EHR systems utilized
EHR used an average of 12.33 years

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1=Never and 5=Always

EHR support my individual profession = 3.36
EHR supports interprofessional team integration= 2.93
EHR supports evidence-based practice = 3.20
EHR supports transitions of care = 3.12

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NAP ONC Shared Work Group

- ONC key stakeholder group
- Joint advocacy for interprofessional integration and health IT
- Address and make recommendations for:
  - *Interprofessional Practice Model with shared documentation, terminologies & views of patient data*
  - *Design recommendations to address documentation & reimbursement issues*
  - *Engage CMS with revenue neutral possibilities across multiple stakeholders*

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Our Challenge

Individual and Community Resilience (Nemeth & Oliver, 2017)

To be firmly grounded in the present, while learning from the past, so we can see ourselves in the future.

Interoperability Use Case

Susan Matney, PhD, RNC-OB, FAAN, FACMI

Current Situation

- Each setting uses a unique terminology to represent pressure injuries
  - Some standardization of codes is now occurring, but…
  - Data is not consistent setting to setting, or even vendor to vendor
- This means that:
  - Tracking and trending Peter's data across settings is impossible
  - Clinicians do not have the comprehensive view of the single patient's history
  - We cannot automate evidence based practice and personalize care
  - Sharing executable software across settings is impossible
  - There are unmet needs for health care applications and decision support
  - It is "organization-centric care" not patient-centered care

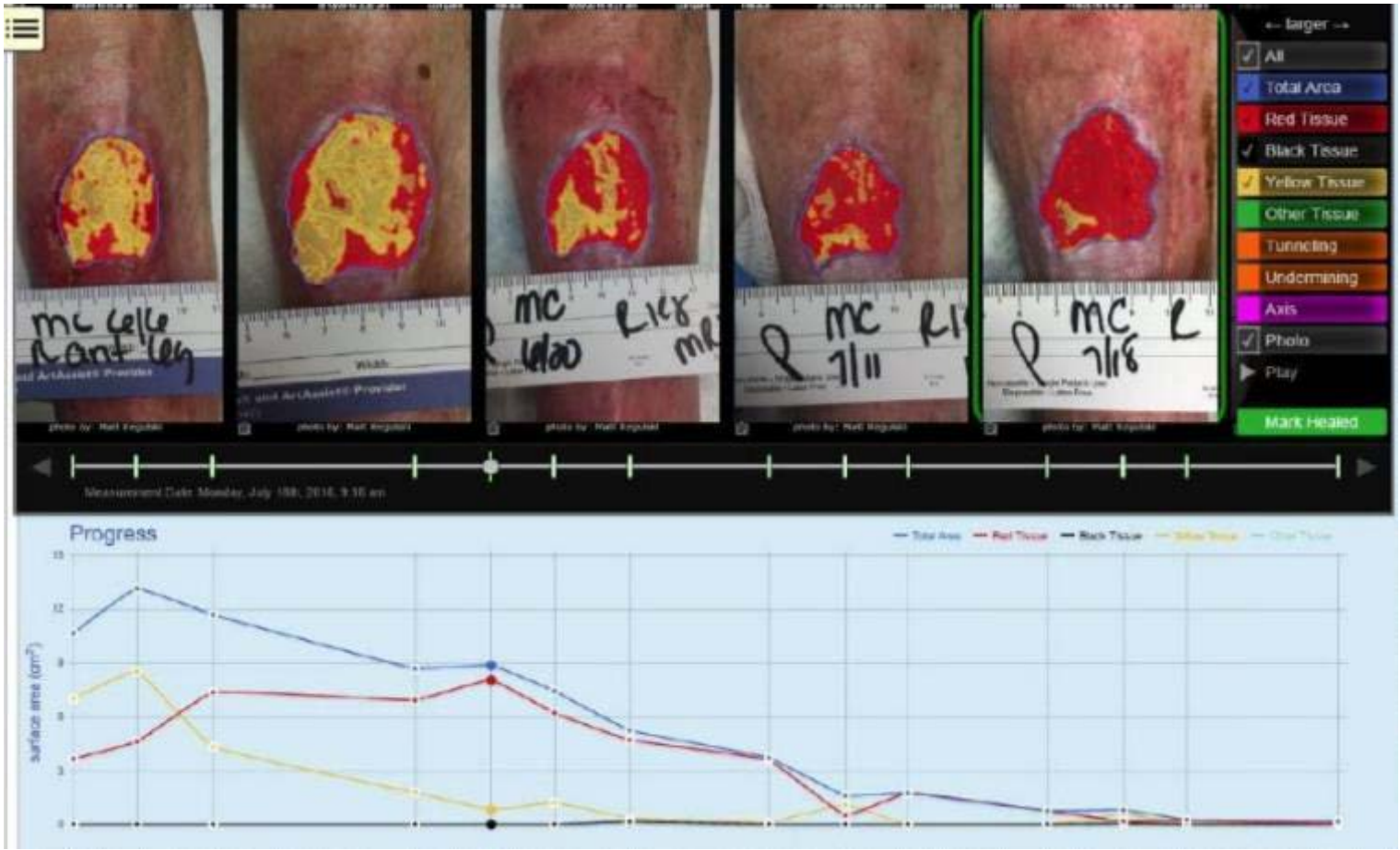
Peter Pepper

- 40 year old male military veteran
  - 5 years post lumbar spinal cord injury (obtained from a blast In Afghanistan)
  - Stage IV Pressure Injury
  - Chronic Pain
  - Chronic Depression

Peter Pepper is wheelchair bound and has no feeling from the waist down. He is admitted today for treatment of a stage four pressure injury with tunneling. The wound is 3 cm X 4 cm and 3 cm deep. There is a 3 cm tunnel in the two o'clock direction. The edge of the wound is boggy.

Free photo obtained from: https://www.flickr.com/photos/bcgovphotos/21039219486

Goal = Interoperable Wound Data



Skin Assessment LOINC Panel (partial)

72284-3 Skin assessment panel

PANEL HIERARCHY (view this panel in the LForms viewer)

LOINC#	LOINC Name
72284-3	Skin assessment panel
72369-2	Body site identification panel
39111-0	Body site
39112-8	Body location qualifier
20228-3	Anatomic part Laterality
39107-8	Color of Skin
39129-2	Moisture of Skin
39106-0	Temperature of Skin
39109-4	Turgor [Interpretation] of Skin
80344-5	Skin integrity
80345-2	Pressure points examined [Anatomy] of Skin
80347-8	Mucous membrane integrity of Mucous membrane
80343-7	Skin assessment [Interpretation]

Wound Assessment LOINC Panel (partial)

39135-9 Wound assessment panel

PANEL HIERARCHY (view this panel in the LForms viewer)

LOINC#	LOINC Name
39135-9	Wound assessment panel
81666-0	Wound number [Identifier]
81664-5	Drain number [Identif
72300-7	Skin alteration of Wou
72369-2	Body site identificatio
39111-0	Body site
39112-8	Body location qualifie
20228-3	Anatomic part Lateral
72301-5	Description of Periwo
72527-5	Pressure ulcer stage N
72372-6	Wound bed and edge

Refset: Wound anatomic location reference set

Number of members 63

Term
Gingival structure (body structure)
Mucous membrane structure (body structure)
Nail structure (body structure)
Skin of eye region (body structure)
Skin of finger (body structure)
Skin of lumbar region (body structure)
Skin of occipital region (body structure)

Encoding The Patient Story

Type	Text	Terminology	Code	FSN
Finding	Wound Present	SNOMED CT	416462003	Wound (disorder)
Observation	Wound Type	LOINC	72300-7	Skin Alteration:Type:PT:Skin:Nom:::
Value	Stage IV Pressure Injury	SNOMED CT	420597008	Pressure ulcer stage 4 (disorder)
Observation	Body Location	LOINC	39112-8	Body location qualifier:Find:PT:^Patient:Nom::
Value	Coccyx	SNOMED CT	287274001	Entire skin of coccygeal region (body structure)

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Panel/Grouping	Wound Size	LOINC	72287-6	Wound Size Panel::PT:Wound::
Question 1	Wound Width	LOINC	39125-0	Width:Len:PT:Wound:Qn::
Value	3 centimeters	SNOMED CT	258672001	centimeter (qualifier value))
Question 2	Wound Length	LOINC	39126-8	Length:Len:PT:Wound:Qn::
Question 3	Wound Depth	LOINC	39127-6	Depth:Len:PT:Wound:Qn::

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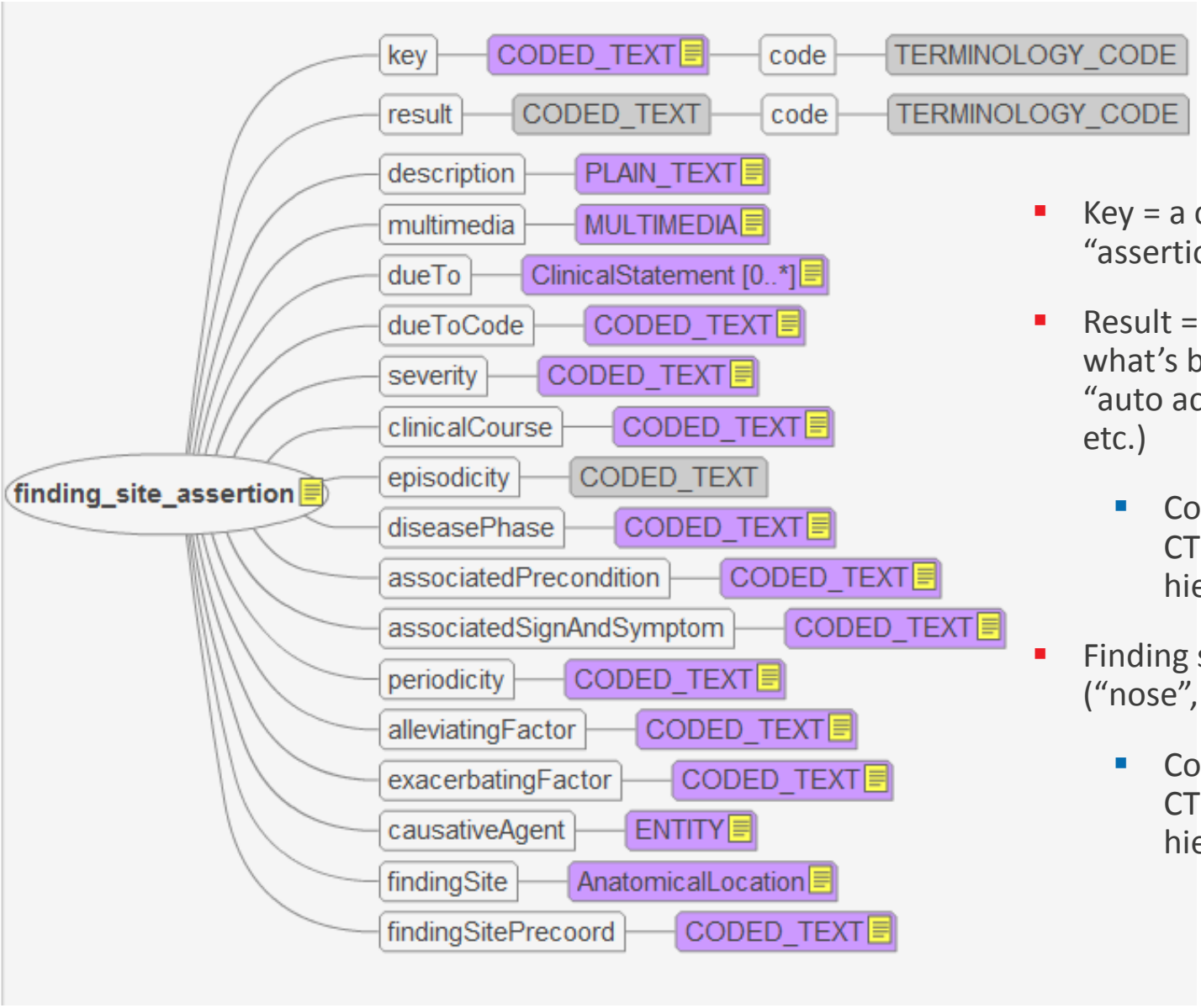
Question	Periwound Condition	LOINC	72301-5	Description of Periwound
Value	Boggy	SNOMED CT	449737008	Boggy periwound skin (finding)

Solution = Terminology AND Structure

- Common model used to represent pressure injuries across settings
  - Clinical Information Modeling Initiative (CIMI) Model
  - Standard terminology bindings
- Model developed from the bottom-up using domain experts
- FHIR Profiles developed off of CIMI model
- This means that:
  - Sharing is easy
  - Tracking and trending Peter's data across settings is possible
  - Sharing executable software across settings is possible
  - Quality measures are easy to retrieve and consistent across settings
  - Software costs are lower

Assertion (Nursing Diagnosis)

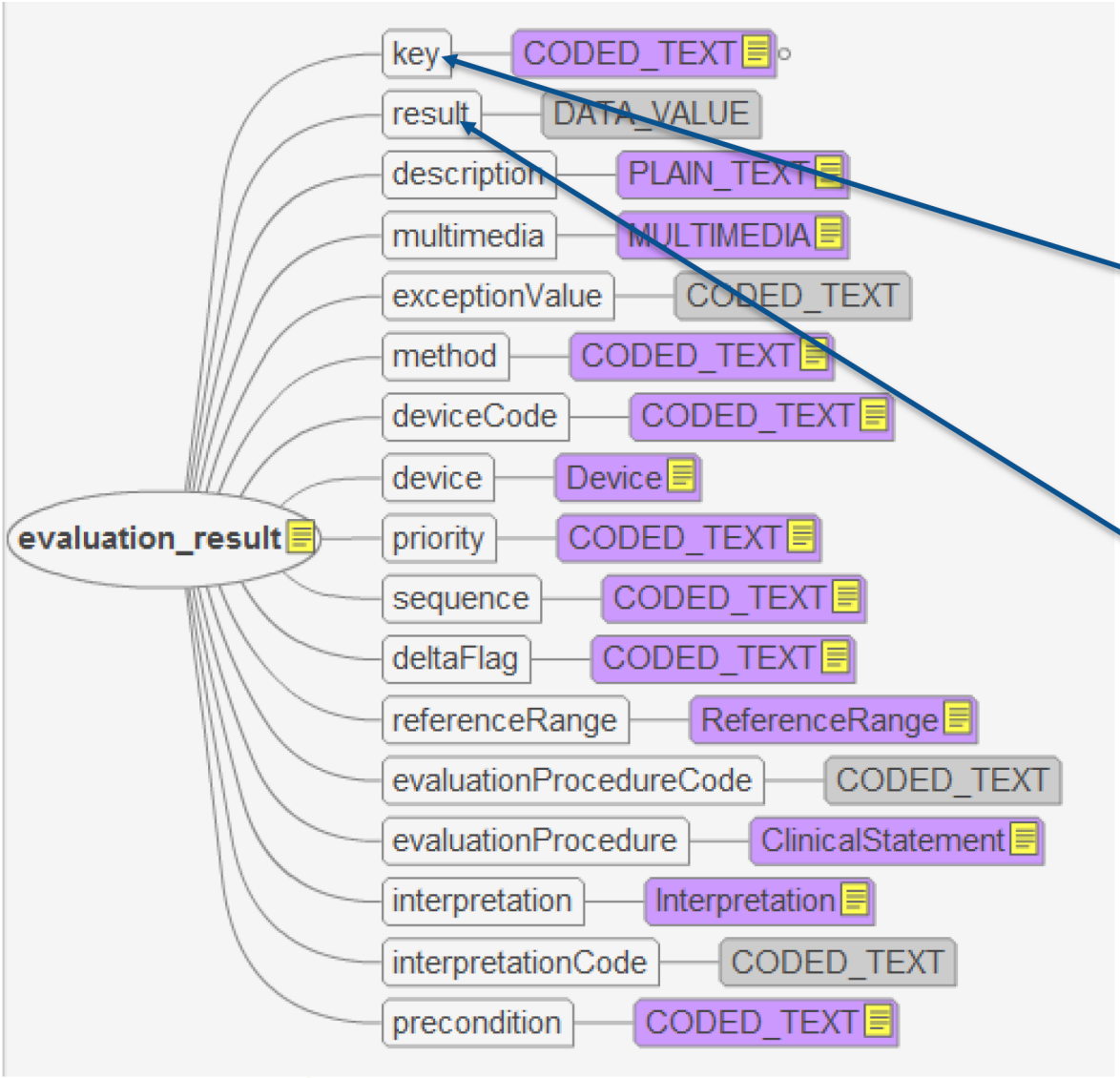


- Key = a code meaning “assertion”
- Result = a code representing what’s being asserted (“rash”, “auto accident”, “hypertrophy”, etc.)
  - Concepts from SNOMED CT “Clinical Finding” hierarchy
- Finding site for the assertion (“nose”, “elbow”)
  - Concepts from SNOMED CT “Body Location” hierarchy

Assertion Examples

Finding Site Assertion String	Syntax
The patient has a stage two pressure injury on the right ischial tuberosity	WoundAssert key: Assertion Result: Pressure ulcer stage 2 (disorder) bodylocation: Skin structure of ischial tuberosity body side: Right (qualifier value) Context: Confirmed present (qualifier value)

Evaluation Result (Assessments)

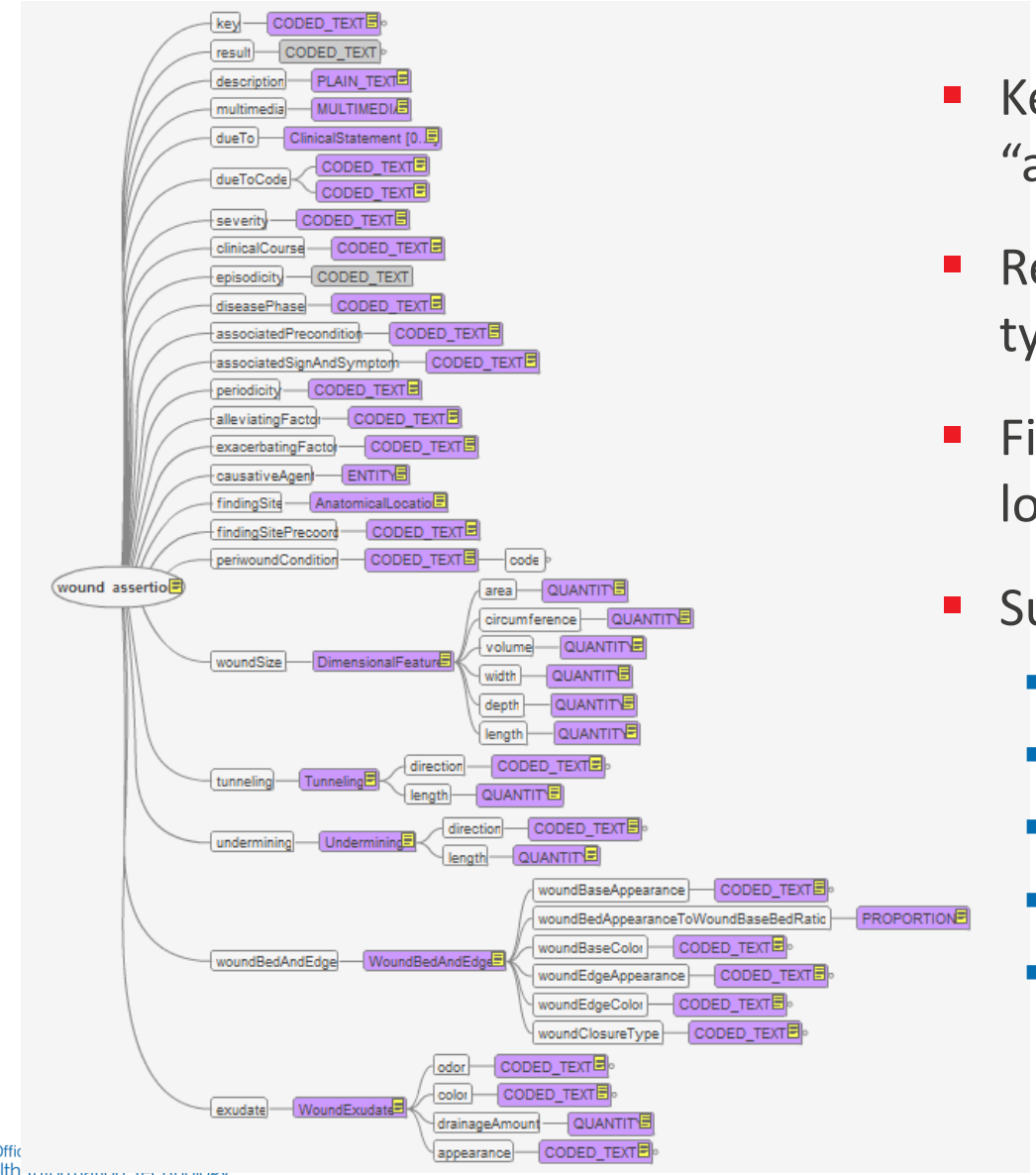


- Key = the item being observed
  - Concepts from LOINC
- Result = the result of the observation
  - If coded; Concepts from SNOMED CT

Evaluation Result Examples

Physical Evaluation String	Syntax
The patient's skin turgor is friable	SkinTurgorEval key: Skin turgor (observable entity) result: Fragile skin (finding) evaluationProcedure: Inspection (procedure) Context: Confirmed present (qualifier value)

Wound Assertion CIMI Model



- Key = a code meaning “assertion”
- Result = a code from wound type value set
- Finding site = code from wound locations value set
- Subgroupings
  - woundSize
  - Tunneling
  - Undermining
  - Wound Bed and Edge
  - Exudate

Final Thoughts

- Nursing Process Data is being encoded with SNOMED CT and LOINC
- Models Developed to support
  - Nursing Problems
  - Interventions (Procedures)
  - Assessment Items
  - Outcomes
- Collaboration occurring across the nation
- How models will be implemented in systems is vender specific
- Much work to do!!

The Office of the National Coordinator for Health Information Technology

Thank You!

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