

# Pressure Ulcer Prevention Domain Analysis Model

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*Informative ballot  
May, 2011*

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## 1. Introduction

This project proposes a domain analysis model for the concepts of pressure ulcer risk assessment and preventative interventions. The model will support both internal uses—internal integration, quality control and decision support—and semantic interoperability among providers and between providers and other stakeholders.

### **Pressure ulcers are a significant problem**

Pressure ulcers are a major threat to the healthcare system and represent a serious safety concern to patients. As many as 3 million patients are treated in U.S. healthcare facilities each year for pressure ulcers at an estimated cost as high as \$15.6 billion<sup>1</sup>.

Pressure ulcers are one of the most serious safety concerns related to hospitalizations<sup>4</sup>. Approximately 3 million adults are affected by pressure ulcers in the U.S. and this adverse event causes increased healthcare costs<sup>2</sup> and a great deal of pain and suffering to patients<sup>3</sup>. The average treatment cost per hospital stay of a pressure ulcer in 2008 was estimated to be \$44,141<sup>8</sup>.

### **Pressure ulcers are a quality indicator**

Accurate identification of the risk and prevention strategies for pressure ulcers crosses many of the high-priority measure concepts, including care coordination, patient health outcomes, care transitions, and effective preventive services. The prevalence of pressure ulcers is widespread in all settings, with estimates of 10-18% in acute care, 2.3-28% in long term care, and 0-29% in home care<sup>4</sup>. In addition, about 50% of all adult patients in acute care facilities are at high risk for developing pressure ulcers<sup>5</sup>. The prevalence of pressure ulcers is generally considered a proxy

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1. Dorner, B., Posthauer, M. E., & Thomas, D. (2009). The role of nutrition in pressure ulcer prevention and treatment: National Pressure Ulcer Advisory Panel white paper. *Advances in Skin and Wound Care*, 22(5), 212-221.
  2. Russo, A., Steiner, C., & Spector, W. (2008). *Hospitalizations Related to Pressure Ulcers Among Adults 18 Years and Older*. Healthcare Cost and Utilization Project, Agency for Healthcare Research and Quality. Retrieved on December 14, 2010 from <http://hcupnet.ahrq.gov>
  3. Hopkins, A., Dealey, C., Bale, S., Defloor, T., & Worboys, F. (2006). Patient stories of living with a pressure ulcer. *Journal of Advanced Nursing*, 56(4), 345-353.
  4. Cuddigan, J., Ayello, E. A., Sussman, C., Baronoski, S. eds. (2001). *Pressure Ulcers in America: Prevalence, Incidence, and Implications for the Future*. Reston, VA: National Pressure Ulcer Advisory Panel.
  5. Hill-Rom. (2007). Hospitals could improve outcomes for patients and save millions according to Hill-Rom, in *10th Annual Pressure Ulcer Survey*. Retrieved on December 17, 2010 from <http://ir.hill-rom.com/releasedetail.cfm?ReleaseID=302241>.

for the quality of care<sup>6</sup>. Better communication about the patient's risk factors and effective preventive interventions is critical to reducing this risk.

The Centers for Medicare and Medicaid Services (CMS)<sup>7</sup> has labeled pressure ulcers as one of the “never events”, and considers skin integrity as a reflection of quality of nursing care. As a result, as of October 2008, CMS will no longer reimburse for hospital-acquired pressure ulcers.

Pressure ulcer prevention is listed as one of the National Priorities Partnership top healthcare reform priorities. Pressure ulcers appear on the both National Quality Forum’s Serious Reportable Events (SREs)<sup>8</sup> and the CMS’s serious Hospital Acquired Conditions (HACs)<sup>10</sup>. As a result, acute care hospitals and nursing homes will soon be required to publicly report the number of these events that occur within their facility<sup>9</sup>.

### **Pressure ulcers are preventable**

Accurately assessing the patient’s risk of developing a pressure ulcer is the first step in prevention. Most of the existing NQF-endorsed quality measures related to pressure ulcers only track the prevalence of late-stage pressure ulcers, but not the process (assessment and intervention) necessary to prevent this common HAC. What is needed is the ability to track and trend patient outcomes suitable for comparison by health care professionals. EHRs that provide evidence-based guidelines at the point of care; make it easier to find and share best practices; help reduce healthcare-associated preventable conditions; promote ongoing research on the effectiveness of practices; and allow monitoring and analysis of how individual clinicians and systems are performing relative to peers exemplify the type of functionality required to demonstrate meaningful use today. The collection of quality measures needs to be an automated byproduct of electronic documentation at the point of care, not a manual, retrospective, and costly process as it exists today.

Currently, there is no single quality measure that addresses the pressure ulcer risk identification and prevention for all environments. NQF-endorsed quality measures #538, 539, 540, 0201, and

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6. Gunningberg, L., Brudin, L., & Idvall, E. (2010). Nurse Manager’s prerequisite for nursing development: a survey on pressure ulcers and contextual factors in hospital organizations. *Journal of Nursing Management*, 18, 757-766. doi:10.1111/j.1365-2834.2010.01149.x
  7. Centers for Medicare and Medicaid Services (CMS). (2008). *Eliminating Serious, Preventable, and Costly Medical Errors – Never Events*. Retrieved on December 14, 2010 from <http://www.cms.hhs.gov/apps/media/press/release.asp?Counter=1863>
  8. National Quality Forum (NQF). (2008). *Serious reportable events*. Retrieved on December 8, 2010 from [http://www.qualityforum.org/Publications/2008/10/Serious\\_Reportable\\_Events.aspx](http://www.qualityforum.org/Publications/2008/10/Serious_Reportable_Events.aspx)
  9. Hospital Inpatient Quality Reporting Program (formerly known as RHQDAPU). (2010). *FY2012 Reporting Quarters*. Retrieved on December 9, 2010 from <http://www.qualitynet.org/dcs/ContentServer?cid=1138115987129&pagename=QnetPublic%2FPage%2FQnetTier2&c=Page>

0181<sup>10</sup> all offer a slightly different view of the problem. A modification, combination, or bundle of these measures that applies to all environments (acute care as and long-term care) is a step the right direction. This quality measure gap can start to be addressed in the next phase of meaningful use criteria with a national focus on capturing select data within an EHR that measures the impact of nursing care on patient outcomes.

### **Nursing data is critical**

A significant part of documentation is completed by nurses, the largest single group of EHR users. The sheer volume of documentation by nurses provides an excellent opportunity to use health information technology (HIT) to improve decision-making during the process of care delivery, where it can have the greatest impact on preventing pressure ulcer occurrence.

HIT, specifically the use of an EHR-enabled standardized risk assessment tool can facilitate the consistent identification of at risk patients, documentation, decision making, and timely communication of these findings to other providers. This is especially true if the system is based on expert rules or clinical guidelines and integrated within the nurses' workflow<sup>11</sup>.

## **2. Scope**

This effort is based on many organizations' observations that nursing data is critical to quality of care, and any EHR vision that purports to improve quality must include this vital source of knowledge. While some efforts, as at the US Veterans Administration, aim at a comprehensive codification of nursing information, this project focuses on a small first step, and for that step has chosen the domain of pressure ulcer prevention.

The use cases, described below, include observations to support a pressure ulcer risk assessment and creating and updating interventions designed to reduce pressure ulcer risk in the patient's care plan. These activities will support a variety of uses, including better-informed clinical care, quality management and quality reporting, better communication of risks to transfer or consultative partners, and clinical decision support.

The model is based on work done by experience clinical nurses and informaticists aimed at representing information required for pressure ulcer risk assessment and prevention in terms that are clear and intuitive to practicing nurses.

A significant part of the value is that the terminology defines the semantics of the properties: for this reason, terminology is included in the model. It might have been possible to "bind" these properties as coded elements to standard terminologies, if a) there were a convention for doing so

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10. National Quality Forum (NQF). (2010). *NQF-Endorsed Standards*. Retrieved on December 17, 2010 from [http://www.qualityforum.org/Measures\\_List.aspx](http://www.qualityforum.org/Measures_List.aspx)

11. Kim, H., Choi, J., Thompson, S., Meeker, L., Dykes, P., Goldsmith, D., & Ohno-Machado, L. (2010). Automatic pressure ulcer risk assessment using documented patient data. *International Journal of Medical Informatics*. doi:10.1016/j.ijmedinf.2010.08.005

and b) most of the terms existed in standard terminologies: neither of these is true. Still, it is the intent of the team that the values be drawn from standardized terminologies; to this end, we adopt the conventions outlined in the Vocabulary section, below. For terms not encoded, the LOINC Nursing Subcommittee is proposing the terms listed herein to LOINC and to SNOMED.

### **3. Current Effort**

The current effort grows out of a cooperative effort sponsored by the US Veterans Administration and by Kaiser Permanente. Its roots lie in a recognition that nursing information is a valuable and critically underused resource. A sister project is being conducted under the LOINC Nursing Subcommittee to model terminologies, primarily for skin and wound care. As pressure ulcers are a subset of the wound domain, terminologies identified by that project play a key role in the development of this model.

It is anticipated that this effort will support very concrete actions in the near term, viz., a pressure ulcer risk assessment document to be used for admission as well as ongoing care and transfers of care. How much this document will owe to or conform with existing specifications has yet to be determined; a list can be found in the Requirements package of the model.

The interventions package overlaps with a nascent effort at HL7 to extend the Care Provision domain to include Care Plans. We believe this model provides requirements for that effort, but remain open to suggestions for modeling our facet of the care plan process.

### **4. Metamodel**

In the interest of clarity and ease of access for clinicians and others who may not be modeling experts, we endeavor to keep the number of UML constructs to a minimum.

We recognize that it can be difficult to read such a long document, so we also provide an html rendering of the model at [pressureulcerpreventionmodel.com](http://pressureulcerpreventionmodel.com). This version is accessible under the DAM20110327 folder, though, being outside the ballot, it carries no procedural weight.

#### ***Package***

Packages group information into comprehensible chunks. At this stage, packaging supports legibility, not system boundary definition. Class diagrams are created for packages, and these diagrams should fit legibly on a page; hence, packages must not be excessively large. If you view a class diagram in this model, you are effectively viewing the package.

#### ***Use Case***

Use cases describe business functionality. They are the primary method of scoping the model. They include Actors, Triggers, Outcomes, and, for two key cases, Activity Diagrams.

#### ***Use Case Diagram***

The use case diagram illustrates what actors participate in use cases and how use cases relate in terms of composition.



## **Activity**

Activities are the steps in use cases.

## **Activity Diagram**

The activity diagram illustrates how activities are related in the flow of the use case.


## **Class**

Classes are business entities, the nouns of the conceptual space.

## **Class Diagram**


A class diagram illustrates how classes are related.

## **Association**

Associations indicate that classes have relationships. They should indicate the cardinality (e.g., ) of each end: blank cardinalities are assumed to be “1:1” (required and unique). They may also indicate the nature of the association with a label (typically a verb), or label the ends to indicate the roles played by the two classes: these labels are rarely necessary.

We do not adopt specialized relationships possible in UML, with the exception of Generalization (and see also the approach to enumerations, below).

## **Generalization**

A generalization, indicated with an open arrowhead () asserts that one class is a special kind of another class.

## **Property**

Properties are the data elements of interest, grouped into the classes to which they pertain.

## **Data type**

Each property will declare a data type (text string, integer, date/time, etc.). Types are taken from the HL7 Abstract Data Types R2.

## **Enumeration**

As noted above, this model includes terms identified by a team of clinical nurses to specify the semantics of the model properties. While enumeration is not the ideal tool for doing so, we have not identified a better option. Enumerations are associated with the classes containing the property whose values they enumerate. See the Vocabulary discussion, below, for further discussion.

## **Scope**

The tool in which this model was built represents a property called “scope” that is used for software engineering. Briefly, it declares what sorts of program can see the affected attribute. It is not relevant for our analysis model, but the tool assigns it, so we leave it at the default. The only impact on the analysis model will be a hyphen or plus sign (“-” or “+”) prepended to class attributes.

## **Naming Conventions**

It is customary to use camel case for class and property names in the interest of facilitating “model-driven architecture.” In other words, if a model is to be used for development, it is useful

to use the naming conventions that support both requirements analysis (legibility) and the development team (no white space) so that they do not have to re-name elements or regenerate the whole model. The Domain Analysis Model, however, has no programmatic transform into the development process: that step is not taken until the constrained model is developed. Further, the point of the analysis model is to represent the concept space clearly back to the domain experts, a task which should be facilitated by the clearest possible statement of the space. As a result, we do not use camel case in this model.

We do, however, need to be able *to distinguish easily between artifact types* in ballot comments and other written communications.

In order to support these two requirements, we suggest the following for domain analysis models in general and we adopt it for this one:

- Class and enumeration names: title case nouns (e.g., “Skin Inspection”)
- Property and enumeration literal names: lower case nouns (e.g., “skin turgor”)
- Association labels: lower case verbs, indicative (e.g., “evaluates”)
- Use cases and activities: title case verb phrases, imperative (“e.g., “Answer Question”).

## 5. Vocabulary

This model pilots the practice of specifying semantics (i.e., vocabulary) in a domain information model. The team felt this was important to the clear communication of the meaning of the model. While we are agnostic on questions of binding formalism, we maintain that the terms listed here constitute the meaning of their associated properties. We recognize that specifying these terms within the information model raises version control problems by tightly coupling model and terminology, but we maintain that, as an analysis model, it would be incomplete without them.

Certain properties in the model have values that are constitutive of the model’s meaning as a representation of the clinical process of pressure ulcer risk assessment. For example, the skin assessment package contains a skin color observation. This observation should not support all colors. The values enumerated for that property were defined by practicing nurses to be clinically correct for the purpose of risk assessment as well as clear and perspicuous to the nursing community. This property is associated with an enumeration that is intended to represent the correct range of the property “skin color.” These value sets are represented as enumerations related to their classes with dependencies.

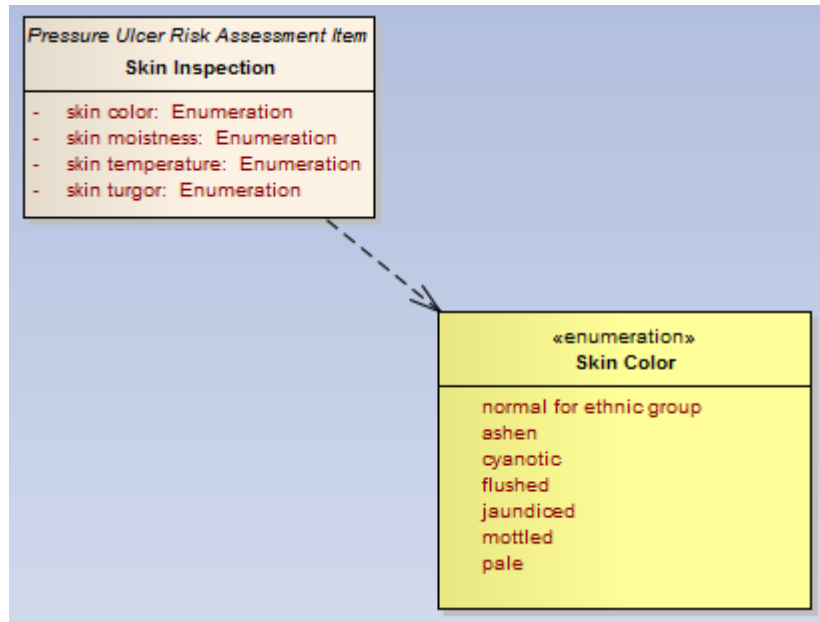


Figure 1: “Enumeration” formalism

In addition, these values are encoded with SNOMED CT concept identifiers, where possible, annotated in the model as “vocabulary” constraints. Concepts not found in SNOMED CT will be submitted for inclusion. In certain cases (e.g., pressure points), concepts have been constructed by post-coordination in the SNOMED CT compositional grammar.

For other properties, the team either was unable to determine a recommended value range or did not believe that such a recommendation was feasible, due to the size of the concept space, its volatility over time, or differences in practice among clinicians. Yet, for many of these properties, the team felt that example values would help illustrate the conceptual intent of the property. These value sets are represented as “examples,” related to their classes with dependencies. Some example sets have also been encoded in SNOMED CT; no specific criterion has been developed for when this is appropriate.

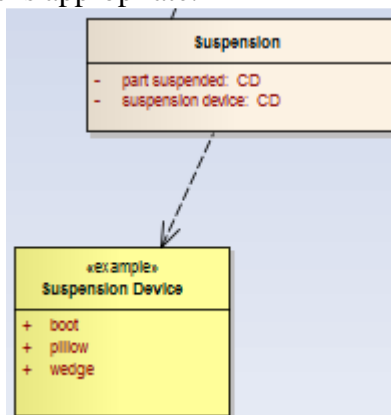


Figure 2: “Example” formalism

Note that the data types of properties with prescribed value sets is “Enumeration,” while the data type of a property associated with an “examples” class is “CD.”

In some cases, while the entire example set cannot be proposed as a defining range of the property, the value of the property itself is constrained. In the above example, the property “suspension device” has a vocabulary constraint of “SNOMED CT: 223394001 equipment for positioning (physical object) (BT).” Neither the example set nor the values explicitly modeled in SNOMED CT include all pertinent values, but the concept space implied by the name and relationships of the head code is semantically appropriate (even if, as in this case, broad).

In many cases, a SNOMED CT term or expression was identified that did not seem to be a perfect match, but which may be close enough to support the use case, or which may prompt the submission of additional terms to IHTSDO. In these cases, the issue is noted. Due to a quirk of the publishing tool, the notes are written directly in the concept description text, not, as would be preferable from a modeling standpoint, in a note on the vocabulary constraint itself.

We generally adopt the *Term Info* direction for using LOINC for observation questions, SNOMED CT for answers, where possible. We depart from this direction where we model a ‘tightly bound’ instrument, e.g. the Braden scale for predicting pressure ulcer risk, which is represented fully in LOINC. We also sometimes provide SNOMED CT equivalents for LOINC identifiers.

We recognize that indicating an enumeration by a class dependency rather than by using the enumeration name as the data type is not standard. We do so purely for reasons of legibility: we wish to show the connections graphically, hence the dependencies, and because many enumerations have very long names, we found it expedient to abbreviate the type to “Enumeration.”

We draw the reader’s attention to two different styles of enumerating values, one using UML specializations, and the other using an ontology-like hierarchy. The *Medical Device* package illustrates the specialization approach: a parent class has many specializations, though the only difference among them is the semantic sub-space of their enumerations. The *Medical / Psychiatric Condition* model illustrates the ontology approach: the parent class contains one enumerated value for general kind (i.e., which of the specializations we would have), and a separate value for the specific condition, related to the class by an ontology-like hierarchy of terms. We solicit feedback on a preferred approach, from perspectives of clear modeling conventions, semantic implications, and legibility.

## 6. Model Detail

This document provides a complete overview of all element details. For simpler and more focused reports, simply copy this initial template and turn off the sections not required.

### Use Case Model

#### Actors

**Actors** - (Use Case diagram)

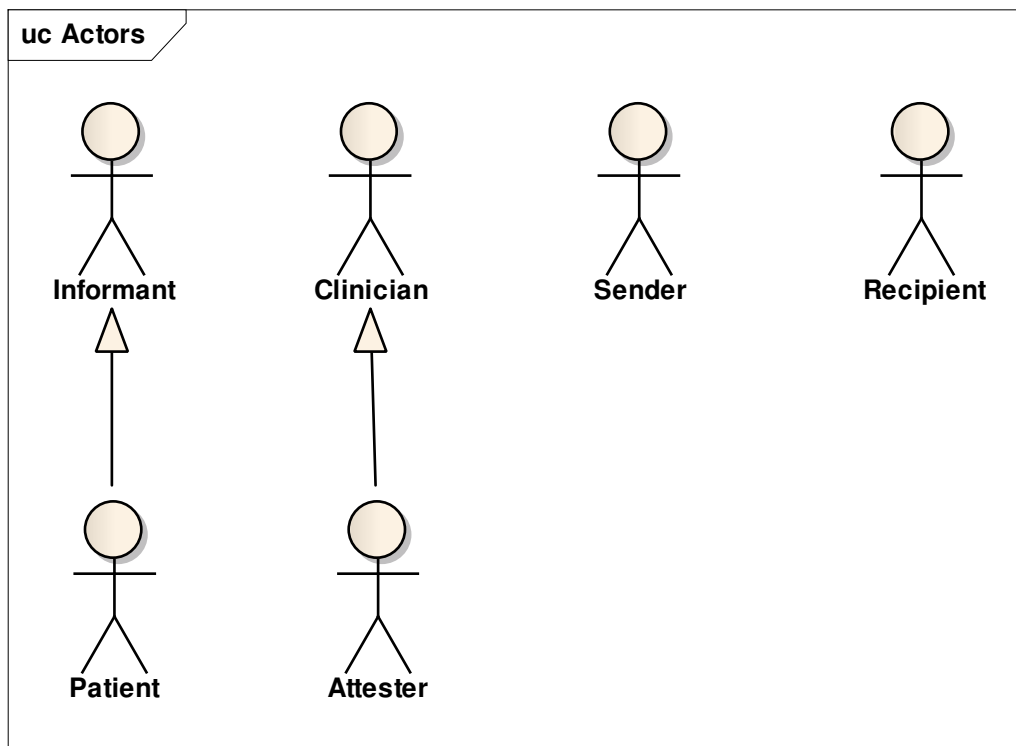


Figure: 1

#### Attester

A clinician with sufficient authority to attest that recorded information is correct

#### Clinician

A person who provides clinical care for the patient, and who may also record information in the course of care provision

### Informant

A person who can answer questions about the patient's condition

### Patient

The recipient of care and subject of the reporting activities

### Recipient

A clinician or representative of a clinical service provider who needs information about the patient to support a transfer, consultation, or other activity

### Sender

A person responsible for providing clinical information to partners (referred providers, payers, transfer providers, etc.)

### *Requirements*

The following have not been programmatically duplicated, but they serve as candidate target interactions.

IHE Functional Status Assessment

[http://wiki.ihe.net/index.php?title=PCC\\_TF-1/FSA](http://wiki.ihe.net/index.php?title=PCC_TF-1/FSA)

IHE e-Nursing Summary

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_PCC\\_Suppl\\_ENS\\_Rev1-1\\_TI\\_2010-08-30.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_PCC_Suppl_ENS_Rev1-1_TI_2010-08-30.pdf)

CMS Minimum Data Set

[https://www.cms.gov/NursingHomeQualityInits/25\\_NHQIMDS30.asp](https://www.cms.gov/NursingHomeQualityInits/25_NHQIMDS30.asp)

NQF quality measures (0181, 0187, 0198, 0199, 0201, 0538, 0539, 0540)

[http://www.qualityforum.org/Measures\\_List.aspx](http://www.qualityforum.org/Measures_List.aspx)

### *Use Cases*

**Use Cases** - (*Use Case diagram*)

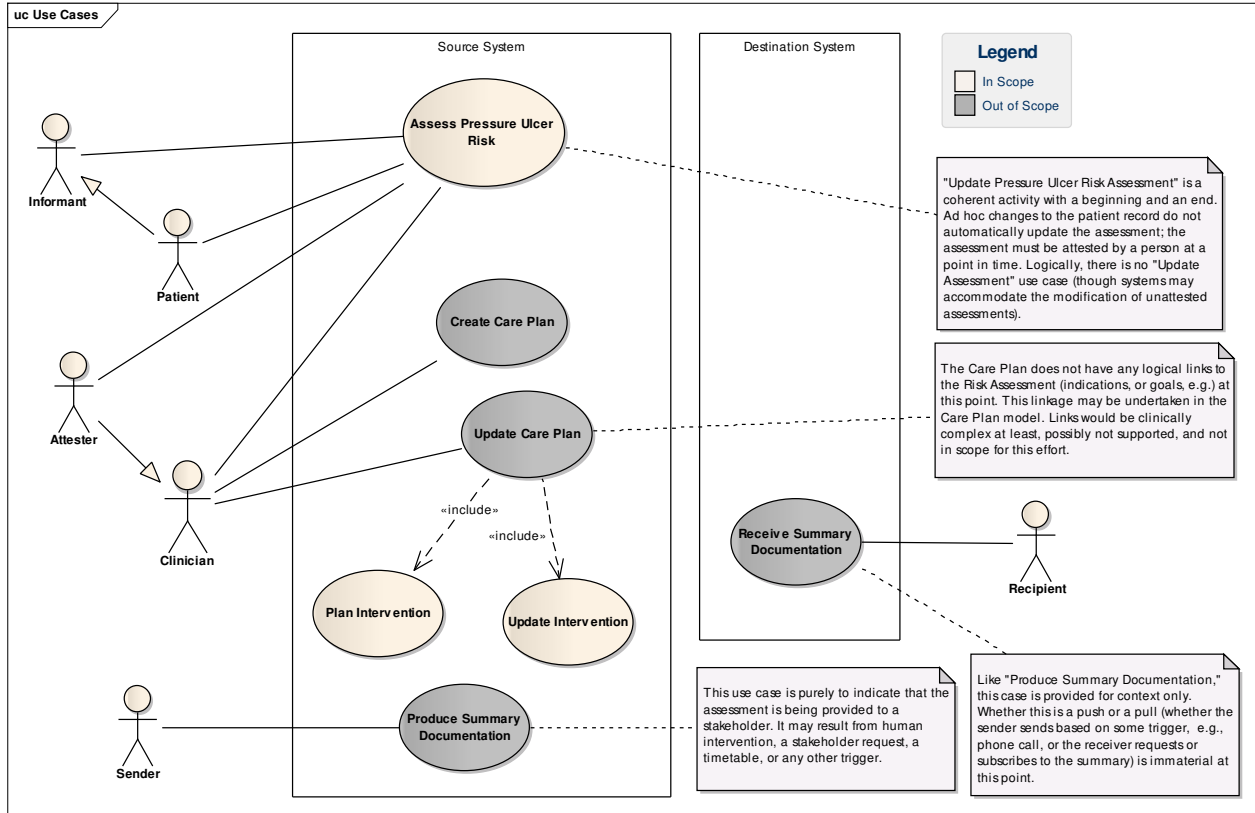


Figure: 2

### Assess Pressure Ulcer Risk

Type: UseCase

A clinician examines a patient to assess pressure ulcer risk. The clinician records the findings. Some findings will be directly observed in the patient; others (medications, conditions) may be derived from the patient's record.

### Activity diagram: Assess Pressure Ulcer Risk AD

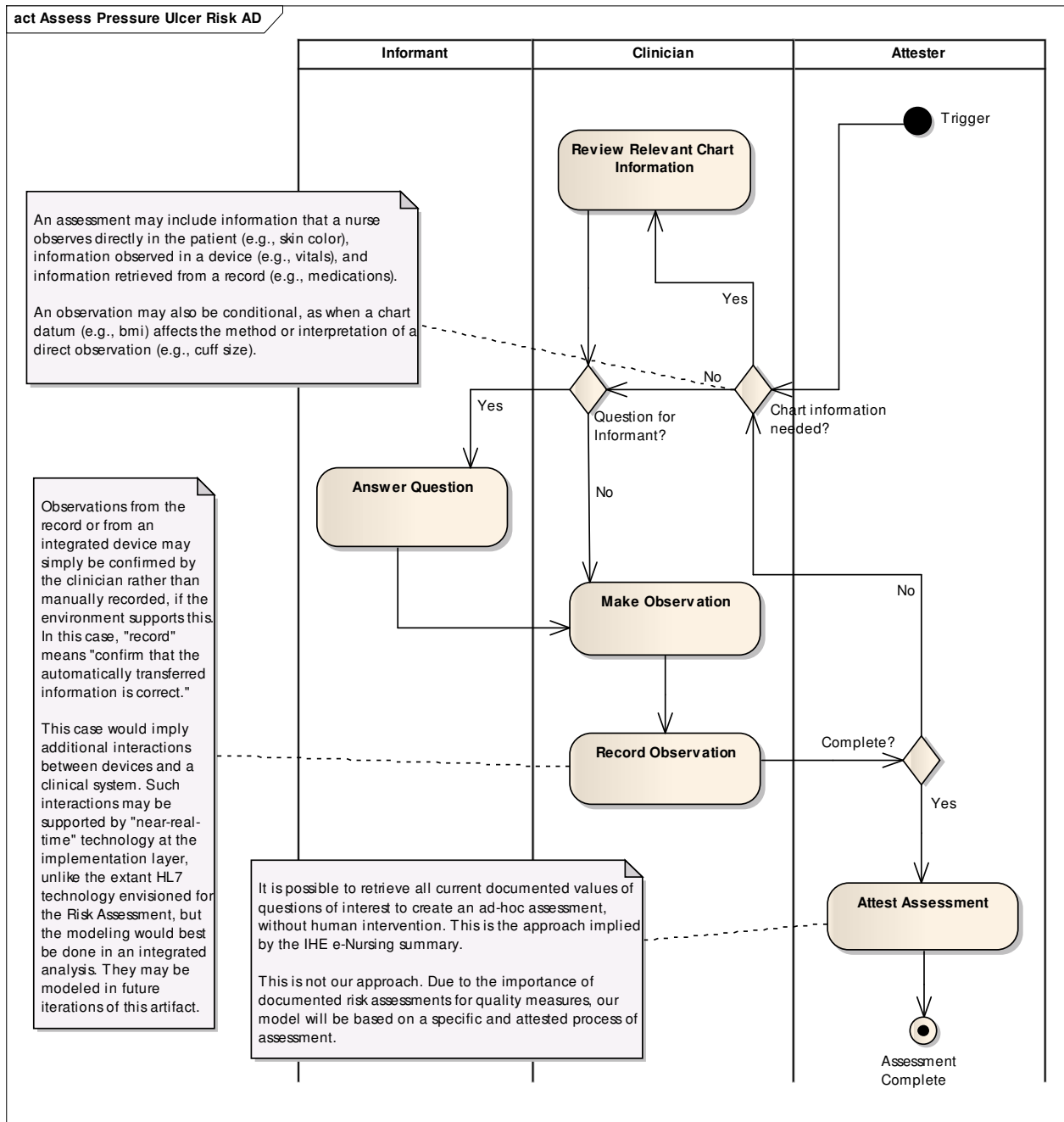


Figure: 3

### Answer Question

Type: **Activity**

The informant provides the observation



### Attest Assessment

Type: **Activity**

A clinician attests that an assessment is complete and accurate

### Complete?

Type: **DecisionNode**

### Assessment Complete

Type: **ActivityFinal**

### Trigger

Type: **ActivityInitial**

A trigger event prompting the assessment. Triggers may include admission, identification of a risk factor, shift change, a schedule, or other factors.

### Question for Informant?

Type: **DecisionNode**

### Make Observation

Type: **Activity**

A clinician makes an observation about a patient

### Record Observation

Type: **Activity**

A system user records an observation about a patient

### Review Relevant Chart Information

Type: **Activity**

A clinician reviews patient information in order to identify relevant information for an assessment or to identify questions or criteria for use in clinical observation

### Chart information needed?

Type: **DecisionNode**

### Create Care Plan

*Type:*            **UseCase**

A clinician establishes a set of planned interventions for a patient. The plan may include goals.

### Plan Intervention

*Type:*            **UseCase**

A clinician determines that a particular intervention is appropriate for a patient. The clinician records the intervention as planned and associates it with relevant observations and goals.

### Produce Summary Documentation

*Type:*            **UseCase**

A system user causes a nursing summary for a patient to be generated to support a transfer, consultation, or other communication.

### Receive Summary Documentation

*Type:*            **UseCase**

An interested person receives and reviews a nursing summary from another service provider

### Update Care Plan

*Type:*            **UseCase**

A clinician indicates needed interventions, with recommended timing and other operational information, updates their completion, and records their effectiveness

## **Activity diagram: Update Care Plan AD**

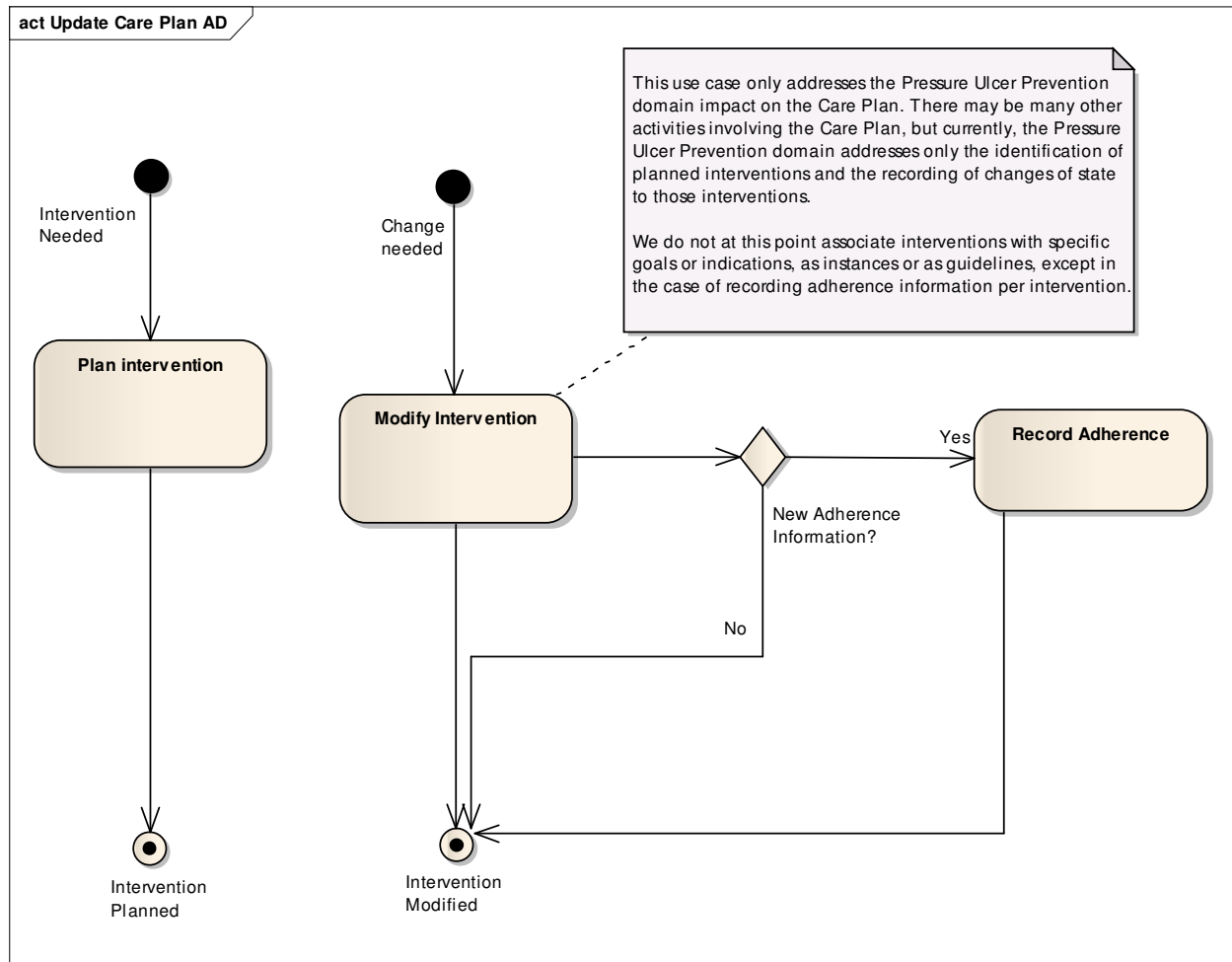


Figure: 4

Sequence diagram: Update Care Plan ID

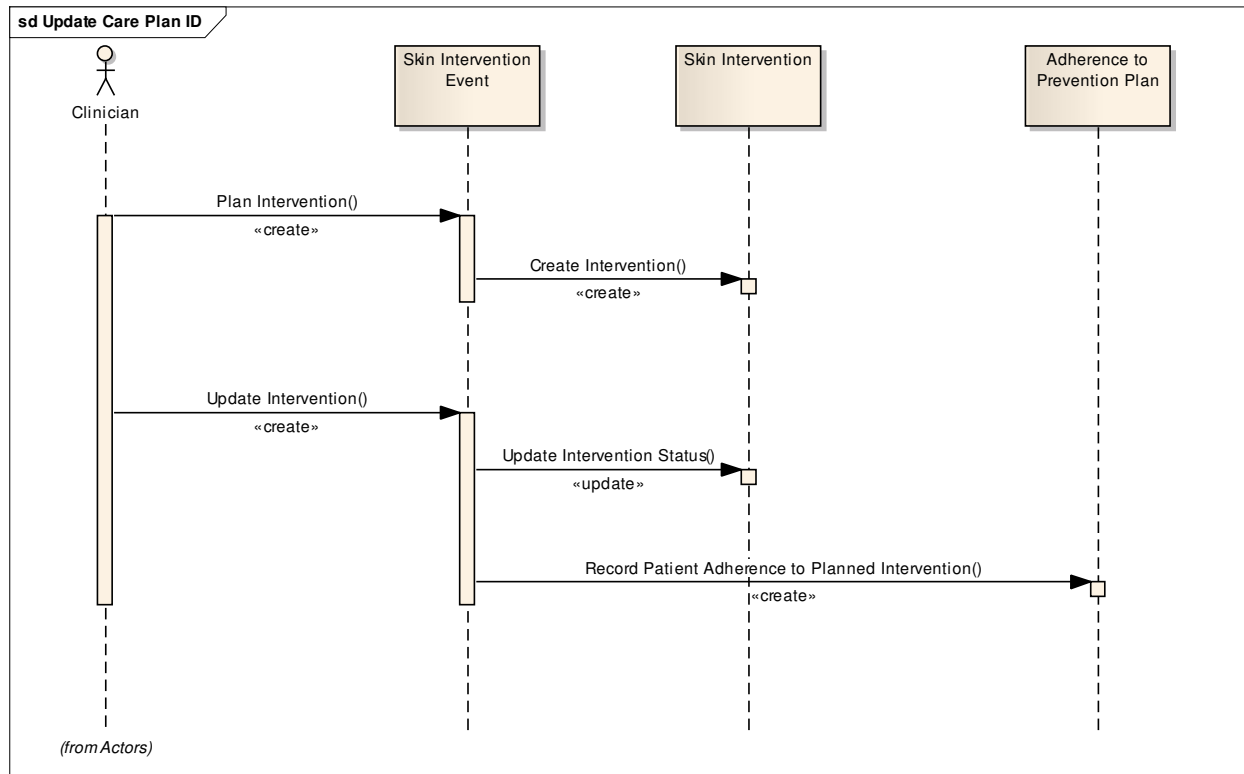


Figure: 5

**Record Adherence**

Type: Activity

**New Adherence**

**Information?**

Type: DecisionNode

**Modify Intervention**

Type: Activity

A clinician records a change to an intervention

**Plan intervention**

Type: Activity

A clinician defines an intervention intended to reduce the risk of pressure ulcers and adds it to the patient's care plan

### Record intervention results

Type: **Activity**

### Plan complete?

Type: **DecisionNode**

### ActivityInitial

Type: **ActivityInitial**

### Change needed

Type: **ActivityInitial**

An intervention needs to be deleted, modified, associated with a goal, evaluated, recorded as complete, or otherwise modified

### Intervention Modified

Type: **ActivityFinal**

The intervention has been updated

### Intervention Needed

Type: **ActivityInitial**

A Pressure Ulcer Risk Assessment suggests that a patient needs a care plan to reduce the risk of pressure ulcers. The clinician determines that the care plan should include certain interventions.

### Intervention Planned

Type: **ActivityFinal**

The care plan contains the intervention planned by the clinician

### Update Intervention

Type: **UseCase**

A clinician changes an existing intervention record, whether to modify its definition, to update its status (e.g., to "completed"), or to change its association with an observation or goal.

### Update Pressure Ulcer Risk Assessment

Type: **UseCase**

## Class Model

Type: **Package**

### Pressure Ulcer Prevention Intervention

Type: **Package**

#### Pressure Ulcer Prevention Intervention - (Logical diagram)

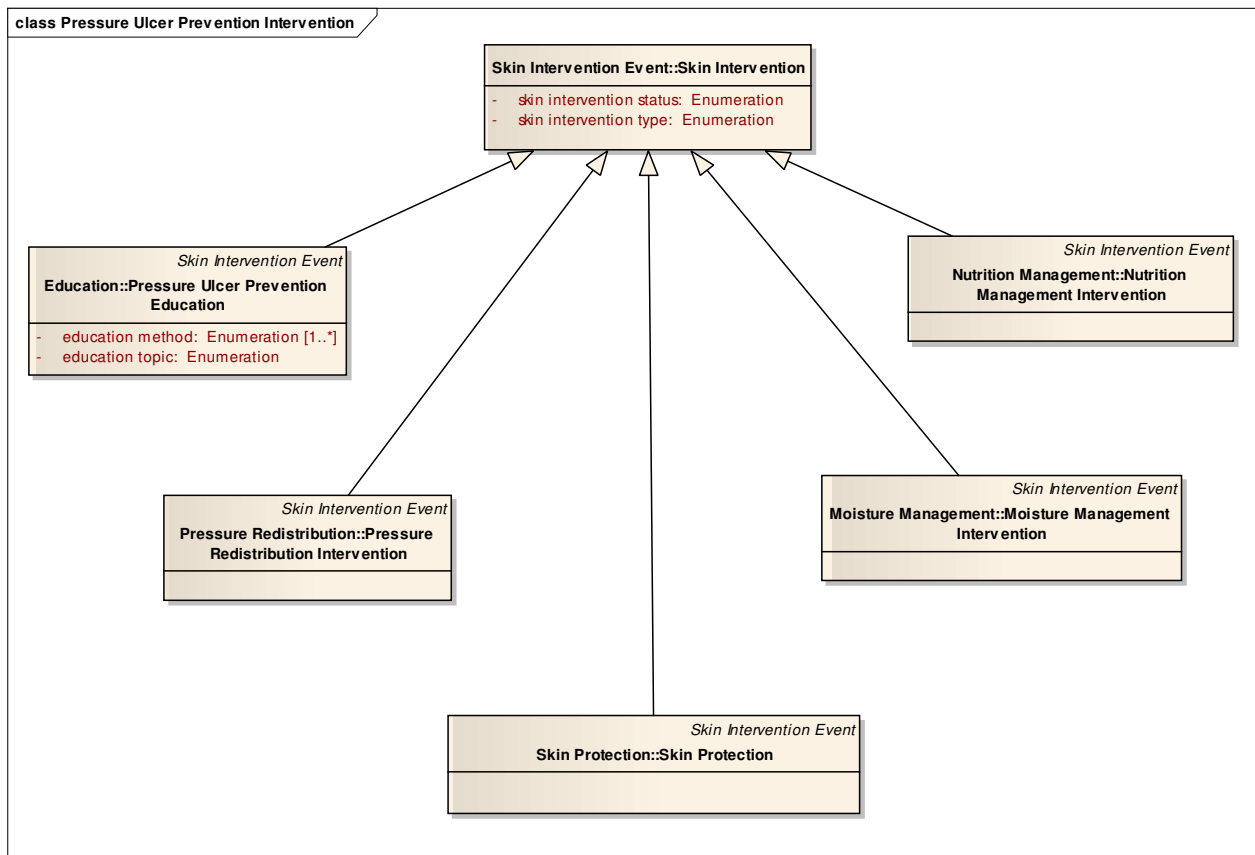


Figure: 6

## Skin Intervention Event

Type: **Package**

### Skin Intervention Event - (Logical diagram)

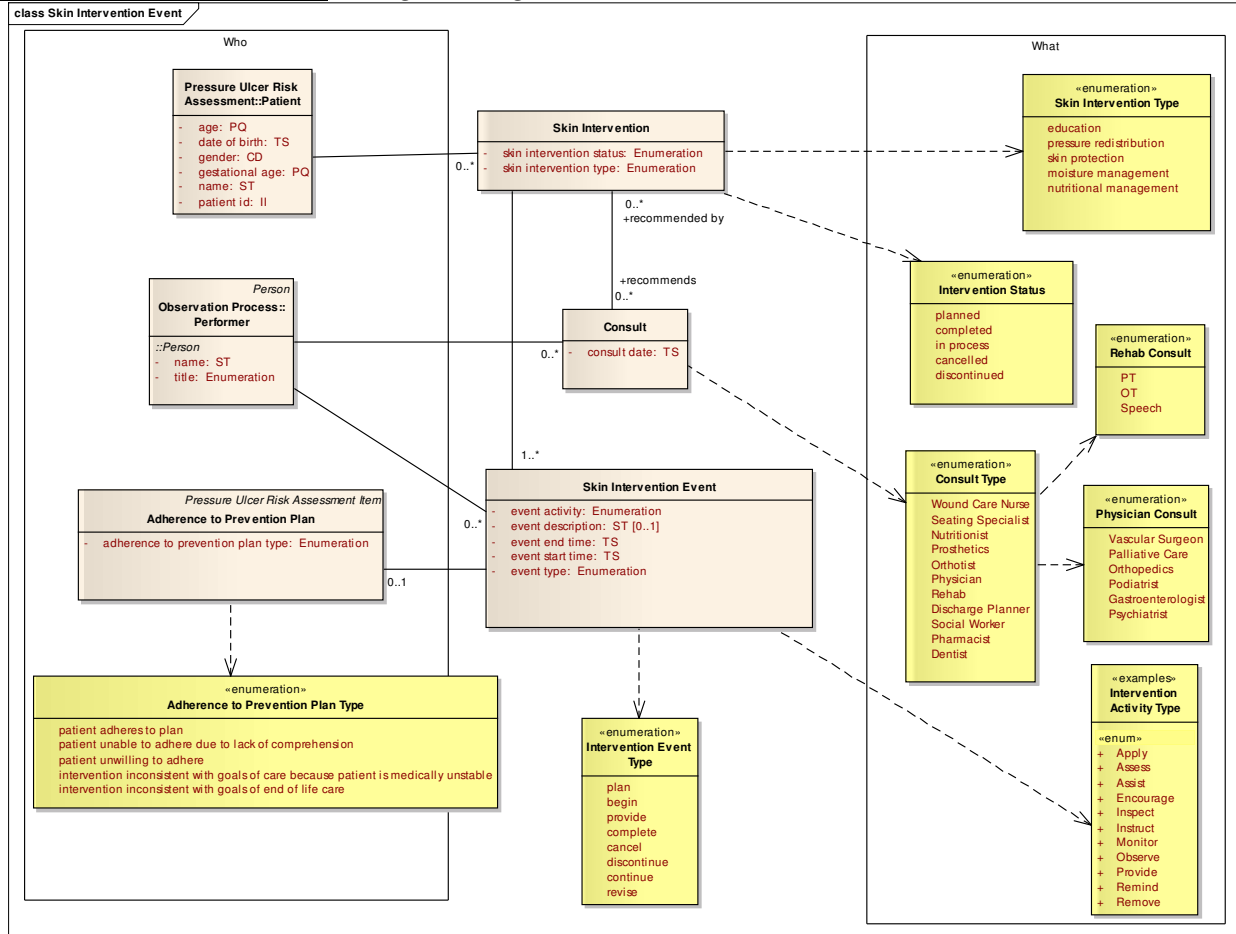


Figure: 7

### Adherence to Prevention Plan

Type: **Class** Pressure Ulcer Risk Assessment Item

An evaluation of how well the patient complies with treatment instructions

#### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>adherence to prevention plan type</b> Enumeration	Judgment of whether and why the patient follows the planned interventions	Vocabulary: { <u>SNOMED CT 397695000 (Finding related to ability to comply with treatment (finding))</u> }

### Adherence to Prevention Plan Type

Type: Enumeration

#### Attributes

Attribute	Notes	Constraints and tags
<b>patient adheres to plan</b>		Vocabulary: { <u>SNOMED CT 386673006 (Does comply with treatment (finding))</u> }
<b>patient unable to adhere due to lack of comprehension</b>		Vocabulary: { <u>SNOMED 182891003 Patient misunderstood treatment instructions (finding)</u> }  [Comment = Code refers only to medication, not other interventions ]
<b>patient unwilling to adhere</b>		Vocabulary: { <u>SNOMED 225465005 Unwilling (finding)</u> }  [Comment = Other coded values specify the predicate of the patient's aspect; is the aspect alone sufficient? ]
<b>intervention inconsistent with goals of care because patient is medically unstable</b>		Vocabulary: { <u>SNOMED 397745006 Medical contraindication (finding)</u> }  [Comment = Instability is a kind of contraindication, but is this much broader term appropriate? We don't do this



Attribute	Notes	Constraints and tags
		elsewhere. ]
<b>intervention inconsistent with goals of end of life care</b>		Vocabulary: { <u>Not found in SNOMED</u> }

## Consult

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
<b>consult date TS</b>	The date of the consult	

## Intervention Event Type

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>plan</b>	Document intent to provide care	Vocabulary: { <u>SNOMED CT: 399684003 development of care plan (procedure)</u> }

Attribute	Notes	Constraints and tags
<b>begin</b>	Begin provision of planned care	Vocabulary: { <u>SNOMED CT: not found</u> }
<b>provide</b>	Deliver complete intervention whether planned or not	Vocabulary: { <u>SNOMED CT: 225304007 implementation of planned interventions (procedure)</u> }
<b>complete</b>	Provide fulfillment of care already begun	Vocabulary: { <u>SNOMED CT: not found</u> }
<b>cancel</b>	Nullify intent to provide existing planned intervention	Vocabulary: { <u>SNOMED CT: not found</u> }
<b>discontinue</b>	Cease providing and nullify intent to continue providing an intervention that has been started	Vocabulary: { <u>SNOMED CT: not found</u> }
<b>continue</b>	Provide care in an ongoing intervention	Vocabulary: { <u>SNOMED CT: not found</u> }

Attribute	Notes	Constraints and tags
<b>revise</b>	Modify the planned intervention	Vocabulary: { SNOMED CT: not found }

## Skin Intervention

Type: **Class**

An intervention designed to reduce the patient's risk of developing a pressure ulcer

### Attributes

Attribute	Notes	Constraints and tags
<b>skin intervention status</b> Enumeration	The life cycle stage of the intervention	
<b>skin intervention type</b> Enumeration	The kind of intervention	

## Skin Intervention Event

Type: **Class**

An event in the life cycle of an intervention

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>event activity</b> Enumeration	The kind of interaction that has occurred	
<b>event description</b> ST  [0..1]	A textual description of the intervention event	
<b>event end time</b> TS	The time at which the intervention event was completed	
<b>event start time</b> TS	The time at which the intervention event was begun	
<b>event type</b> Enumeration	The kind of event	

### Skin Intervention Type

Type: **Enumeration**

#### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>education</b>		Vocabulary: { SNOMED CT: <u>372919008 patient education based on identified need (procedure)</u> }
<b>pressure redistribution</b>		Vocabulary: { SNOMED CT: <u>225359006 pressure area care (regime/therapy)</u> }
<b>skin protection</b>		Vocabulary: { SNOMED CT: <u>not found</u> }
<b>moisture management</b>		Vocabulary: { SNOMED CT: <u>not found</u> }
<b>nutritional management</b>		Vocabulary: { SNOMED CT: <u>386372009 nutrition management (regime/therapy) (procedure)</u> }

## Intervention Status

Type: Enumeration  
Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>planned</b>	Intended and documented	Vocabulary: { SNOMED CT: 397943006 planned (qualifier value) }
<b>completed</b>	Fully implemented	Vocabulary: { SNOMED CT: 398166005 performed (qualifier value) }
<b>in process</b>	Begun but not completed	Vocabulary: { SNOMED CT: 385651009 in progress (qualifier value) }
<b>cancelled</b>	Cancelled before implementation begun	: { SNOMED CT: 89925002 cancelled (qualifier value) }
<b>discontinued</b>	Cancelled after implementation begun	Vocabulary: { SNOMED CT: 410546004 discontinued (qualifier value) }

**Intervention Activity Type**

Type: **Class**

Type of activity performed by the clinician

Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>Apply</b>		
<b>Assess</b>		
<b>Assist</b>		
<b>Encourage</b>		
<b>Inspect</b>		
<b>Instruct</b>		

Attribute	Notes	Constraints and tags
<b>Monitor</b>		
<b>Observe</b>		
<b>Provide</b>		
<b>Remind</b>		
<b>Remove</b>		

**Consult Type**

Type: **Enumeration**

**Attributes**

Attribute	Notes	Constraints and tags
-----------	-------	----------------------



<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>Wound Care Nurse</b>		
<b>Seating Specialist</b>		
<b>Nutritionist</b>		
<b>Prosthetics</b>		
<b>Orthotist</b>		
<b>Physician</b>		

Attribute	Notes	Constraints and tags
<b>Rehab</b>		
<b>Discharge Planner</b>		
<b>Social Worker</b>		
<b>Pharmacist</b>		
<b>Dentist</b>		

**Physician Consult**

Type: **Enumeration**

Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>Vascular Surgeon</b>		
<b>Palliative Care</b>		
<b>Orthopedics</b>		
<b>Podiatrist</b>		
<b>Gastroenterologist</b>		
<b>Psychiatrist</b>		

**Rehab Consult**

Type: **Enumeration**

**Attributes**

Attribute	Notes	Constraints and tags
<b>PT</b>		
<b>OT</b>		
<b>Speech</b>		

**Intervention States**

Type: **Package**

**Skin Intervention State Diagram** - (*StateMachine diagram*)

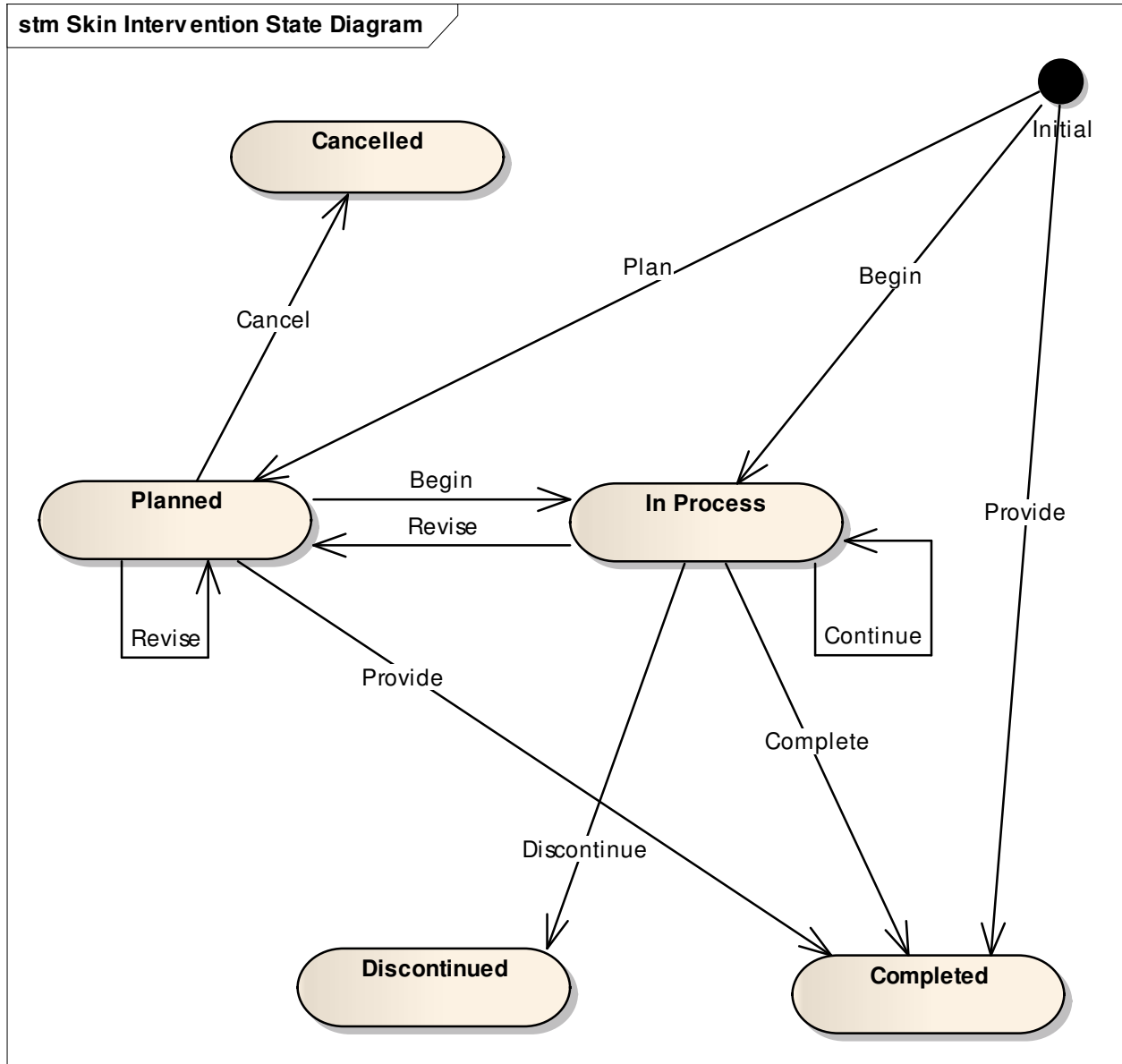


Figure: 8

Cancelled

Type: **State**

Cancelled

Type: **State**

Completed

Type: **State**

Discontinued

Type: **State**

In Process

Type: **State**

Planned

Type: **State**

Initial

Type: **Initial State**

Education

Type: **Package**

**Education** - (Logical diagram)

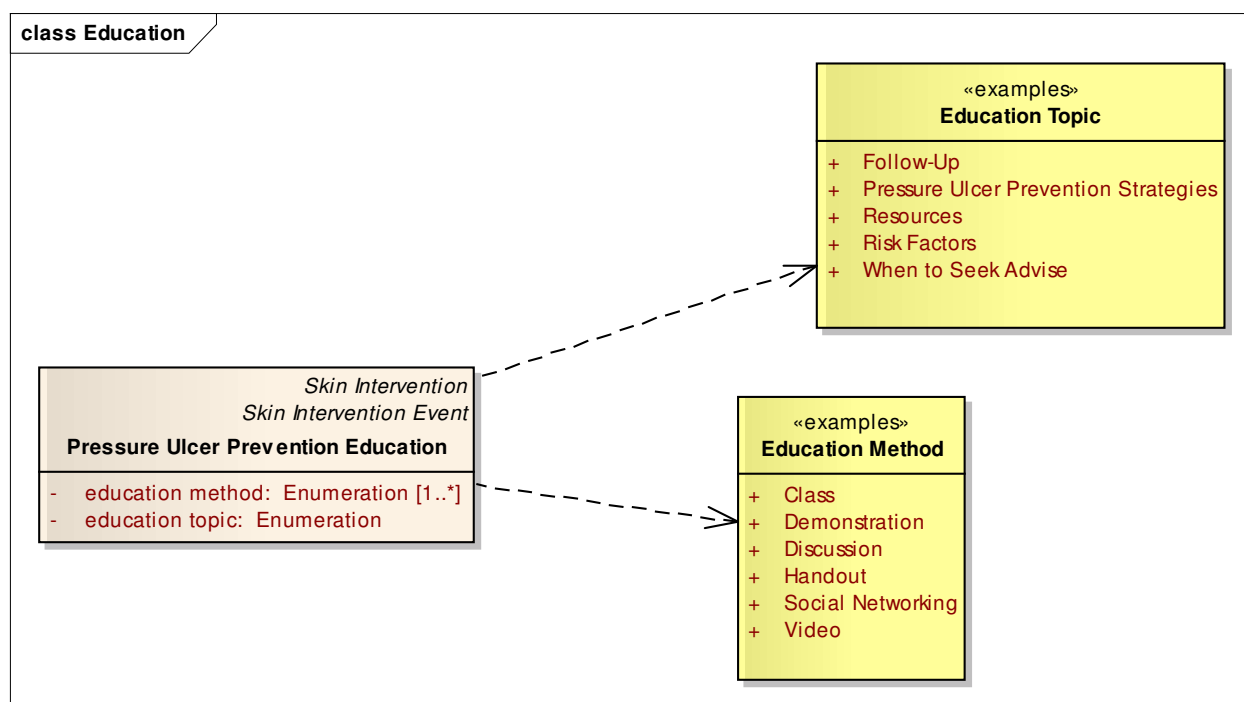


Figure: 9

**Pressure Ulcer Prevention Education**

Type: **Class Skin Intervention, Skin Intervention Event**

An effort to inform the patient about ways to reduce the patient's risk of developing a pressure ulcer

Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>education method</b> Enumeration  [1..*]	The method or channel by which educational information is delivered	
<b>education topic</b> Enumeration	The subject of the education	

## Education Method

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
<b>Class</b>		
<b>Demonstration</b>		

Attribute	Notes	Constraints and tags
<b>Discussion</b>		
<b>Handout</b>		
<b>Social Networking</b>		
<b>Video</b>		

**Education Topic**

Type: **Class**

Attributes

Attribute	Notes	Constraints and tags
<b>Follow-Up</b>		



Attribute	Notes	Constraints and tags
<b>Pressure Ulcer Prevention Strategies</b>		
<b>Resources</b>		
<b>Risk Factors</b>		
<b>When to Seek Advise</b>		

Pressure Redistribution  
*Type:* **Package**

**Pressure Redistribution** - (*Logical diagram*)

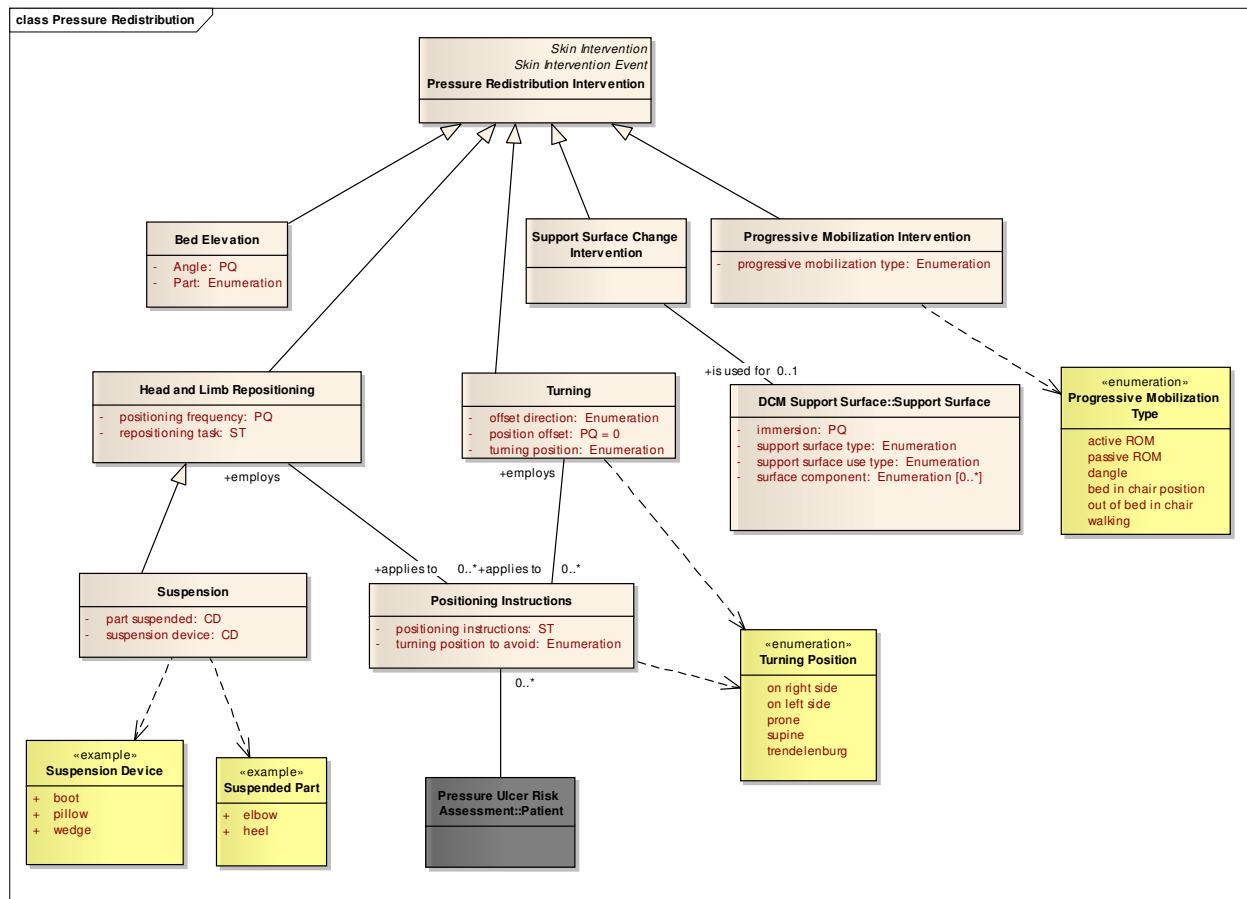


Figure: 10

## Bed Elevation

Type: Class Pressure Redistribution Intervention

### Attributes

Attribute	Notes	Constraints and tags
Angle PQ		

Attribute	Notes	Constraints and tags
<b>Part Enumeration</b>	Bed part elevated (head, foot, etc.)	

### Pressure Redistribution Intervention

Type: **Class** Skin Intervention, Skin Intervention Event

An effort to reduce the patient's risk of developing a pressure ulcer by changing the pattern of normal force against the patient's skin

### Head and Limb Repositioning

Type: **Class** Pressure Redistribution Intervention

#### Attributes

Attribute	Notes	Constraints and tags
<b>positioning frequency PQ</b>	The frequency with which the repositioning should be performed. This may be better served by an enumerated list than a physical quantity (e.g., per shift, when turned, etc.)	
<b>repositioning task ST</b>	A description of what should be repositioned and how	

### Positioning Instructions

Type: **Class**

Direction to perform or avoid performing specified actions

Attributes

Attribute	Notes	Constraints and tags
<b>positioning instructions</b> ST	Directions regarding a concern specific to a patient that may involve in internal or external injury or other limitation on or criteria for positioning the patient	
<b>turning position to avoid</b> Enumeration	A position that the patient should not be placed in	

**Suspension**

Type: **Class** **Head and Limb Repositioning**

An effort to change the pattern of normal force against the patient's skin by suspending part of the patient's body

Constraints

- SNOMED CT: 223394001 equipment for positioning (physical object): (*Vocabulary*)

Attributes

Attribute	Notes	Constraints and tags
<b>part suspended</b> CD		Vocabulary: { <u>SNOMED CT: 38866009 body part structure (body structure) (BT)</u> }

Attribute	Notes	Constraints and tags
suspension device CD		Vocabulary: { SNOMED CT: 223394001 equipment for positioning (physical object) (BT) }

## Suspended Part

Type: Class

### Attributes

Attribute	Notes	Constraints and tags
elbow		
heel		

## Suspension Device

Type: Class

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>boot</b>		Vocabulary: { <u>SNOMED CT: not found</u> }
<b>pillow</b>		Vocabulary: { <u>SNOMED CT: not found</u> }
<b>wedge</b>		Vocabulary: { <u>SNOMED CT: 255296002 wedge (physical object)</u> }

## Turning

*Type:* **Class Pressure Redistribution Intervention**

An effort to reduce the patient's risk of developing a pressure ulcer by changing the pattern of normal force against the patient's skin by rotating the patient

### Attributes

Attribute	Notes	Constraints and tags
<b>offset direction</b> Enumeration	Direction, left or right, in which the position is offset	

Attribute	Notes	Constraints and tags
<b>position offset PQ</b>	Angular distance patient is rotated away from the base position selected	0
<b>turning position</b> Enumeration	Position into which the patient is placed	

### Turning Position

Type: **Enumeration**

#### Attributes

Attribute	Notes	Constraints and tags
<b>on right side</b>		Vocabulary: { SNOMED CT: <u>102535000 right lateral decubitus position (finding)</u> }
<b>on left side</b>		Vocabulary: { SNOMED CT: <u>102536004 left lateral decubitus position (finding)</u> }
<b>prone</b>		: { SNOMED CT: <u>1240000 prone body position (finding)</u> }

Attribute	Notes	Constraints and tags
<b>supine</b>		: { <u>SNOMED CT: 40199007 supine body position (finding)</u> }
<b>trendelenburg</b>		Vocabulary: { <u>SNOMED CT: 34106002 Trendelenburg position (finding)</u> }

### Support Surface Change Intervention

*Type:* **Class Pressure Redistribution Intervention**

An effort to reduce the patient's risk of developing a pressure ulcer by changing the pattern of normal force against the patient's skin by changing the support surface

### Progressive Mobilization Intervention

*Type:* **Class Pressure Redistribution Intervention**

#### Attributes

Attribute	Notes	Constraints and tags
<b>progressive mobilization type</b> Enumeration		

### Progressive Mobilization Type

*Type:* **Enumeration**



Attributes

Attribute	Notes	Constraints and tags
<b>active ROM</b>		<u>Vocabulary: { SNOMED CT: values not found }</u>
<b>passive ROM</b>		
<b>dangle</b>		
<b>bed in chair position</b>		
<b>out of bed in chair</b>		
<b>walking</b>		

## DCM Support Surface

Type: **Package**

Source: National Pressure Ulcer Advisory Panel, Support Surface Standards Initiative, Ver 1/29/2007

### Support Surface - (Logical diagram)

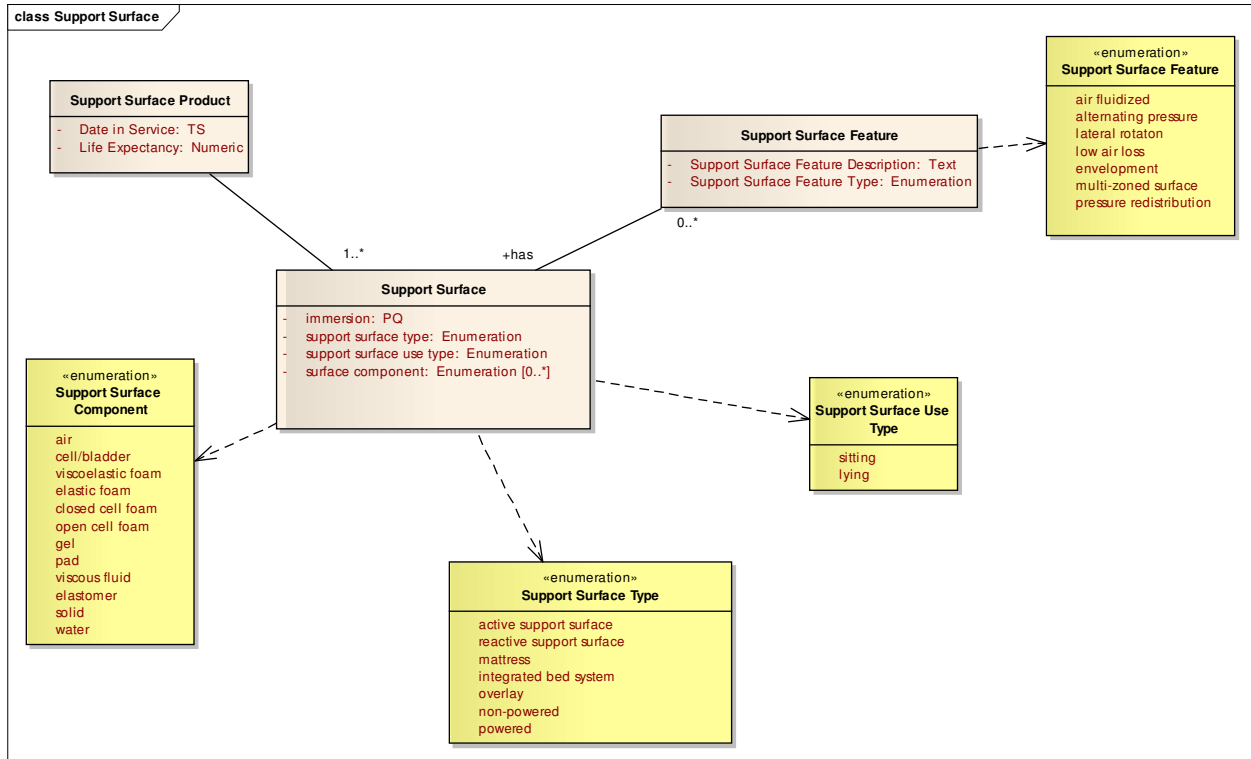


Figure: 11

## Support Surface Type

Type: **Enumeration**

Most concepts listed are types; some are qualities. A consistent concept space will make encoding clearer.

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>active support surface</b>	A powered support surface, with the capability to change its load distribution properties, with or without applied load. <i>Ref: NPUAP</i>	Vocabulary: { SNOMED CT: 9096001   support, device (physical object)   : {362981000   qualifier value   = 410679008   Surface (qualifier value)   : 55561003   active (qualifier value)   } }
<b>reactive support surface</b>	A powered or non-powered support surface with the capability to change its load distribution properties only in response to applied load. <i>Ref: NPUAP</i>	Vocabulary: { SNOMED CT: 9096001   Support, device (physical object)   : {362981000   qualifier value   = 410679008   Surface (qualifier value)   : 11214006   Reactive (qualifier value)   } }
<b>mattress</b>	A support surface designed to be placed directly on the existing bed frame. <i>Ref: NPUAP</i>	Vocabulary: { SNOMED CT: Mattress, device (physical object) (17207004) }
<b>integrated bed system</b>	A bed frame and support surface that are combined into a single unit whereby the surface is unable to function separately. <i>Ref: NPUAP</i> Note on vocabulary constraint: Parent concept found (SNOMED CT: Bed (physical object) (229772003))	Vocabulary: { SNOMED CT: not found }
<b>overlay</b>	An additional support surface designed to be placed directly on top of an existing surface. <i>Ref: NPUAP</i> Note on vocabulary constraint: proposed value is qualifier only (SNOMED CT: Overlay (qualifier value) (255547006))	
<b>non-powered</b>	Any support surface not requiring or using external sources of energy for operation. (Energy = D/C or A/C) <i>Source: NPUAP</i> It's not clear that this is a separate type rather than a property of other types, nor is it obvious that it is relevant.	Vocabulary: { SNOMED CT: not found }

Attribute	Notes	Constraints and tags
	Especially curious is the stipulation of electrical current.	
<b>powered</b>	Any support surface requiring or using external sources of energy for operation. (Energy = D/C or A/C) <i>Source: NPUAP</i> See note for non-powered. Note on vocabulary constraint: proposed value is qualifier only ( <i>SNOMED CT</i> : Powered method (qualifier value) (262063002))	Vocabulary: { <i>SNOMED CT</i> : Powered method (qualifier value) (262063002) }

### Support Surface Use Type

Type: **Enumeration**

The corporal position supported by the surface

#### Attributes

Attribute	Notes	Constraints and tags
<b>sitting</b>	Intended to support a sitting patient	
<b>lying</b>	Intended to support a patient lying down	

### Support Surface

Type: **Class**

A specialized device for pressure redistribution designed for management of tissue loads, micro-climate, and/or other therapeutic functions (i.e., any mattresses, integrated bed system, mattress replacement, overlay, or seat cushion, or seat cushion overlay. This class describes concepts related to support services that assist in the redistribution of pressure. These terms refer to basic physical concepts and design considerations as well as product characteristics.

**Constraints**

- SNOMED CT: << 272243001 support equipment (physical object): (*Vocabulary*)  
More detailed concepts not available in SNOMED
- SNOMED CT: Support, device (physical object) (9096001) + Surface (qualifier value) (410679008): (*Vocabulary*)

**Tagged Values**

- Reference = National Pressure Ulcer Advisory Panel (2007). Support Surface Standards Initiative, Terms and definitions related to support surfaces. Version 01/29/2007. Retrieved from [http://www.npuap.org/NPUAP\\_S3I\\_TD.pdf](http://www.npuap.org/NPUAP_S3I_TD.pdf) .

**Attributes**

Attribute	Notes	Constraints and tags
<b>immersion PQ</b>	Depth of penetration (sinking) into a support surface.	
<b>support surface type Enumeration</b>		
<b>support surface use type Enumeration</b>		

Attribute	Notes	Constraints and tags
<p><b>surface component</b> Enumeration</p> <p>[0..*]</p>	<p>A physical material, structure, or system used alone or in combination with other components to fashion a support surface</p>	

### Support Surface Feature

Type: **Enumeration**

SCT coding is made difficult by the complexity of the concept: it is a set of functional capabilities that do not map cleanly to SCT axes. Post-coordination may be possible, but only with the addition of several values, and with consensus on how a "feature" is to be semantically composed.

#### Attributes

Attribute	Notes	Constraints and tags
<p><b>air fluidized</b></p>	<p>A feature of a support surface that provides pressure redistribution via a fluid-like medium created by forcing air through beads as characterized by immersion and envelopment. <i>Ref: NPUAP</i></p>	<p>Vocabulary: { SNOMED CT: not found }</p>
<p><b>alternating pressure</b></p>	<p>A feature of a support surface that provides pressure redistribution via cyclic changes in loading <i>and unloading</i> as characterized by frequency, duration, amplitude, and rate of change parameters. <i>Ref: NPUAP</i></p> <p>Note on vocabulary constraint: Proposed expression is qualifier only (SNOMED CT: Pressure - action (qualifier value) (257893003) + Alternating (qualifier value) (49572008 ))</p>	<p>Vocabulary: { SNOMED CT: not found }</p>

Attribute	Notes	Constraints and tags
<b>lateral rotaton</b>	<p>A feature of a support surface that provides rotation about a longitudinal axis as characterized by degree of patient turn, duration, and frequency. <i>Ref: NPUAP</i></p> <p>Note on vocabulary constraint: Proposed expression is qualifier only: SNOMED CT: Lateral rotation - action (qualifier value) (264730003 )</p>	<p>Vocabulary: { SNOMED CT: not found }</p>
<b>low air loss</b>	<p>A feature of a support surface that provides a flow of air to assist in managing the heat and humidity (microclimate) of the skin. <i>Ref: NPUAP</i></p> <p>Note on vocabulary constraint: Proposed expression does not capture the air flow: SNOMED CT: Low air pressure (physical force) (285405000)</p>	<p>Vocabulary: { SNOMED CT: not found }</p>
<b>envelopment</b>	<p>The ability of a support surface to conform, so to fit or mold around irregularities in the body. <i>Ref: NPUAP</i></p>	<p>Vocabulary: { SNOMED CT: not found }</p>
<b>multi-zoned surface</b>	<p>A surface in which different segments can have different pressure redistribution capabilities. <i>Ref: NPUAP</i></p>	<p>Vocabulary: { SNOMED CT: not found }</p>
<b>pressure redistribution</b>	<p>The ability of a support surface to distribute load over the contact areas of the human body. <i>Ref: NPUAP</i></p> <p>Note: this may be a parent concept for the others; consider deletion.</p>	<p>Vocabulary: { SNOMED CT: not found }</p>

Support Surface Product

Type: **Class**

Attributes

Attribute	Notes	Constraints and tags
<b>Date in Service TS</b>	The date the product was put in service from which life expectancy can be estimated	
<b>Life Expectancy</b> Numeric	The defined period of time during which a product is able to effectively fulfill its designated purpose.	

## Support Surface Feature

Type: **Class**

A functional aspect of a support surface component

A feature is a functional component of a support surface that can be used alone or in combination with other features.--Ref: *NPUAP Support Surface Standards Initiative, Terms and Definitions, Ver. 01/29/2007*

Constraints

- LOINC: Support surfaces attachment:Find:Pt:^Patient:Doc: (52061-9): (*Vocabulary*)

Tagged Values

- Reference = Notes.: Reference: Shahin ES, Meijers JM, Schols JM, Tannen A, Halfens RJ & Dassen T. (2010). The relationship between malnutrition parameters and pressure ulcers in hospitals and nursing homes. *Journal of Nutrition*, 26, 886-889. doi:10.1016/j.nut.201.

Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>Support Surface Feature Description</b> Text		
<b>Support Surface Feature Type</b> Enumeration		

Support Surface Component

Type: **Enumeration**

Attributes

Attribute	Notes	Constraints and tags
<b>air</b>	A low density fluid with minimal resistance to flow. <i>Ref: NPUAP</i> Note: the NPUAP definition seems to allow for liquid state fluids, but the SNOMED CT concept identifier clearly refers to gases. Clarify.	Vocabulary: { <u>SNOMED CT: Air (substance) (15158005)</u> }
<b>cell/bladder</b>	A means of encapsulating a support medium. <i>Ref: NPUAP</i>	Vocabulary: { <u>SNOMED CT: not found</u> }

Attribute	Notes	Constraints and tags
<b>viscoelastic foam</b>	<p>A type of porous polymer material that conforms in proportion to the applied weight. The air exists and enters the foam cells slowly which allows the material to respond slower than a standard elastic foam (memory foam).  <i>Ref: NPUAP</i>            Note on vocabulary constraint:            SNOMED CT: Foam (qualifier value) (421166008) + (need new concept for viscoelastic)</p>	<p><u>Vocabulary: { SNOMED CT: not found }</u></p>
<b>elastic foam</b>	<p>A type of porous polymer material that conforms in proportion to the applied weight. Air enters and exits the foam cells more rapidly, due to greater density (non-memory). <i>Ref: NPUAP</i>            Note: a) more rapidly than what? b) how does greater density facilitate air movement? c) what is the meaning of the parenthetical "non-memory"?            Note on vocabulary constraint: Is there a difference between a foam that is elastic (implied by the term) and an elastic substance that is foamy (per the SNOMED CT expression)?</p>	<p><u>Vocabulary: { SNOMED CT: 261257001   Elastic/plastic (substance)  : 362981000   qualifier value   = 421166008   Foam (qualifier value)   }</u></p>
<b>closed cell foam</b>	<p>A non-permeable structure in which there is a barrier between cells, preventing gases or liquids from passing through the foam. <i>Ref: NPUAP</i>            Note on vocabulary constraint: Partial expression requires "closed cell" concept: SNOMED CT: 261257001   Elastic/plastic (substance)  : 362981000   qualifier value   = 421166008   Foam (qualifier value) </p>	<p><u>Vocabulary: { SNOMED CT: not found }</u></p>
<b>open cell foam</b>	<p>A permeable structure in which there is no barrier between cells and gases or liquids can pass through the foam. <i>Ref: NPUAP</i>            Note on vocabulary constraint: Partial expression requires "open cell" concept: SNOMED CT: 261257001   Elastic/plastic (substance)  : 362981000   qualifier value   = 421166008   Foam</p>	<p><u>Vocabulary: { SNOMED CT: not found }</u></p>

Attribute	Notes	Constraints and tags
	(qualifier value)	
<b>gel</b>	<p>A semisolid system consisting of a network of solid aggregates, colloidal dispersions or polymers, which may exhibit elastic properties. (Can range from a hard gel to a soft gel). <i>Ref: NPUAP</i></p> <p>Note on vocabulary constraint: Expression found is qualifier, not substance: SNOMED CT: Gel (qualifier value) (385100002)</p>	<p>Vocabulary: { <u>SNOMED CT: not found</u> }</p>
<b>pad</b>	<p>A cushion-like mass of soft material used for comfort, protection, or positioning. <i>Ref: NPUAP</i></p> <p>Note on vocabulary constraint: Found expression is qualifier only: SNOMED CT: Padding (qualifier value) (257889009)</p>	<p>Vocabulary: { <u>SNOMED CT: not found</u> }</p>
<b>viscous fluid</b>	<p>A fluid with a relatively high resistance to flow of the fluid. <i>Ref: NPUAP</i></p> <p>Note on vocabulary constraint: Suggestion (SNOMED CT: Liquid substance (substance) (33463005) + Viscosity modifier (substance) (418681006)) uses two materials, which could work, if a compositional relationship were used, but which would exclude liquids that are viscous without additives. There is a "viscosity" concept (78949001), but no defining relationship to levels is found.</p>	<p>Vocabulary: { <u>SNOMED CT: not found</u> }</p>
<b>elastomer</b>	<p>Any material that can be repeatedly stretched to at least twice its original length; upon release the stretch will return to approximately its original length. <i>Ref: NPUAP</i></p> <p>Note: is the "2x" requirement a clinical criterion? It's not usually required to call a material an elastomer.</p>	<p>Vocabulary: { <u>SNOMED CT: Elastomer (substance) (261777007)</u> }</p>

Attribute	Notes	Constraints and tags
<b>solid</b>	A substance that does not flow perceptibly under stress. Under ordinary conditions retains its size and shape. <i>Ref: NPUAP</i>	Vocabulary: { <u>SNOMED CT: Solid substance (substance) (78910004)</u> }
<b>water</b>	A moderate density fluid with moderate resistance to flow. <i>Ref: NPUAP</i> Note: NPUAP definition allows for mixtures, suspensions, and substitutes, but the SNOMED CT concept identifier clearly refers to H2O. Clarify.	Vocabulary: { <u>SNOMED CT: Water (substance) (11713004)</u> }

### Skin Protection

Type: **Package**

**Skin Protection** - (Logical diagram)

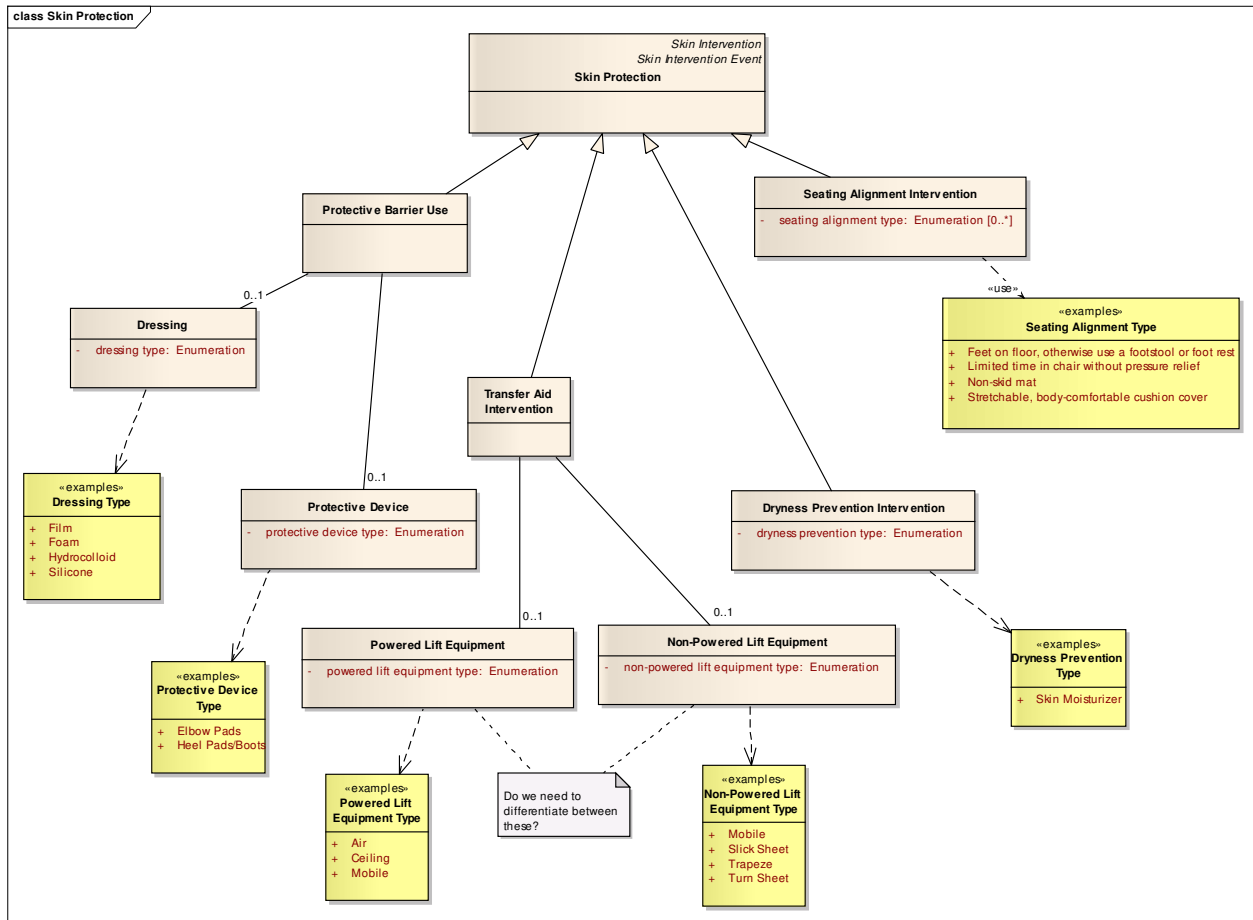


Figure: 12

### Skin Protection

Type: Class Skin Intervention, Skin Intervention Event

An effort to reduce the patient's risk of developing a pressure ulcer by reducing the magnitude of lateral forces between the patient's skin and sheets or other surfaces

### Protective Barrier Use

Type: Class Skin Protection

The placing of a physical object between the patient and a source of friction or shear

### Dressing

Type: Class

Status: Proposed. Version 1.0. Phase 1.0.

Package: Skin Protection    *Keywords:*  
 Detail: Created on 8/31/2010. Last modified on 3/21/2011.  
 GUID: {2B18E33E-F334-4dfc-88A0-B7821B047002}

A material applied to a wound to protect against further skin breakdown and contamination

Attributes

Attribute	Notes	Constraints and tags
<b>dressing type</b> Enumeration		Vocabulary: { SNOMED CT: 37898001 dressing, device (physical object) }

**Dressing Type**

Type: Class

Attributes

Attribute	Notes	Constraints and tags
<b>Film</b>		
<b>Foam</b>		
<b>Hydrocolloid</b>		

Attribute	Notes	Constraints and tags
<b>Silicone</b>		

## Protective Device

Type: **Class**

A device designed to reduce friction against the patient

### Attributes

Attribute	Notes	Constraints and tags
<b>protective device type</b> Enumeration		Vocabulary: { SNOMED CT: not found }

## Protective Device Type

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
<b>Elbow Pads</b>		

Attribute	Notes	Constraints and tags
<b>Heel Pads/Boots</b>		

### Transfer Aid Intervention

Type: **Class** **Skin Protection**

Use of a device to help move a patient in order to avoid the friction that may attend manual movement of the patient

### Powered Lift Equipment

Type: **Class**

A transfer aid that supplies motive power

#### Attributes

Attribute	Notes	Constraints and tags
<b>powered lift equipment type</b> Enumeration		

### Powered Lift Equipment Type

Type: **Class**

#### Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>Air</b>		
<b>Ceiling</b>		
<b>Mobile</b>		

### Non-Powered Lift Equipment

Type: Class

#### Attributes

Attribute	Notes	Constraints and tags
<b>non-powered lift equipment type</b> Enumeration		

### Non-Powered Lift Equipment Type

Type: Class

Attributes

Attribute	Notes	Constraints and tags
<b>Mobile</b>		
<b>Slick Sheet</b>		
<b>Trapeze</b>		
<b>Turn Sheet</b>		

**Dryness Prevention Intervention**

Type: **Class** **Skin Protection**

Attributes

Attribute	Notes	Constraints and tags
<b>dryness prevention type</b> Enumeration		

Attribute	Notes	Constraints and tags

### Dryness Prevention Type

Type: **Class**

#### Attributes

Attribute	Notes	Constraints and tags
Skin Moisturizer		

### Seating Alignment Intervention

Type: **Class** **Skin Protection**

#### Attributes

Attribute	Notes	Constraints and tags
seating alignment type Enumeration  [0..*]		

### Seating Alignment Type

Type: **Class**

#### Attributes

Attribute	Notes	Constraints and tags
<b>Feet on floor, otherwise use a footstool or foot rest</b>		
<b>Limited time in chair without pressure relief</b>		
<b>Non-skid mat</b>		
<b>Stretchable, body- comfortable cushion cover</b>		

Moisture Management

Type: **Package**

**Moisture Management** - (Logical diagram)

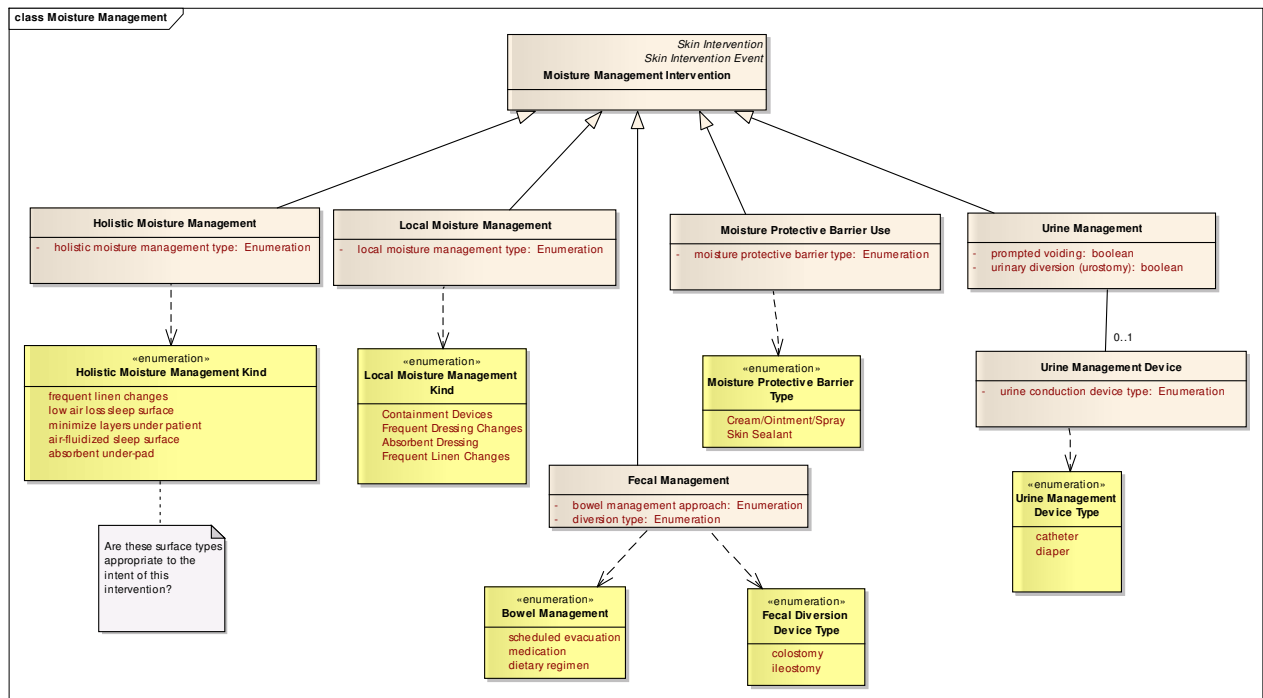


Figure: 13

### Holistic Moisture Management

Attributes

Attribute	Notes	Constraints and tags
holistic moisture management type Enumeration		

### Local Moisture Management

Type: Class Moisture Management Intervention

Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>local moisture management type</b> Enumeration		

**Local Moisture Management Kind**

Type: **Enumeration**

Attributes

Attribute	Notes	Constraints and tags
<b>Containment Devices</b>		
<b>Frequent Dressing Changes</b>		
<b>Absorbent Dressing</b>		

Attribute	Notes	Constraints and tags
<b>Frequent Linen Changes</b>		

## Fecal Management

Type: **Class** **Moisture Management Intervention**

### Attributes

Attribute	Notes	Constraints and tags
<b>bowel management approach</b> Enumeration	Approach for ensuring bowels move when intended	
<b>diversion type</b> Enumeration	The type of anatomical configuration used to conduct fecal matter from the patient	

## Fecal Diversion Device Type

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>colostomy</b>		Vocabulary: { SNOMED CT: 398740003 colostomy (procedure) }
<b>ileostomy</b>		Vocabulary: { SNOMED CT: 301784005 ileostomy operation (procedure) }

## Bowel Management

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>scheduled evacuation</b>		
<b>medication</b>		
<b>dietary regimen</b>		



## Moisture Management Intervention

Type: **Class** **Skin Intervention, Skin Intervention Event**

## Moisture Protective Barrier Use

Type: **Class** **Moisture Management Intervention**

### Attributes

Attribute	Notes	Constraints and tags
<b>moisture protective barrier type</b> Enumeration		

## Moisture Protective Barrier Type

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>Cream/Ointment/Spray</b>		
<b>Skin Sealant</b>		

## Urine Management

Type: **Class** **Moisture Management Intervention**

Attributes

Attribute	Notes	Constraints and tags
<b>prompted voiding</b> boolean		
<b>urinary diversion (urostomy)</b> boolean		

**Urine Management Device**

Type: **Class**

Attributes

Attribute	Notes	Constraints and tags
<b>urine conduction device type</b> Enumeration	The type of device used to conduct urine away from the patient	

**Urine Management Device Type**

Type: **Enumeration**

Attributes

Attribute	Notes	Constraints and tags
<b>catheter</b>		Vocabulary: { <u>SNOMED CT:</u> <u>20568009 urinary catheter, device</u> <u>(physical object)</u> }
<b>diaper</b>		Vocabulary: { <u>SNOMED CT:</u> <u>52065008 diaper, device (physical</u> <u>object)</u> }

### Holistic Moisture Management Kind

Type: **Enumeration**

#### Attributes

Attribute	Notes	Constraints and tags
<b>frequent linen changes</b>		
<b>low air loss sleep surface</b>		
<b>minimize layers under patient</b>		

Attribute	Notes	Constraints and tags
<b>air-fluidized sleep surface</b>		
<b>absorbent under-pad</b>		

Nutrition Management

Type: **Package**

**Nutrition Management** - (Logical diagram)

Created By: Luigi on 9/24/2010

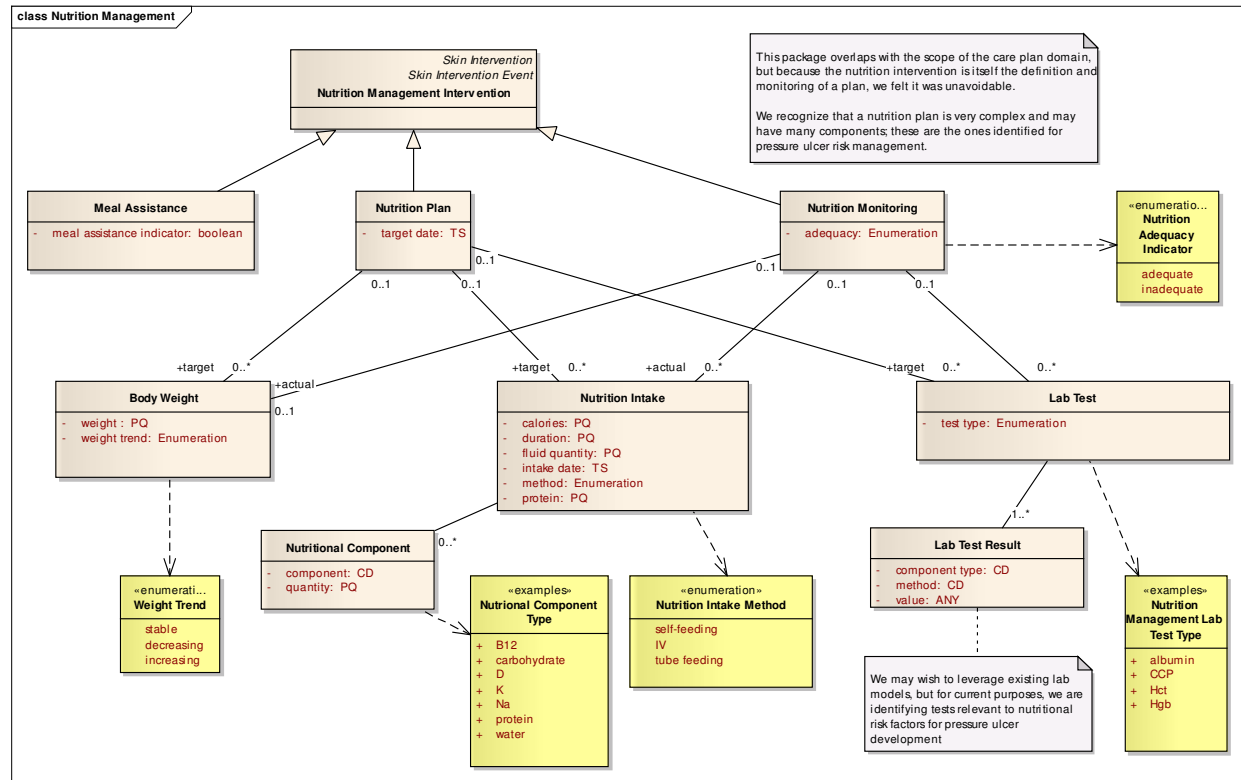


Figure: 14

### Nutritional Component Type

Type: Class

#### Attributes

Attribute	Notes	Constraints and tags
B12		
carbohydrate		

Attribute	Notes	Constraints and tags
<b>D</b>		
<b>K</b>		
<b>Na</b>		
<b>protein</b>		
<b>water</b>		

**Nutrition Monitoring**

Type: Class Nutrition Management Intervention

Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>adequacy</b> Enumeration	Whether the nutrition intake is adequate for the patient's health	Vocabulary: { SNOMED CT: 366364004 finding of nutritional status (finding) (BT) }

## Nutrition Plan

Type: **Class** **Nutrition Management Intervention**

### Attributes

Attribute	Notes	Constraints and tags
<b>target date</b> TS	The time at which the planner desires or expects to measure the specified nutrition values	

## Nutritional Component

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
<b>component</b> CD	The name of the nutritional component (fiber, vitamin, mineral, etc.) of interest	
<b>quantity</b> PQ	The quantity of the nutritional component (fiber, vitamin, mineral, etc.) of interest	

## Nutrition Management Intervention

Type: **Class** **Skin Intervention, Skin Intervention Event**

An effort to reduce the patient's risk of developing a pressure ulcer by ensuring adequate nutrition and hydration

## Nutrition Adequacy Indicator

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>adequate</b>		Vocabulary: { SNOMED CT: <u>248324001 well nourished (finding)</u> (clinical finding) }
<b>inadequate</b>		Vocabulary: { SNOMED CT: <u>248325000 undernourished</u> (finding) (clinical finding) }

## Nutrition Intake

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
<b>calories PQ</b>	The number of calories consumed	



Attribute	Notes	Constraints and tags
<b>duration</b> PQ	The amount of time in which the nutrition was consumed, e.g., number of hours on IV	
<b>fluid quantity</b> PQ	The amount of fluid consumed by the patient	
<b>intake date</b> TS	The date and time the patient consumed the nutrition	
<b>method</b> Enumeration	The method by which the patient consumed the nutrition	
<b>protein</b> PQ	The quantity of protein the patient consumed	

### Nutrition Intake Method

Type: **Enumeration**

#### Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>self-feeding</b>	Nourishment of a patient who chews and swallows	Vocabulary: { SNOMED CT: not found }
<b>IV</b>	The nourishment of the patient via intravenous line	Vocabulary: { SNOMED CT: 25156005 intravenous feeding of patient (regime/therapy) (procedure) }
<b>tube feeding</b>	The feeding of the patient with a tube, whether naso-gastrically or gastrically	Vocabulary: { SNOMED CT: 61420007 tube feeding of patient (regime/therapy) }

## Lab Test

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
<b>test type</b> Enumeration		

## Nutrition Management Lab Test Type

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>albumin</b>		
<b>CCP</b>		
<b>Hct</b>		
<b>Hgb</b>		

### Lab Test Result

Type: **Class**

#### Attributes

Attribute	Notes	Constraints and tags
<b>component type CD</b>	The component type, if the lab is a panel	

Attribute	Notes	Constraints and tags
<b>method</b> CD	The method by which the test was conducted	
<b>value</b> ANY	The result value of the test, of whatever datatype necessary	

### Meal Assistance

Type: Class Nutrition Management Intervention

#### Attributes

Attribute	Notes	Constraints and tags
<b>meal assistance indicator</b> boolean	Whether the patient receives assistance eating meals	

### Body Weight

Type: Class

#### Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>weight</b> PQ	The patient's body weight	
<b>weight trend</b> Enumeration	The increase, decrease, or stability of the patient's weight	Vocabulary: { SNOMED CT: 365910001 <u>weight trend finding</u> (finding) }

## Weight Trend

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>stable</b>		Vocabulary: { SNOMED CT: 271398006 <u>weight steady (clinical</u> <u>finding)</u> }
<b>decreasing</b>		Vocabulary: { SNOMED CT: 89362005 <u>weight loss finding</u> (clinical finding) }
<b>increasing</b>		Vocabulary: { SNOMED CT: 8943002 <u>weight gain finding</u> (clinical finding) }

### Pressure Ulcer Risk Assessment

Type: **Package**

### Pressure Ulcer Risk Assessment: High Level - (Logical diagram)

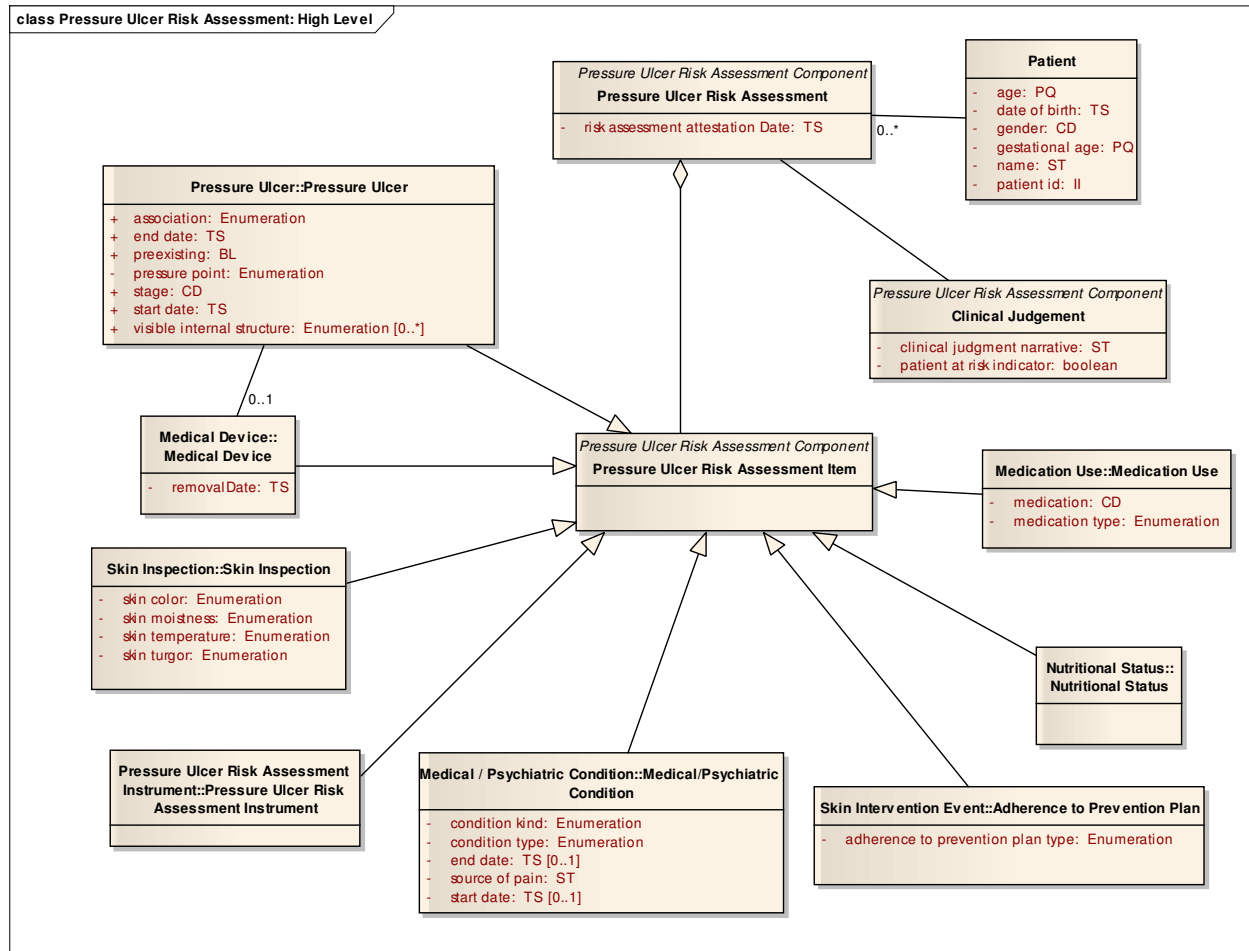


Figure: 15

### Patient

Type: **Class**

The subject of care being assessed for ulcer risk

### Attributes

Attribute	Notes	Constraints and tags
<b>age PQ</b>	The patient's age. May be calculated from date of birth; used in BMI calculation.	Vocabulary: { LOINC: <u>Age:Time:Pt:Patient:Qn: (30525-0)</u> } Vocabulary: { SNOMED CT: <u>Current chronological age (observable entity) (424144002)</u> }
<b>date of birth TS</b>	The patient's date of birth	
<b>gender CD</b>	The patient's gender	Vocabulary: { LOINC: <u>Gender:Type:Pt:Patient:Nom: (21840-4)</u> } Vocabulary: { SNOMED CT: <u>Gender (observable entity) (263495000)</u> }
<b>gestational age PQ</b>	For neonatal patients, the patient's gestational age	
<b>name ST</b>	The patient's name	
<b>patient id II</b>	An identifier for the patient	

Pressure Ulcer Risk Assessment

Type: **Class Pressure Ulcer Risk Assessment Component**

A comprehensive, attested assessment of the risk factors for a patient to develop a pressure ulcer

Attributes

Attribute	Notes	Constraints and tags
<b>risk assessment attestation Date TS</b>	The date the completed assessment was confirmed by an authorized clinician	

Pressure Ulcer Risk Assessment Item

A set of related risk assessment questions

Clinical Judgement

Type: **Class Pressure Ulcer Risk Assessment Component**

A statement of risk made by a qualified clinician, especially useful when treatment decisions are made in exception to documented protocols

Attributes

Attribute	Notes	Constraints and tags
<b>clinical judgment narrative ST</b>	Prose explaining the clinical judgement of risk	



Attribute	Notes	Constraints and tags
<b>patient at risk indicator</b> boolean	Whether the patient is judged to be at risk for developing a pressure ulcer	

Pressure Ulcer

Type: **Package**

**Pressure Ulcer** - (Logical diagram)

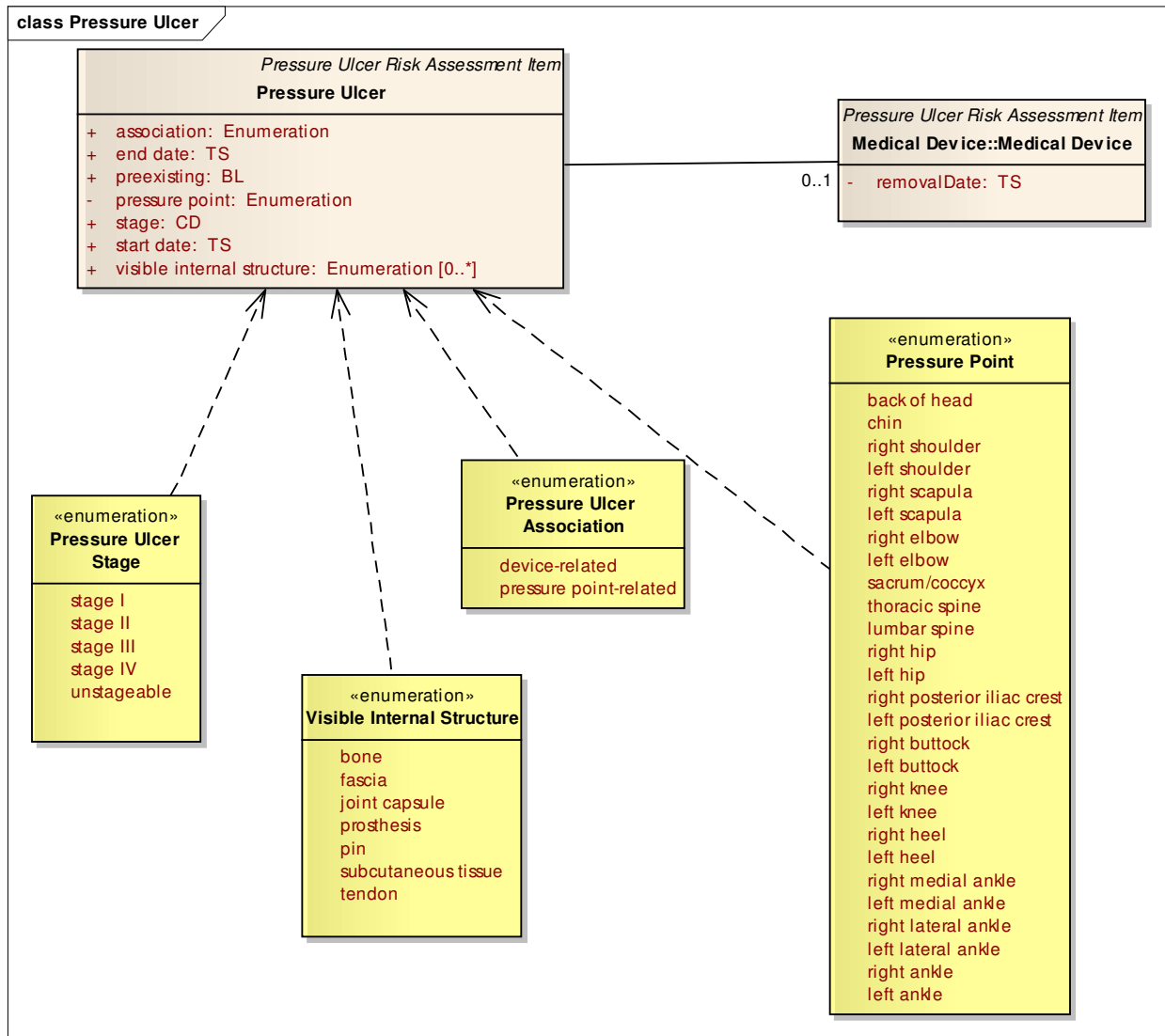


Figure: 16

### Pressure Point

Type: **Enumeration**

Points on the body that are susceptible to pressure ulcer formation

#### Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>back of head</b>		Vocabulary: { <u>SNOMED CT: 43631005 occipital region structure (body structure)</u> }
<b>chin</b>		Vocabulary: { <u>SNOMED CT: 23747009 skin structure of chin (body structure)</u> }
<b>right shoulder</b>		Vocabulary: { <u>SNOMED CT: 91774008 structure of right shoulder region (body structure)</u> }
<b>left shoulder</b>		Vocabulary: { <u>SNOMED CT: 91775009 structure of left shoulder region (body structure)</u> }
<b>right scapula</b>		Vocabulary: { <u>SNOMED CT: 7874003   structure of scapular region of back (body structure)  : 272741003   laterality   =24028007   right (qualifier value)</u> }
<b>left scapula</b>		Vocabulary: { <u>SNOMED CT: 7874003   structure of scapular region of back (body structure)  : 272741003   laterality   = 7771000   left (qualifier value)</u> }

Attribute	Notes	Constraints and tags
<b>right elbow</b>		Vocabulary: { <u>SNOMED CT: 368149001 right elbow region structure (body structure)</u> }
<b>left elbow</b>		Vocabulary: { <u>SNOMED CT: 368148009 left elbow region structure (body structure)</u> }
<b>sacrum/coccyx</b>		Vocabulary: { <u>SNOMED CT: 87141009 sacral vertebra structure (body structure)</u> }
<b>thoracic spine</b>		Vocabulary: { <u>SNOMED CT: 122495006 thoracic spine structure (body structure)</u> }
<b>lumbar spine</b>		Vocabulary: { <u>SNOMED CT: 122496007 lumbar spine structure (body structure)</u> }
<b>right hip</b>		Vocabulary: { <u>SNOMED CT: 287579007 Right hip region structure (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>left hip</b>		Vocabulary: { SNOMED CT: <u>387679003 Left hip region structure</u> (body structure) }
<b>right posterior iliac crest</b>		Vocabulary: { SNOMED CT: <u>396993003 Right posterior iliac crest</u> (body structure) }
<b>left posterior iliac crest</b>		Vocabulary: { SNOMED CT: <u>396994009 Left posterior iliac crest</u> (body structure) }
<b>right buttock</b>		Vocabulary: { SNOMED CT: <u>46862004   buttock structure (body structure)  </u> <u>272741003   laterality  </u> <u>= 24028007   right (qualifier value)</u> }
<b>left buttock</b>		Vocabulary: { SNOMED CT: <u>46862004   buttock structure (body structure)  </u> <u>272741003   laterality  </u> <u>= 7771000   left (qualifier value)</u> }
<b>right knee</b>		Vocabulary: { SNOMED CT: <u>6757004 Structure of right knee</u> (body structure) }

Attribute	Notes	Constraints and tags
<b>left knee</b>		Vocabulary: { <u>SNOMED CT: 82169009 Structure of left knee (body structure)</u> }
<b>right heel</b>		Vocabulary: { <u>SNOMED CT: 76853006   heel structure (body structure)  : 272741003   laterality   = 24028007   right (qualifier value)</u> }
<b>left heel</b>		Vocabulary: { <u>SNOMED CT: 76853006   heel structure (body structure)  : 272741003   laterality   = 7771000   left (qualifier value)</u> }
<b>right medial ankle</b>		Vocabulary: { <u>SNOMED CT: 182304008   medial aspect of ankle (body structure)  : 272741003   laterality   = 24028007   right (qualifier value)</u> }
<b>left medial ankle</b>		: { <u>SNOMED CT: 182304008   medial aspect of ankle (body structure)  : 272741003   laterality   = 7771000   left (qualifier value)</u> }
<b>right lateral ankle</b>		Vocabulary: { <u>SNOMED CT: 182305009   lateral aspect of ankle (body structure)  : 272741003   laterality   = 24028007   right (qualifier value)</u> }

Attribute	Notes	Constraints and tags
<b>left lateral ankle</b>		Vocabulary: { SNOMED CT: <u>182305009   lateral aspect of ankle (body structure)  </u> : <u>272741003   laterality   = 7771000   left (qualifier value)  </u> }
<b>right ankle</b>		Vocabulary: { SNOMED CT: <u>6685009 structure of right ankle (body structure)  </u> }
<b>left ankle</b>		Vocabulary: { SNOMED CT: <u>51636004 structure of left ankle (body structure)  </u> }

## Pressure Ulcer Association

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>device-related</b>		Vocabulary: { SNOMED CT: <u>not found  </u> }
<b>pressure point-related</b>		Vocabulary: { SNOMED CT: <u>not found  </u> }

## Pressure Ulcer Stage

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>stage I</b>	Intact skin with nonblanchable redness of a localized area, usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area. Reference: Brown, P., 2009, www.npuap.org	Vocabulary: { SNOMED CT: <u>421076008 Pressure ulcer stage 1 (disorder)</u> }
<b>stage II</b>	Partial thickness loss of dermis presenting as a shallow open ulcer with a red-pink wound bed, without slough. It may also present as an intact or open/ruptured serum-filled blister. Reference: Brown, P., 2009; www.npuap.org	Vocabulary: { SNOMED CT: <u>420324007 Pressure ulcer stage 2 (disorder)</u> }
<b>stage III</b>	Full thickness tissue loss. Subcutaneous fat may be visible, but bone, tendon, or muscle is not exposed. Slough may be present but does not obscure the depth of tissue loss. It may include undermining and tunneling. Reference: Brown, P., 2009; www.npuap.org	Vocabulary: { SNOMED CT: <u>421927004 Pressure ulcer stage 3 (disorder)</u> }
<b>stage IV</b>	Full thickness tissue loss with exposed bone, tendon, or muscle. Slough or exchar may be present on some parts of the wound bed. It often includes undermining and tunneling. Reference: Brown, P., 2009; www.npuap.org	Vocabulary: { SNOMED CT: <u>420597008 Pressure ulcer stage 4 (disorder)</u> }
<b>unstageable</b>	Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown, or black) in the wound base. Reference: Brown, P., 2009; www.npuap.org	Vocabulary: { SNOMED CT: <u>421594008 Nonstageable pressure ulcer (disorder)</u> }



## Pressure Ulcer

Type: **Class** Pressure Ulcer Risk Assessment Item

An area of skin that breaks down when constant pressure is placed against the skin (Medline Plus)

### Attributes

Attribute	Notes	Constraints and tags
<b>association</b> Enumeration	Whether the ulcer is related to a device or a pressure point	
<b>end date</b> TS	The date on which the ulcer was healed	
<b>preexisting</b> BL	Whether the pressure ulcer was present on admission to the encounter for which the information is recorded	
<b>pressure point</b> Enumeration		
<b>stage</b> CD	The stage of the ulcer, per the AHCPR Guidelines, following the recommendations of the National Pressure Ulcer Advisory Panel (NPUAP) Consensus Development Conference	

Attribute	Notes	Constraints and tags
<b>start date</b> TS	The date on which the ulcer was identified	
<b>visible internal structure</b> Enumeration  [0..*]	An internal anatomical structure or device that is exposed to view by a pressure ulcer	

**Visible Internal Structure**

Type: **Enumeration**

Attributes

Attribute	Notes	Constraints and tags
<b>bone</b>	A hard connective tissue consisting of cells embedded in a matrix of mineralized ground substance and collagen fibers. A portion of osseous tissue of definite shape and size, forming a part of the skeleton. Ref: Stedman's Medical Dictionary	Vocabulary: { SNOMED CT: <u>3138006 Bone (tissue) structure (body structure)</u> }
<b>fascia</b>	A sheet of fibrous tissue that envelops the body beneath the skin; it also encloses muscles and groups of muscles, and separates their several layers or groups. Ref: Stedman's Medical Dictionary	Vocabulary: { SNOMED CT: <u>84820005 structure of fascia (body structure)</u> }
<b>joint capsule</b>	A sac enclosing a joint, formed by an outer fibrous articular capsule and an inner synovial membrane. Syn: Articular capsule. Ref: Stedman's medical dictionary	Vocabulary: { SNOMED CT: <u>32551008 structure of articular capsule (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>prosthesis</b>	Fabricated substitute for a diseased or missing part of the body. Ref: Stedman's Medical Dictionary	Vocabulary: { SNOMED CT: <u>53350007 prosthesis, device (physical object)</u> }
<b>pin</b>	Rod used in surgical treatment of bone fractures. Syn: pin. Ref: Stedman's Medical Dictionary	Vocabulary: { SNOMED CT: <u>77444004 bone pin, device (physical object)</u> }
<b>subcutaneous tissue</b>	A layer of loose, irregular connective tissue immediately beneath the skin and closely attached to the corium by coarse fibrous bands. Ref: Stedman's Medical Dictionary	Vocabulary: { SNOMED CT: <u>71966008 subcutaneous tissue structure (body structure)</u> }
<b>tendon</b>	A nondistensible fibrous cord or band of variable length that is part of the muscle that connects the fleshy (contractile) part of muscle with its bony attachment or other structure. Ref: Stedman's Medical Dictionary	Vocabulary: { SNOMED CT: <u>13024002 tendon structure (body structure)</u> }

Medical / Psychiatric Condition

Type: **Package**

**Medical Psychiatric Condition Detail** - (Logical diagram)

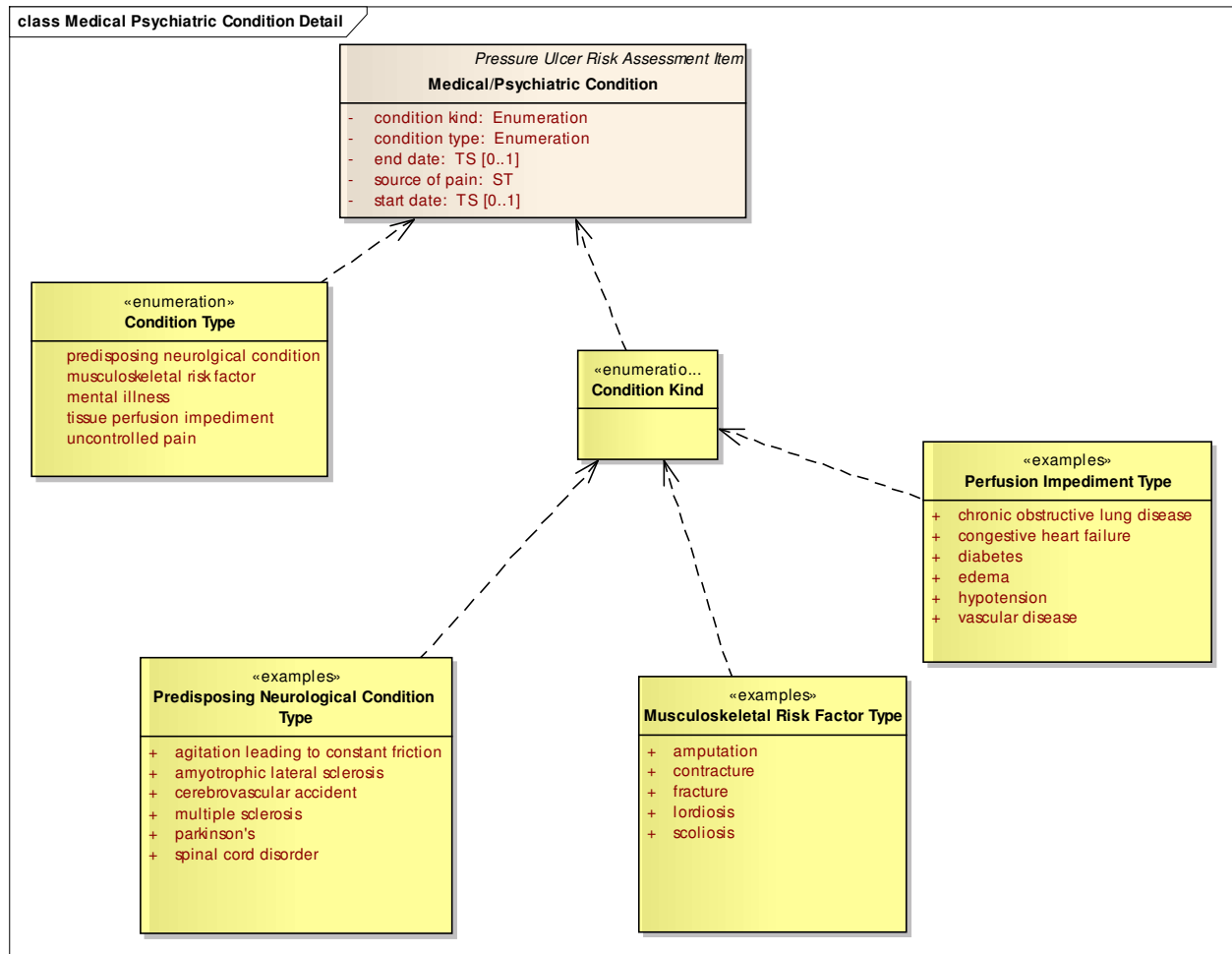


Figure: 17

### Condition Kind

Type: Enumeration

### Condition Type

Type: Enumeration

### Attributes

Attribute	Notes	Constraints and tags
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Attribute	Notes	Constraints and tags
<b>predisposing neurological condition</b>	A neurological condition that increases pressure ulcer risk	Vocabulary: { <u>SNOMED CT: not found</u> }
<b>musculoskeletal risk factor</b>	A condition affecting the musculoskeletal systems and thereby impairing the patient's mobility	Vocabulary: { <u>SNOMED CT: 928000 disorder of musculoskeletal system (disorder)</u> }
<b>mental illness</b>		Vocabulary: { <u>SNOMED CT: 74732009 mental disorder (disorder)</u> }
<b>tissue perfusion impediment</b>	A condition that impairs perfusion in body tissue	Vocabulary: { <u>SNOMED CT: not found</u> }
<b>uncontrolled pain</b>	Pain that cannot be or is not effectively controlled with medication or other interventions	Vocabulary: { <u>SNOMED CT: 274665008 chronic intractable pain (finding)</u> }

### Medical/Psychiatric Condition

Type: **Class Pressure Ulcer Risk Assessment Item**

A pathological state of the patient, whether a diagnosis, problem, or complaint

Attributes

Attribute	Notes	Constraints and tags
<b>condition kind</b> Enumeration	The specific condition affecting pressure ulcer risk	
<b>condition type</b> Enumeration	The general category of condition affecting pressure ulcer risk	
<b>end date</b> TS  [0..1]	The date on which the condition was healed or otherwise ceased to afflict the patient	
<b>source of pain</b> ST	A description of the source of pain, if applicable	
<b>start date</b> TS  [0..1]	The date of onset of the condition	

**Predisposing Neurological Condition Type**

Type: **Class**  
Constraints

**Constraints**

- SNOMED CT 118940003 (Disorder of nervous system (disorder))  
: (Vocabulary)

**Attributes**

Attribute	Notes	Constraints and tags
<b>agitation leading to constant friction</b>		Vocabulary: { <u>Not found in SNOMED</u> }
<b>amyotrophic lateral sclerosis</b>		Vocabulary: { <u>SNOMED CT 86044005 (Amyotrophic lateral sclerosis (disorder))</u> }
<b>cerebrovascular accident</b>		Vocabulary: { <u>SNOMED CT 230690007 (Cerebrovascular accident (disorder))</u> }
<b>multiple sclerosis</b>		Vocabulary: { <u>SNOMED CT 24700007 (Multiple sclerosis (disorder))</u> }
<b>parkinson's</b>		Vocabulary: { <u>SNOMED CT 49049000 (Parkinson's disease (disorder))</u> }

Attribute	Notes	Constraints and tags
<b>spinal cord disorder</b>		Vocabulary: { <u>SNOMED CT 24700007 (Multiple sclerosis (disorder))</u> }

## Musculoskeletal Risk Factor Type

Type: **Class**

### Constraints

- SNOMED CT 928000 (Disorder of musculoskeletal system (disorder))  
: (Vocabulary)

### Attributes

Attribute	Notes	Constraints and tags
<b>amputation</b>		Vocabulary: { <u>SNOMED CT 262595009 (Traumatic amputation (disorder))</u> }
<b>contracture</b>		Vocabulary: { <u>SNOMED CT 7890003 (Contracture of joint (disorder))</u> }
<b>fracture</b>		Vocabulary: { <u>SNOMED CT 125605004 (Fracture of bone (disorder))</u> }



Attribute	Notes	Constraints and tags
<b>lordiosis</b>		Vocabulary: { <u>SNOMED CT (No code found)</u> }
<b>scoliosis</b>		Vocabulary: { <u>SNOMED CT 298382003 (Scoliosis deformity of spine (disorder))</u> }

## Perfusion Impediment Type

Type: **Class**

### Constraints

- SNOMED CT 66354006 (Complication of perfusion (disorder))  
: (*Vocabulary*)

This code is not intended to constrain the allowable values, but to indicate a semantic space. Diabetes, e.g., is a critically relevant value, but it is not a child of this code.

### Attributes

Attribute	Notes	Constraints and tags
<b>chronic obstructive lung disease</b>		Vocabulary: { <u>SNOMED CT 13645005 (Chronic obstructive lung disease (disorder))</u> }
<b>congestive heart failure</b>		Vocabulary: { <u>SNOMED CT 42343007 (Congestive heart failure (disorder))</u> }

Attribute	Notes	Constraints and tags
<b>diabetes</b>		Vocabulary: { <u>SNOMED CT: not found</u> }
<b>edema</b>		Vocabulary: { <u>SNOMED CT 57609005 (Edema disease (disorder))</u> }
<b>hypotension</b>		Vocabulary: { <u>SNOMED CT 45007003 (Low blood pressure (disorder))</u> }
<b>vascular disease</b>		Vocabulary: { <u>SNOMED CT: 27550009 disorder of blood vessel (disorder)</u> }

Medical Device

*Type:* **Package****Medical Device Detail** - (Logical diagram)

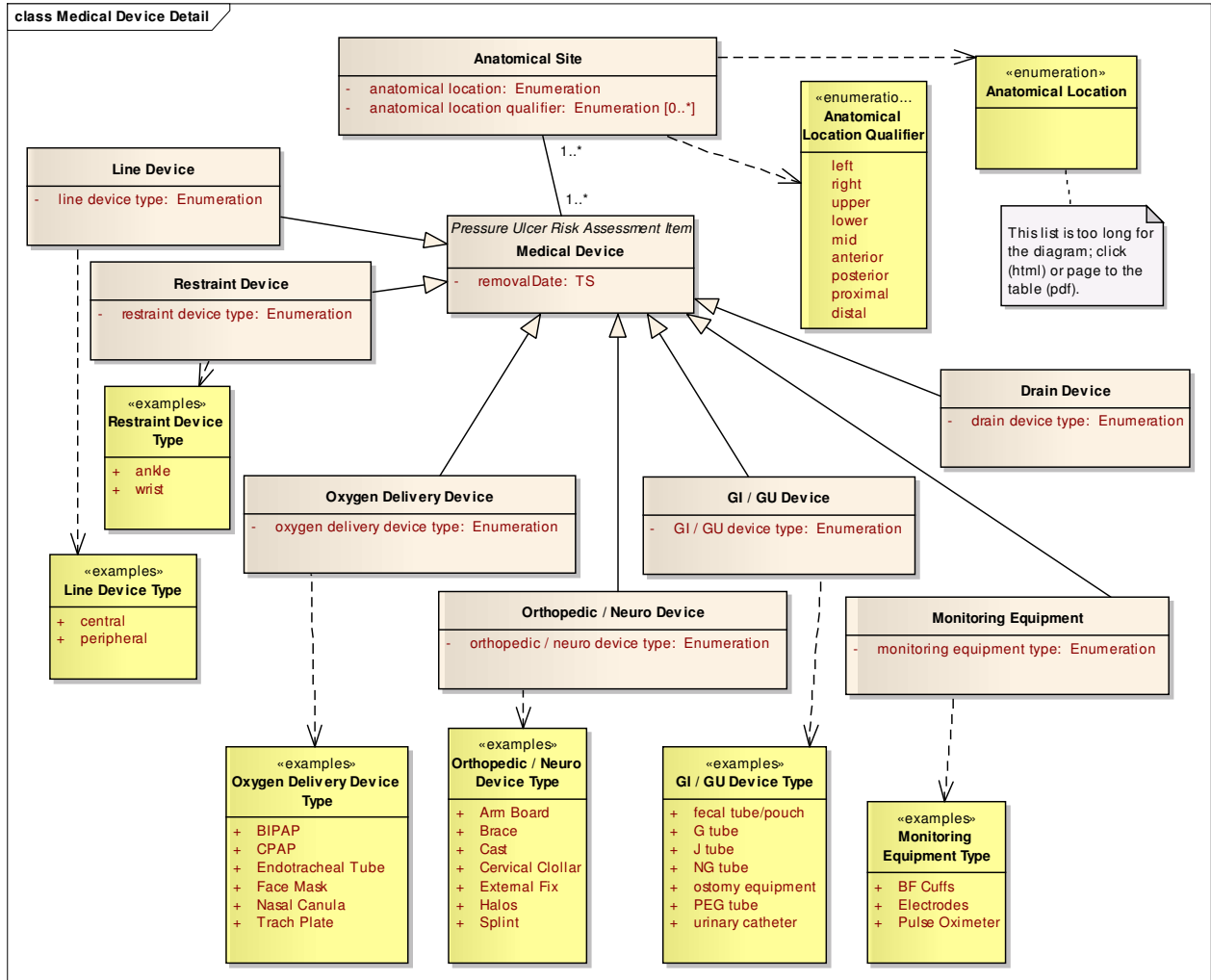


Figure: 18

**Anatomical Location**

Type: Enumeration

Places on the exterior of the body. NB: in the interest of uniformity, items in this list do not specify "skin of," even in the sporadic cases (e.g., "ear") where SCT supports such a distinction.

Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>elbow</b>		Vocabulary: { <u>SNOMED CT: 127949000 elbow region structure (body structure)</u> }
<b>heel</b>		Vocabulary: { <u>SNOMED CT: 84607009 skin structure of heel (body structure)</u> }
<b>ischial tuberosity</b>		Vocabulary: { <u>SNOMED CT: 69030007 ischial tuberosity structure (body structure)</u> }
<b>knee</b>		Vocabulary: { <u>SNOMED CT: 72696002 knee region structure (body structure)</u> }
<b>malleolus</b>		Vocabulary: { <u>SNOMED CT: 314796009 malleolar structure of tibia (body structure)</u> }
<b>trochanter</b>		Vocabulary: { <u>SNOMED CT: 182047004 trochanter of femur (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>occipital region</b>		Vocabulary: { <u>SNOMED CT:</u> <u>43631005 occipital region structure</u> (body structure) }
<b>forehead</b>		Vocabulary: { <u>SNOMED CT:</u> <u>68698007 skin structure of forehead</u> (body structure) }
<b>scapula</b>		Vocabulary: { <u>SNOMED CT:</u> <u>79601000 bone structure of scapula</u> (body structure) }
<b>ear</b>		Vocabulary: { <u>SNOMED CT:</u> <u>117590005 ear structure (body</u> <u>structure)</u> }
<b>scrotum</b>		Vocabulary: { <u>SNOMED CT:</u> <u>20233005 scrotal structure (body</u> <u>structure)</u> }
<b>sacrum</b>		Vocabulary: { <u>SNOMED CT:</u> <u>87141009 sacral vertebra structure</u> (body structure) }

Attribute	Notes	Constraints and tags
<b>abdomen</b>		Vocabulary: { <u>SNOMED CT: 113345001 abdominal structure (body structure)</u> }
<b>back</b>		Vocabulary: { <u>SNOMED CT: 66643007 skin structure of back (body structure)</u> }
<b>eye</b>	Note: should this include eye proper, conjunctiva, or both?	Vocabulary: { <u>SNOMED CT: 81745001 structure of eye proper (body structure)</u> } Vocabulary: { <u>SNOMED CT: 29445007 conjunctival structure (body structure)</u> }
<b>wrist</b>		Vocabulary: { <u>SNOMED CT: 8205005 wrist region structure (body structure)</u> }
<b>face</b>		Vocabulary: { <u>SNOMED CT: 89545001 face structure (body structure)</u> }
<b>foot</b>		Vocabulary: { <u>SNOMED CT: 56459004 foot structure (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>hand</b>		Vocabulary: { <u>SNOMED CT: 85562004 hand structure (body structure)</u> }
<b>head</b>		Vocabulary: { <u>SNOMED CT: 69536005 head structure (body structure)</u> }
<b>hip</b>		Vocabulary: { <u>SNOMED CT: 29836001 hip region structure (body structure)</u> }
<b>leg</b>		Vocabulary: { <u>SNOMED CT: 61685007 lower limb structure (body structure)</u> }
<b>neck</b>		Vocabulary: { <u>SNOMED CT: 45048000 neck structure (body structure)</u> }
<b>rectum</b>		Vocabulary: { <u>SNOMED CT: 34402009 rectum structure (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>shoulder</b>		Vocabulary: { <u>SNOMED CT: 16982005 shoulder region structure (body structure)</u> }
<b>buttocks</b>		Vocabulary: { <u>SNOMED CT: 46862004 buttock structure (body structure)</u> }
<b>chest</b>	Note on vocabulary constraint: one is not limited to the thorax; one is not limited to skin.	Vocabulary: { <u>SNOMED CT: 51185008 thoracic structure (body structure)</u> } Vocabulary: { <u>SNOMED CT: 86381001 skin structure of trunk (body structure)</u> }
<b>ankle</b>		Vocabulary: { <u>SNOMED CT: 67269001 skin structure of ankle (body structure)</u> }
<b>arm</b>		Vocabulary: { <u>SNOMED CT: 53120007 upper limb structure (body structure)</u> }
<b>mouth</b>		Vocabulary: { <u>SNOMED CT: 123851003 mouth region structure (body structure)</u> }



Attribute	Notes	Constraints and tags
<b>achilles</b>		Vocabulary: { <u>SNOMED CT: 61352006 structure of achilles tendon (body structure)</u> }
<b>axilla</b>		Vocabulary: { <u>SNOMED CT: 76261009 skin structure of axilla (body structure)</u> }
<b>breast</b>		Vocabulary: { <u>SNOMED CT: 76752008 breast structure (body structure)</u> }
<b>calf</b>		Vocabulary: { <u>SNOMED CT: 51059006 skin structure of calf of leg (body structure)</u> }
<b>chin</b>		Vocabulary: { <u>SNOMED CT: 23747009 skin structure of chin (body structure)</u> }
<b>coccyx</b>		Vocabulary: { <u>SNOMED CT: 64688005 bone structure of coccyx (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>finger</b>		: { <u>SNOMED CT: 7569003 finger structure (body structure)</u> }
<b>flank</b>		Vocabulary: { <u>SNOMED CT: 34284005 skin structure of flank (body structure)</u> }
<b>groin</b>		Vocabulary: { <u>SNOMED CT: 39687006 skin structure of inguinal region (body structure)</u> }
<b>gum</b>		Vocabulary: { <u>SNOMED CT: 113279002 gingival structure (body structure)</u> }
<b>iliac crest</b>		Vocabulary: { <u>SNOMED CT: 29850006 iliac crest structure (body structure)</u> }
<b>jaw</b>		Vocabulary: { <u>SNOMED CT: 661005 jaw region structure (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>labia</b>		Vocabulary: { <u>SNOMED CT: 39117004 genital labium structure (body structure)</u> }
<b>lip</b>		Vocabulary: { <u>SNOMED CT: 48477009 lip structure (body structure)</u> }
<b>lumbar</b>		Vocabulary: { <u>SNOMED CT: 122496007 lumbar spine structure (body structure)</u> }
<b>mucous membrane</b>		Vocabulary: { <u>SNOMED CT: 414781009 mucous membrane structure (body structure)</u> }
<b>nail</b>		Vocabulary: { <u>SNOMED CT: 72651009 nail structure (body structure)</u> }
<b>nares</b>		Vocabulary: { <u>SNOMED CT: 244506005 both anterior nares (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>nose</b>		Vocabulary: { <u>SNOMED CT: 45206002 nasal structure (body structure)</u> }
<b>parietal</b>		Vocabulary: { <u>SNOMED CT: 76332005 parietal region structure (body structure)</u> }
<b>pelvic region</b>		Vocabulary: { <u>SNOMED CT: 12921003 pelvic structure (body structure)</u> }
<b>penis</b>		Vocabulary: { <u>SNOMED CT: 18911002 penile structure (body structure)</u> }
<b>perineum</b>		Vocabulary: { <u>SNOMED CT: 38864007 perineal structure (body structure)</u> }
<b>peri-rectum</b>		Vocabulary: { <u>SNOMED CT: 113285009 structure of perineal flexure of rectum (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>scalp</b>		Vocabulary: { <u>SNOMED CT: 41695006 scalp structure (body structure)</u> }
<b>sternum</b>		Vocabulary: { <u>SNOMED CT: 302522007 entire sternum (body structure)</u> }
<b>suprapubic region</b>		Vocabulary: { <u>SNOMED CT: 11708003 hypogastric region structure (body structure)</u> }
<b>temporal region</b>		Vocabulary: { <u>SNOMED CT: 31287004 temporal region structure (body structure)</u> }
<b>thigh</b>		Vocabulary: { <u>SNOMED CT: 68367000 thigh structure (body structure)</u> }
<b>toes</b>		Vocabulary: { <u>SNOMED CT: 8671006 structure of all toes (body structure)</u> }

Attribute	Notes	Constraints and tags
<b>tongue</b>		Vocabulary: { SNOMED CT: <u>21974007 tongue structure (body structure)</u> }
<b>umbilicus</b>		Vocabulary: { SNOMED CT: <u>78220002 umbilical structure (body structure)</u> }
<b>vagina</b>		Vocabulary: { SNOMED CT: <u>76784001 vaginal structure (body structure)</u> }

### Anatomical Location Qualifier

Type: **Enumeration**

#### Attributes

Attribute	Notes	Constraints and tags
<b>left</b>		Vocabulary: { SNOMED CT: <u>7771000 left (qualifier value)</u> }
<b>right</b>		Vocabulary: { SNOMED CT: <u>24028007 right (qualifier value)</u> }

Attribute	Notes	Constraints and tags
<b>upper</b>		Vocabulary: { SNOMED CT: <u>261183002 upper (qualifier value)</u> }
<b>lower</b>		: { SNOMED CT: <u>261122009 lower (qualifier value)</u> }
<b>mid</b>		Vocabulary: { SNOMED CT: <u>255562008 mid (qualifier value)</u> }
<b>anterior</b>		Vocabulary: { SNOMED CT: <u>255549009 anterior (qualifier value)</u> }
<b>posterior</b>		: { SNOMED CT: <u>255551008 posterior (qualifier value)</u> }
<b>proximal</b>		Vocabulary: { SNOMED CT: <u>40415009 proximal (qualifier value)</u> }

Attribute	Notes	Constraints and tags
<b>distal</b>		: { <u>SNOMED CT: 46053002 distal (qualifier value)</u> }

## Anatomical Site

Type: **Class**

An identified region of the patient's body

### Attributes

Attribute	Notes	Constraints and tags
<b>anatomical location</b> Enumeration	A kind of anatomical structure	
<b>anatomical location qualifier</b> Enumeration  [0..*]	The laterality of the structure, if applicable	

## Medical Device

Type: **Class** Pressure Ulcer Risk Assessment Item

A medical device that has been used in contact with the patient

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------



Attribute	Notes	Constraints and tags
<b>removalDate</b> TS	The date the device was removed, if it has been removed	

## Line Device

Type: **Class** **Medical Device**

A device used to continuously introduce medications or other substances into the patient's bloodstream

### Constraints

- SNOMED CT: 405676006 intravenous fluid administration device (physical object):  
(*Vocabulary*)

### Attributes

Attribute	Notes	Constraints and tags
<b>line device type</b> Enumeration		Vocabulary: { <u>SNOMED CT: 303728004 venous catheter (physical object)</u> }

## Line Device Type

Type: **Class**

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>central</b>		Vocabulary: { SNOMED CT: 52124006 central venous catheter, device (physical object) }
<b>peripheral</b>		Vocabulary: { SNOMED CT: 82449006 peripheral intravenous catheter, device (physical object) }

## Restraint Device

Type: Class Medical Device

A device used to prevent the patient from making certain movements

### Attributes

Attribute	Notes	Constraints and tags
<b>restraint device type</b> Enumeration		Vocabulary: { SNOMED CT: 57395004 physical restraint equipment, device (physical object) }

## Restraint Device Type

Type: Class

SNOMED CT: 57395004 physical restraint equipment, device (physical object)

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>ankle</b>		
<b>wrist</b>		

### Oxygen Delivery Device

Type: Class Medical Device

A device used to augment the oxygen the patient inspires

#### Attributes

Attribute	Notes	Constraints and tags
<b>oxygen delivery device type</b> Enumeration		Vocabulary: { <u>SNOMED CT: 277973009 respiratory equipment (physical object)</u> }

### Oxygen Delivery Device Type

Type: Class

#### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>BIPAP</b>		
<b>CPAP</b>		
<b>Endotracheal Tube</b>		
<b>Face Mask</b>		
<b>Nasal Canula</b>		
<b>Trach Plate</b>		

**Orthopedic / Neuro Device***Type:* **Class** **Medical Device**

A device used to immobilize a part of the anatomy to allow it to heal

Attributes

Attribute	Notes	Constraints and tags
<b>orthopedic / neuro device type</b> Enumeration		Vocabulary: { <u>SNOMED CT</u> : not found }

**Orthopedic / Neuro Device Type***Type:* **Class**Attributes

Attribute	Notes	Constraints and tags
<b>Arm Board</b>		
<b>Brace</b>		
<b>Cast</b>		

Attribute	Notes	Constraints and tags
<b>Cervical Clollar</b>		
<b>External Fix</b>		
<b>Halos</b>		
<b>Splint</b>		

### GI / GU Device

Type: **Class Medical Device**

A device used to introduce or to remove substances into or from the patient's gut or genitourinary system

#### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>GI / GU device type</b> Enumeration		Vocabulary: { <u>SNOMED CT: not found</u> }

## GI / GU Device Type

Type: Class

### Attributes

Attribute	Notes	Constraints and tags
<b>fecal tube/pouch</b>		Vocabulary: { <u>SNOMED CT: not found</u> }
<b>G tube</b>		Vocabulary: { <u>SNOMED CT: TBD</u> }
<b>J tube</b>		Vocabulary: { <u>SNOMED CT: 126065006 jejunostomy tube, device (physical object)</u> }
<b>NG tube</b>		Vocabulary: { <u>SNOMED CT: 17102003 nasogastric tube, device (physical object)</u> }

Attribute	Notes	Constraints and tags
<b>ostomy equipment</b>		Vocabulary: { SNOMED CT: <u>35398009 ostomy appliance, device (physical object)</u> or <u>24697008 ostomy belt, device (physical object)</u> or <u>32711007 ostomy collection bag, device (physical object)</u> }
<b>PEG tube</b>	Question: is PEG needed?	
<b>urinary catheter</b>		Vocabulary: { SNOMED CT: <u>20568009 urinary catheter, device (physical object)</u> }

## Monitoring Equipment

Type: Class Medical Device

A device used to record vital signs or other information about the patient's condition

### Attributes

Attribute	Notes	Constraints and tags
<b>monitoring equipment type</b> Enumeration		Vocabulary: { SNOMED CT: <u>13288007 monitor, device (physical object)</u> }



## Monitoring Equipment Type

Type: Class

### Attributes

Attribute	Notes	Constraints and tags
<b>BF Cuffs</b>		
<b>Electrodes</b>		
<b>Pulse Oximeter</b>		

## Drain Device

Type: Class Medical Device

A device used to drain fluid from a wound

### Attributes

Attribute	Notes	Constraints and tags
<b>drain device type</b> Enumeration		

## Medication Use

Type: **Package**

### Medication Use Detail - (Logical diagram)

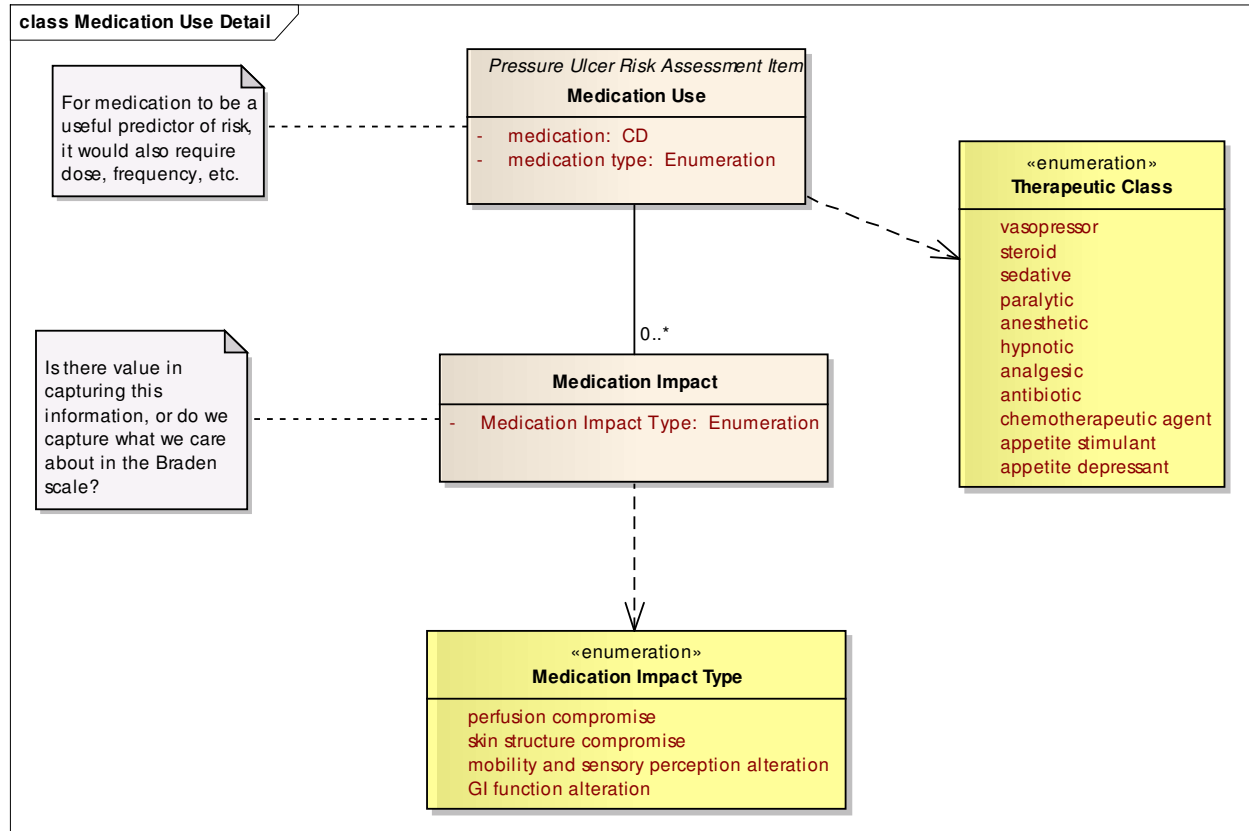


Figure: 19

## Medication Impact Type

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>perfusion compromise</b>	Note on vocabulary constraint: Does 4249000 poor peripheral circulation (disorder) fit?	Vocabulary: { <u>SNOMED CT: not found</u> }
<b>skin structure compromise</b>		Vocabulary: { <u>SNOMED CT: not found</u> }
<b>mobility and sensory perception alteration</b>		Vocabulary: { <u>SNOMED CT: not found</u> }
<b>GI function alteration</b>		Vocabulary: { <u>SNOMED CT: not found</u> }

### Therapeutic Class

Type: **Enumeration**

#### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>vasopressor</b>		
<b>steroid</b>		
<b>sedative</b>		
<b>paralytic</b>		
<b>anesthetic</b>		
<b>hypnotic</b>		

Attribute	Notes	Constraints and tags
analgesic		
antibiotic		
chemotherapeutic agent		
appetite stimulant		
appetite depressant		

### Medication Use

Type: Class Pressure Ulcer Risk Assessment Item

A medication that the patient is taking, with imputed risks based on medication type

Attributes

Attribute	Notes	Constraints and tags
<b>medication CD</b>	The medication that the patient is taking	
<b>medication type Enumeration</b>	The class of medication, assigned in order to assess effects that increase pressure ulcer risk	Vocabulary: { <u>SNOMED CT: 129019007 taking medication (observable entity)</u> }

**Medication Impact**

Type: **Class**

An effect that the medication may have on the patient that puts the patient at greater risk for developing a pressure ulcer

Attributes

Attribute	Notes	Constraints and tags
<b>Medication Impact Type Enumeration</b>		Vocabulary: { <u>SNOMED CT: not found</u> }

## Nutritional Status

Type: **Package**

**Nutritional Status Detail** - (Logical diagram)

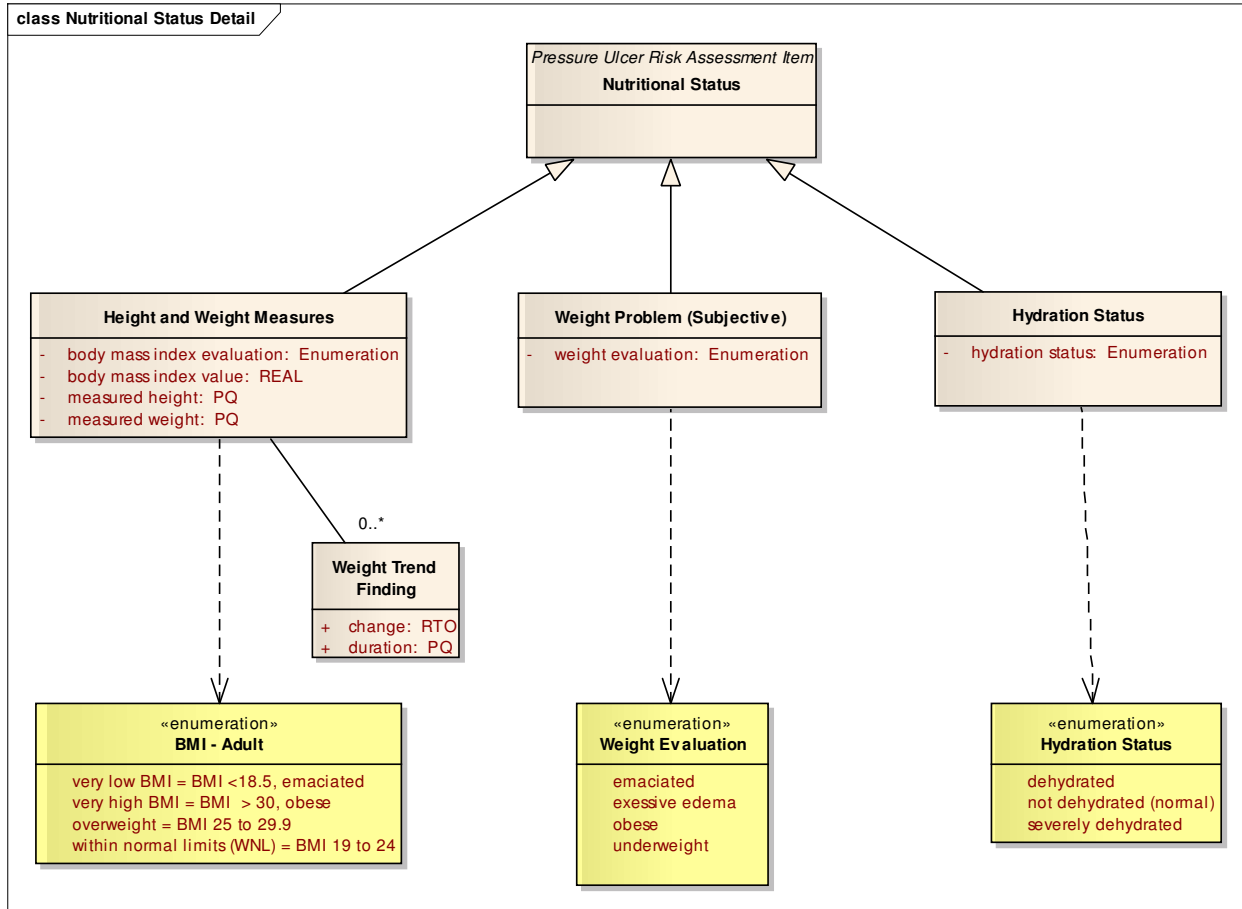


Figure: 20

### Weight Trend Finding

Type: **Class**

Change in patient weight

Notes: A weight loss of 5% within the past month or >10% within the past 6 months is found to be significant in increasing the risk of pressure ulcers. This is also consistent with information captured for the Minimum Data Set (MDS) for Nursing Home patients.

#### Constraints

- LOINC: Weight loss of 5% or more in the last month or loss of 10% or more in last 6 months:Find:Pt:^Patient:Ord:MDSv3 (54863-6): (*Vocabulary*)
- SNOMED CT: Weight change (observable entity) (248346009): (*Vocabulary*)

Tagged Values

- Reference = Shahin ES, Meijers JM, Schols JM, Tannen A, Halfens RJ & Dassen T. (2010). The relationship between malnutrition parameters and pressure ulcers in hospitals and nursing homes. Journal of Nutrition, 26, 886-889. doi:10.1016/j.nut.2010.01.016.

Attributes

Attribute	Notes	Constraints and tags
<b>change</b> RTO	Percentage magnitude of change in time period	Vocabulary: { SNOMED CT: <u>Percentage weight loss (observable entity) (248349002)</u> }
<b>duration</b> PQ	Time span of weight change	

**Nutritional Status**

Type: **Class Pressure Ulcer Risk Assessment Item**

An evaluation of the patient's metabolic function

**Height and Weight Measures**

Type: **Class Nutritional Status**

The objective measurements that are used to determine if the patient's weight makes them at risk for pressure ulcers

Constraints

- LOINC: Height and weight:-:Pt:^Patient:-: (54567-3): (Vocabulary)
- SNOMED CT: Height and weight (observable entity) (162879003): (Vocabulary)



Attributes

Attribute	Notes	Constraints and tags
<b>body mass index evaluation</b> Enumeration	The BMI range under which the patient's BMI falls	<u>Vocabulary: { LOINC: Body mass index:Prctl:Pt:~Patient:Qn:Per age and gender (59576-9) }</u>
<b>body mass index value</b> REAL	A value calculated from the patient's weight, age, and gender	<u>Vocabulary: { SNOMED CT: 60621009 body mass index (observable entity) }</u> <u>Vocabulary: { LOINC: Body mass index:Ratio:Pt:~Patient:Qn: (39156-5) }</u>
<b>measured height</b> PQ		<u>Vocabulary: { LOINC: Body height:Len:Pt:~Patient:Qn: (8302-2) }</u> <u>Vocabulary: { SNOMED CT: Standing height (observable entity) (248333004) }</u>
<b>measured weight</b> PQ		<u>Vocabulary: { SNOMED CT: Body weight (observable entity) (27113001) }</u> <u>Vocabulary: { LOINC: Body weight:Mass:Pt:~Patient:Qn:Measured (3141-9) }</u>

**BMI - Adult**Type: **Enumeration**Tagged Values

- Reference = References: Shahin ES, Meijers JM, Schols JM, Tannen A, Halfens RJ & Dassen T. (2010). The relationship between malnutrition parameters and pressure ulcers in hospitals and nursing homes. Journal of Nutrition, 26, 886-889.

doi:10.1016/j.nut.2010.01.016.

Attributes

Attribute	Notes	Constraints and tags
<b>very low BMI</b>	Note on vocabulary constraint: Range in SCT is "less than 20" (310252000)	BMI <18.5, emaciated Vocabulary: { SNOMED CT: <u>not found</u> }
<b>very high BMI</b>		BMI > 30, obese Vocabulary: { SNOMED CT: <u>162864005 body mass index 30+ - obesity (finding)</u> }
<b>overweight</b>		BMI 25 to 29.9 Vocabulary: { SNOMED CT: <u>162863004 body mass index 25-29 - overweight (finding)</u> }
<b>within normal limits (WNL)</b>		BMI 19 to 24 Vocabulary: { SNOMED CT: <u>normal body mass index (finding) (35425004)</u> }

**Weight Problem (Subjective)**Type: **Class** Nutritional Status

A subjective evaluation of the issues with the patient's nutritional status as evidenced by their weight.

Constraints

- LOINC: not found: (Vocabulary)

Constraints

- SNOMED CT: On examination - weight (finding) (162763007): (*Vocabulary*)

Attributes

Attribute	Notes	Constraints and tags
<b>weight evaluation</b> Enumeration		

**Weight Evaluation**

Type: **Enumeration**

Attributes

Attribute	Notes	Constraints and tags
<b>emaciated</b>	Abnormal thinness resulting from extreme loss of flesh; wasting. Ref: <i>Stedman's Medical Dictionary</i> .	Vocabulary: { SNOMED CT: <u>371597004 emaciated (finding)</u> }
<b>excessive edema</b>	An accumulation of an excessive amount of watery fluid in cells, tissues, or serous cavities. Ref: <i>Stedman's Medical Dictionary</i> .	Vocabulary: { SNOMED CT: <u>267038008   edema (finding)  </u> ; <u>362981000   qualifier value   =</u> <u>260378005   Excessive (qualifier value)  </u> }
<b>obese</b>	Extremely fat; having a body mass index of 30 or higher; corpulent. Ref: <i>Stedman's Medical Dictionary</i> .	Vocabulary: { SNOMED CT: <u>414915002 obese (finding)</u> }

Attribute	Notes	Constraints and tags
<b>underweight</b>	A ratio of height-to-weight circumference that is below an acceptable range for healthy people. <i>Ref: Stedman's Medical Dictionary.</i>	Vocabulary: { SNOMED CT: <u>248342006 underweight (finding)</u> }

## Hydration Status

Type: **Class** **Nutritional Status**

The relative hydration or dehydration of the patient

### Attributes

Attribute	Notes	Constraints and tags
<b>hydration status</b> Enumeration	The patient's hydration status. This reflects the patient's general hydration status as observed upon examination; it does not articulate individual criteria such as turgor, moistness of mucous membranes, and so forth.	Vocabulary: { SNOMED CT: <u>405006006 hydration status (observable entity)</u> } Vocabulary: { LOINC: <u>Digestion-hydration.status:Find:Pt:Patient:Ord:Observed.OMAHA (28271-5)</u> }

## Hydration Status

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>dehydrated</b>		Vocabulary: { SNOMED CT: <u>162685008 on examination - dehydrated (disorder)</u> }

Attribute	Notes	Constraints and tags
<b>not dehydrated (normal)</b>		Vocabulary: { SNOMED CT: 312450001 on examination - not dehydrated (finding) }
<b>severely dehydrated</b>		Vocabulary: { SNOMED CT: 162685008   On examination - dehydrated (disorder)   362981000   qualifier value   24484000 Severe (severity modifier) (qualifier value) }

### Observation Process

Type: **Package**

### **Observation Metadata** - (Logical diagram)

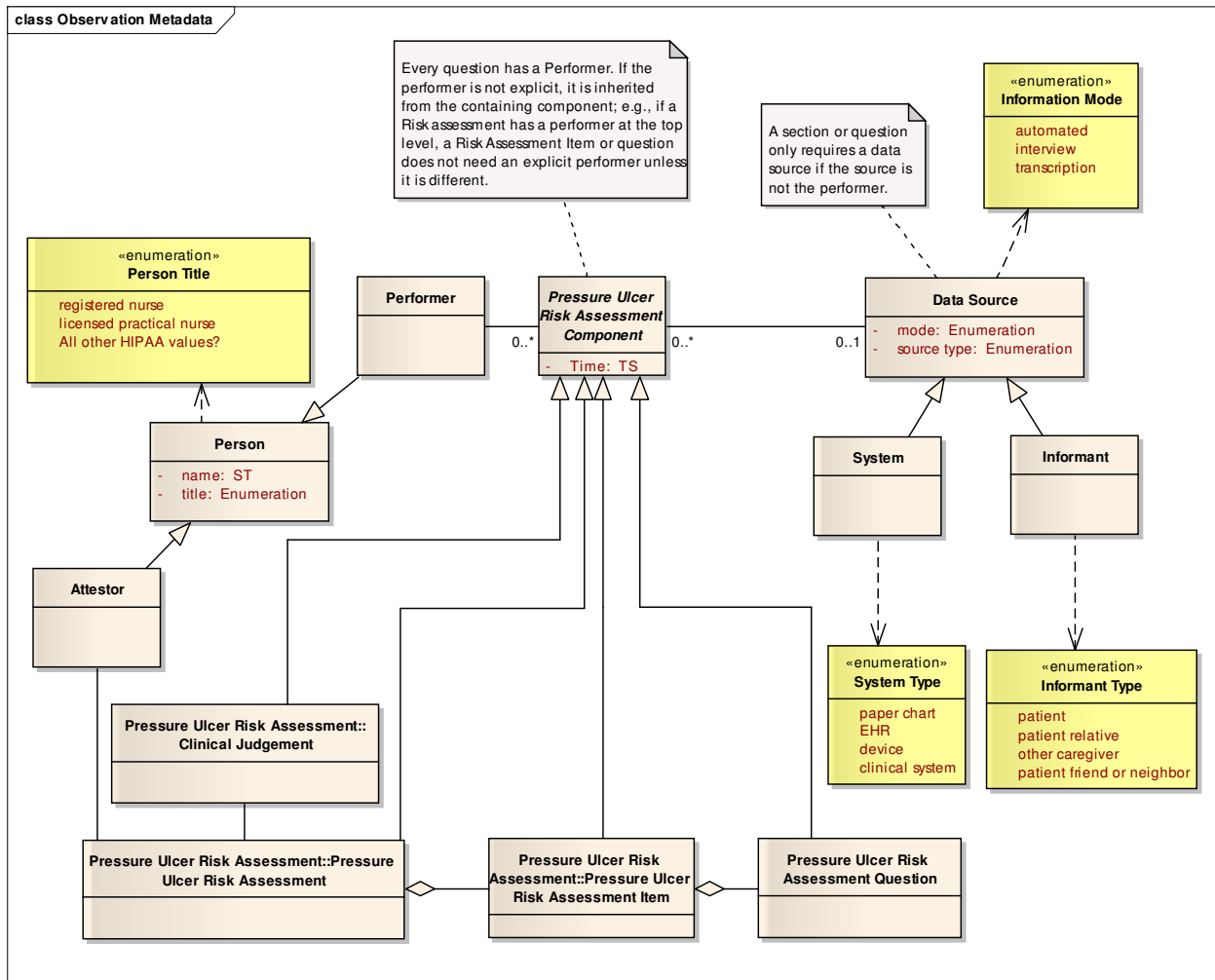


Figure: 21

### Attestor

Type: Class **Person**

A clinician who is qualified to attest that information is recorded correctly

### Data Source

Type: Class

The source of information recorded in the assessment, if not the direct observation of the performer

### Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>mode</b> Enumeration	The manner in which information was collected	
<b>source type</b> Enumeration	The kind of information source	

## Informant

Type: **Class** **Data Source**

A person who provides information for the assessment

## Informant Type

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>patient</b>	The patient as reporter of patient condition	
<b>patient relative</b>	A relative of the patient as reporter of patient condition	

Attribute	Notes	Constraints and tags
<b>other caregiver</b>	A caregiver -- provider or other person employed to provide care -- as reporter of patient condition	
<b>patient friend or neighbor</b>	An unrelated associate of the patient as reporter of patient condition	

### Information Mode

Type: **Enumeration**

#### Attributes

Attribute	Notes	Constraints and tags
<b>automated</b>	Information is provided via automatic electronic interface	
<b>interview</b>	Information is provided by a person	
<b>transcription</b>	Information is copied manually from a source system	



**Performer***Type:* **Class** **Person**

A clinician performing clinical tasks, e.g., observations or procedures

**Person***Type:* **Class**

A human being

**Attributes**

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>name</b> ST	The name of the person	
<b>title</b> Enumeration	For licensed clinicians, the practicing title	

**Person Title***Type:* **Enumeration**

The official title or credential of the assessment observation performer or recorder (per HIPAA Provider Taxonomy)

**Attributes**

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>registered nurse</b>		

Attribute	Notes	Constraints and tags
<b>licensed practical nurse</b>		
<b>All other HIPAA values?</b>		

### Pressure Ulcer Risk Assessment Component

Type: **Class**

An abstract class that attaches a performer to the assessment, assessment item, or question

#### Attributes

Attribute	Notes	Constraints and tags
<b>Time TS</b>	The time the observation was recorded by the assessment performer, for direct observations [for charts, original time or transcription time?]	

### Pressure Ulcer Risk Assessment Question

Type: **Class Pressure Ulcer Risk Assessment Component**

A question intended to help assess a patient's risk of developing a pressure ulcer

## System

Type: **Class** **Data Source**

An inanimate scheme for recording and viewing information

## System Type

Type: **Enumeration**

### Attributes

Attribute	Notes	Constraints and tags
<b>paper chart</b>	A patient record written on paper or other legible physical medium	
<b>EHR</b>	A software system storing comprehensive clinical information	
<b>device</b>	An artifact designed to make automatic observations about the patient	
<b>clinical system</b>	A software system storing clinical information	

Pressure Ulcer Risk Assessment Instrument

Type: Package

**Pressure Ulcer Risk Assessment Instrument Detail - (Logical diagram)**

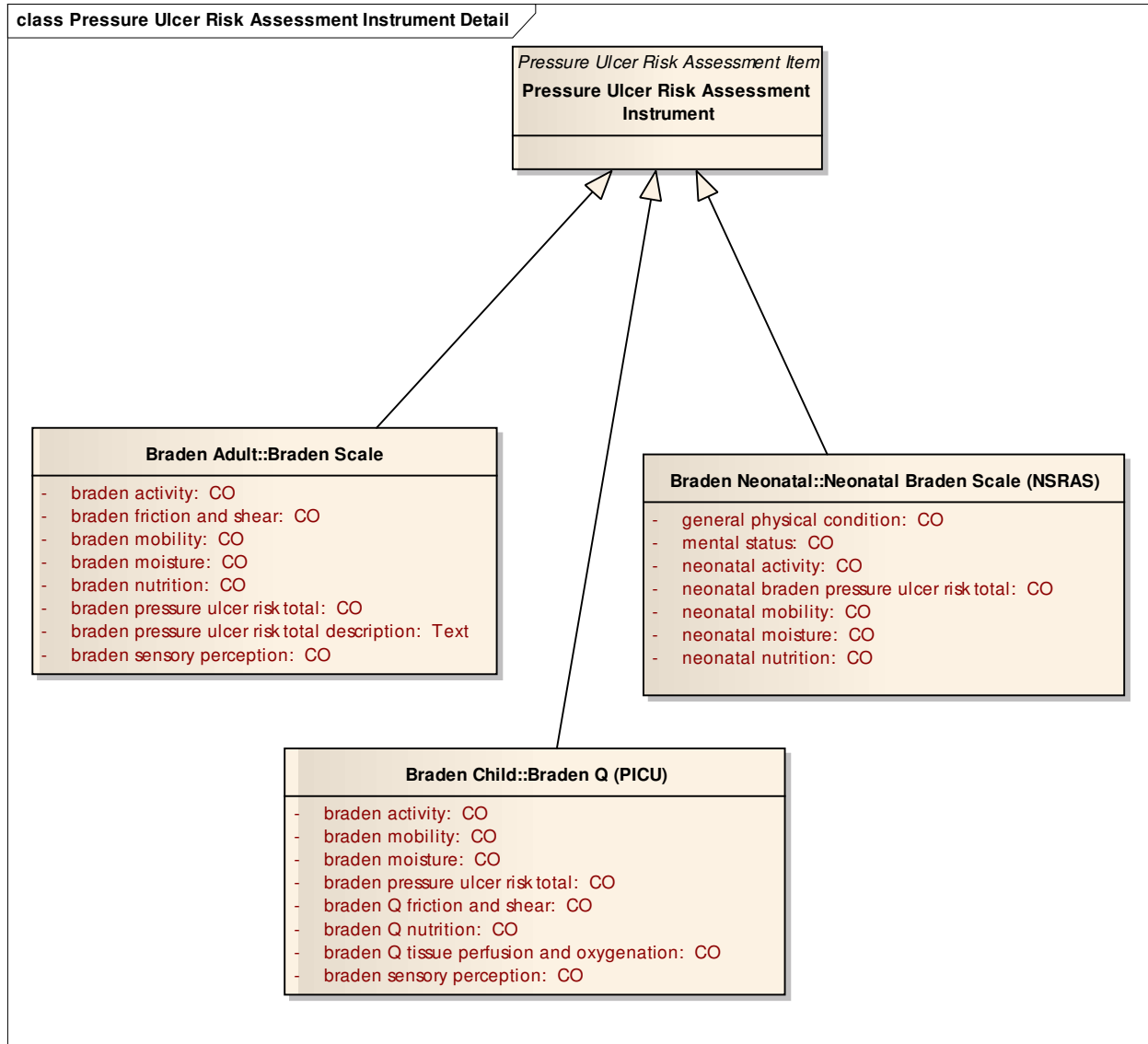


Figure: 22

**Pressure Ulcer Risk Assessment Instrument**

Type: Class Pressure Ulcer Risk Assessment Item

A set of questions used to assess a clinical concept

## Braden Scale

Type: **Package**

The Braden Scale is a standardized instrument to assess the risk of pressure ulcers. There are three types of scales that are described in this document. The scales have been adapted to patients who are at different types of functioning.

1. The Adult scale is used for patients who are at least 5 years old and are able to answer questions cognitively.
2. The Child scale is used for patients between the ages of x and 5 years old.
3. The Neonatal scale is used for patients less than x.

## Braden Sensory Perception

Type: **Enumeration**

### Constraints

- LOINC: Sensory perception:Finding:Point in time:Skin:Ordinal:Observed.Braden scale [38222-6]: (*Vocabulary*)

### Attributes

Attribute	Notes	Constraints and tags
<b>Completely Limited</b>	Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation. OR limited ability to feel pain over most of body Source: Braden & Berstrom	1 Vocabulary: { LOINC: LA9603-7 } }
<b>Very Limited</b>	Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness. OR has a sensory impairment which limits the ability to feel pain or discomfort over 1/2 of body. Source: Braden & Bergstrom	2
<b>Slightly Limited</b>	Responds to verbal commands, but cannot always communicate discomfort or the need to be turned. OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities. Source: Braden & Bergstrom	3 Vocabulary: { LOINC: LA9605-2 } }

Attribute	Notes	Constraints and tags
<b>No Impairment</b>	Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort. Source: Braden & Bergstrom	4 <u>Vocabulary: { LOINC: LA9606-0 }</u>

## Braden Moisture

Type: **Enumeration**

### Constraints

- LOINC: Moisture exposure:Finding:Point in time:Skin:Ordinal:Observed.Braden scale [38229-1]: (*Vocabulary*)

### Attributes

Attribute	Notes	Constraints and tags
<b>Constantly Moist</b>	Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned. Source: Braden & Bergstrom	1
<b>Very Moist</b>	Skin is often, but not always moist. Linen must be changed at least once a shift. Source: Braden & Bergstrom	2 <u>Vocabulary: { LOINC: LA9608-6 }</u>
<b>Occasionally Moist</b>	Skin is occasionally moist, requiring an extra linen change approximately once a day. Source: Braden & Bergstrom	3 <u>Vocabulary: { LOINC: LA9609-4 }</u>

Attribute	Notes	Constraints and tags
<b>Rarely Moist</b>	Skin is usually dry, linen only requires changing at routine intervals. Source: Braden & Bergstrom	4 Vocabulary: { LOINC: LA9610-2 } }

## Braden Activity

Type: **Enumeration**

### Constraints

- LOINC: Physical activity:Finding:Point intime:^Patient:Ordinal:Observed.Braden scale [38223-4]: (Vocabulary)

### Attributes

Attribute	Notes	Constraints and tags
<b>Bedfast</b>	Confined to bed. Source: Braden & Bergstrom	1 Vocabulary: { LOINC: LA6742-6 } }
<b>Chairfast</b>	Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair. Source: Braden & Bergstrom	2 Vocabulary: { LOINC: LA9611-0 } }
<b>Walks Occasionally</b>	Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair. Source: Braden & Bergstrom	3 Vocabulary: { LOINC: LA9612-8 } }

Attribute	Notes	Constraints and tags
<b>Walks Frequently</b>	Walks outside room at least twice a day and inside room at least once every two hours during waking hours. Source: Braden & Bergstrom	4 Vocabulary: { LOINC: LA9613-6 }

## Braden Mobility

Type: **Enumeration**

### Constraints

- LOINC: Physical mobility:Finding:Point intime:^Patient:Ordinal:Observed.Braden scale [38224-2]: (*Vocabulary*)

### Attributes

Attribute	Notes	Constraints and tags
<b>Completely Immobile</b>	Does not make even slight changes in body or extremity position without assistance. Source: Braden & Bergstrom	1 Vocabulary: { LOINC: LA9614-4 }
<b>Very Limited</b>	Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently. Source: Braden & Bergstrom	2 Vocabulary: { LOINC: LA9604-5 }
<b>Slightly Limited</b>	Makes frequent though slight changes in body or extremity position independently. Source: Braden & Bergstrom	3 Vocabulary: { LOINC: LA9605-2 }



Attribute	Notes	Constraints and tags
<b>No Limitation</b>	Makes major and frequent changes in position without assistance. Source: Braden & Bergstrom	4 Vocabulary: { LOINC: LA120-8 }

### Braden Adult

Type: Package

### Braden Scale - (Logical diagram)

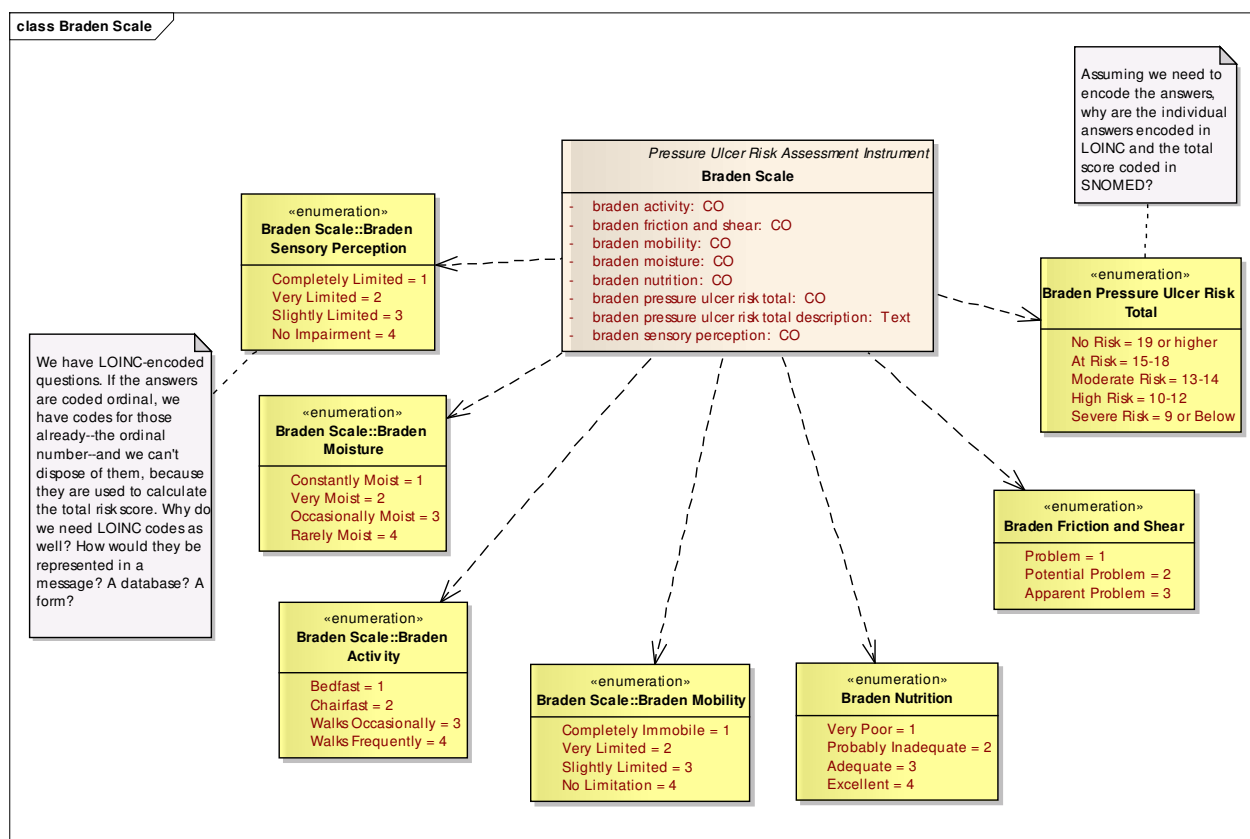


Figure: 23

### Braden Scale

Type: Class Pressure Ulcer Risk Assessment Instrument

Braden Scale for Predicting Pressure Sore Risk, aka Adult Braden Scale, Copyright Barbara Braden and Nancy Bergstrom, 1988.

Constraints

- LOINC: (38288-3): (*Vocabulary*)

Attributes

Attribute	Notes	Constraints and tags
<b>braden activity CO</b>	Degree of physical activity Source: Braden & Bergstrom  Notes: The Braden Q Activity subscore is identical to the Adult Braden Score question and responses; therefore the LOINC codes should be valid to use. Source: Braden & Bergstrom; Quigley & Curley	
<b>braden friction and shear CO</b>	Friction occurs when skin moves against support surfaces. Shear occurs when skin and adjacent bony surface slide across one another. Source: Braden & Bergstrom	
<b>braden mobility CO</b>	Ability to change and control body position Source: Braden & Bergstrom  Notes: The Braden Q Mobility subscore is identical to the Adult Braden Score question and responses; therefore the LOINC codes should be valid to use. Source: Braden & Bergstrom; Quigley & Curley	
<b>braden moisture CO</b>	Degree to which skin is exposed to moisture Source: Braden & Bergstrom  Notes: The Braden Q Moisture subscore is identical to the Adult Braden Score question and responses; therefore the LOINC codes should be valid to use.	

Attribute	Notes	Constraints and tags
	Source: Braden & Bergstrom; Quigley & Curley	
<b>braden nutrition CO</b>	Usual food intake pattern. Source: Braden & Bergstrom	
<b>braden pressure ulcer risk total CO</b>	Total score based upon addition of all sub-scores that determines the patient's overall risk for developing a pressure ulcer. Source: Braden & Bergstrom	
<b>braden pressure ulcer risk total description Text</b>		
<b>braden sensory perception CO</b>	Ability to respond meaningfully to pressure-related discomfort Source: Braden & Bergstrom  Note: [Braden Q] is the same as the Adult Braden Scale sub-scale except for the addition of "in a developmentally appropriate way" to the question. For this reason, the LOINC codes should still be valid to use. Source: Quigley & Curley	

**Braden Nutrition**Type: **Enumeration****Constraints**

- LOINC: Nutrition intake pattern:Finding:Point in time:^Patient:Ordinal:Observed.Braden scale [38225-9]: (*Vocabulary*)

**Attributes**

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>Very Poor</b>	Never eats a complete meal. Rarely eats more than a of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement. OR is NPO and/or maintained on clear liquids or IV's for more than 5 days. Source: Braden & Bergstrom	1 Vocabulary: { LOINC: LA9615-1 } }
<b>Probably Inadequate</b>	Rarely eats a complete meal and generally eats only about 2 of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement. OR receives less than optimum amount of liquid diet or tube feeding. Source: Braden & Bergstrom	2 Vocabulary: { LOINC: LA9616-9 } }
<b>Adequate</b>	Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products per day. Occasionally will refuse a meal, but will usually take a supplement when offered. OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs. Source: Braden & Bergstrom	3 Vocabulary: { LOINC: LA8913-1 } }
<b>Excellent</b>	Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation. Source: Braden & Bergstrom	4 Vocabulary: { LOINC: LA9206-9 } }

*Braden Friction and Shear*

Type: **Enumeration**

Constraints

- LOINC: Friction & sheer:Finding:Point in time:Skin:Ordinal:Observed.Braden scale [38226-7]: (*Vocabulary*)

Attributes

Attribute	Notes	Constraints and tags
<b>Problem</b>	Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation leads to almost constant friction. Source: Braden & Bergstrom	1 Vocabulary: { LOINC: LA9617-7 } }
<b>Potential Problem</b>	Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down. Source: Braden & Bergstrom	2 Vocabulary: { LOINC: LA9618-5 } }
<b>Apparent Problem</b>	Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair. Source: Braden & Bergstrom	3 Vocabulary: { LOINC: LA9619-3 } }

*Braden Pressure Ulcer Risk Total*

Type: **Enumeration**

Constraints

- LOINC: [38227-5]  
Braden scale score.total:Finding:Point in time:^Patient:Ordinal:Observed.Braden scale

**Constraints**

: (Vocabulary)

**Attributes**

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>No Risk</b>	No risk for developing a pressure ulcer in an adult patient. Source: Bolton, L.	19 or higher Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>At Risk</b>	At risk for developing pressure ulcers and a prevention protocol should be initiated. Source: Ayello & Braden	15-18 Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>Moderate Risk</b>	At moderate risk for developing pressure ulcers and a prevention protocol should be initiated. Source: Ayello & Braden	13-14 Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>High Risk</b>	At high risk for developing pressure ulcers and an aggressive prevention protocol should be initiated. Source: Ayello & Braden	10-12 Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>Severe Risk</b>	At extreme risk for developing pressure ulcers and an aggressive prevention protocol should be initiated. Source: Ayello & Braden	9 or Below Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }

**Braden Child**Type: **Package**

**Braden Child - (Logical diagram)**

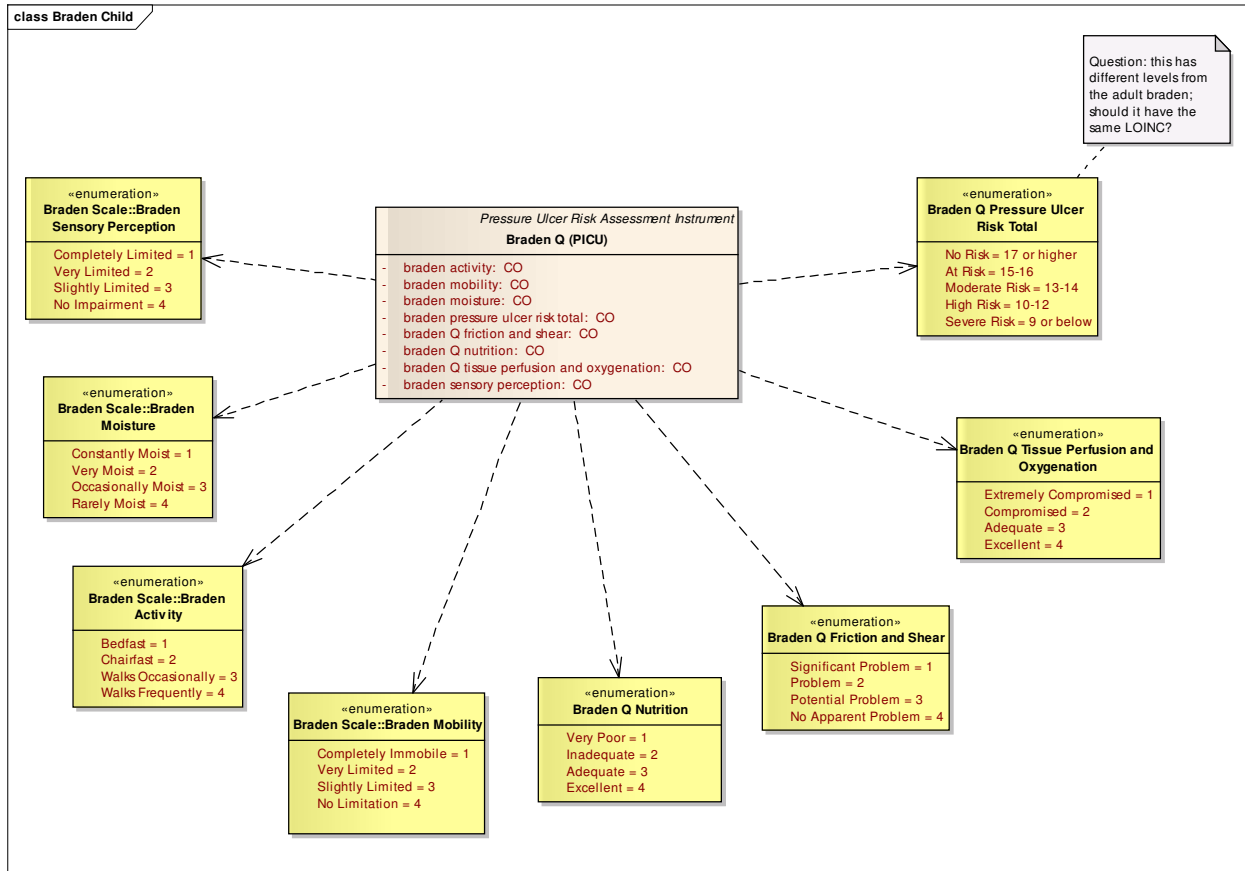


Figure: 24

**Braden Q (PICU)**

Type: **Class Pressure Ulcer Risk Assessment Instrument**

aka Braden Q Scale for children

Patient Age: 21 days to 8 years

Copyright: Nursecom, Inc.

Available online at [www.mc.vanderbilt.edu/learning-center/publist.html](http://www.mc.vanderbilt.edu/learning-center/publist.html)

**Constraints**

- Age range: (Invariant)

The Braden Q Scale was validated in pediatric patients 3 weeks to 8 years of age. The specific age of 21 postnatal days was selected because at 3 weeks of age the skin reaches relative maturity comparable to a full-term infant, regardless of the infant's gestational age at birth (Malloy & PerezWoods, 1991). The selection of 8 years of age reflected conventional norms; specifically, in 1994, the American Heart Association considered

Constraints

patients older than 8 years to be an adult in terms of treatment (Chameides & Hazinski, 1994)

JPN 2011

Using the Braden Q Scale to Predict Pressure Ulcer Risk in

Pediatric Patients, Catherine Noonan RN, MS, CPNP, CWON

a., Sandy Quigley RN, CPNP, CWOCN, b, Martha A.Q. Curley RN, PhD, FAAN c,d

a Department of Nursing, Children's Hospital Boston, MA

b Department of Patient Services, Children's Hospital Boston, MA

c Critical Care and Cardiovascular Program, Children's Hospital Boston, MA

d University of Pennsylvania School of Nursing, Philadelphia, PA

- No codes have been identified in LOINC : (*Vocabulary*)

Attributes

Attribute	Notes	Constraints and tags
<b>braden activity CO</b>	Degree of physical activity	
<b>braden mobility CO</b>	Ability to change and control body position	
<b>braden moisture CO</b>	Degree to which skin is exposed to moisture	
<b>braden pressure ulcer risk total CO</b>	Total score based upon addition of all sub-scores that determines the patient's overall risk for developing a pressure ulcer. Source: Braden & Bergstrom	



Attribute	Notes	Constraints and tags
<b>braden Q friction and shear CO</b>	Friction: Occurs when skin moves against support surfaces Shear: Occurs when skin and adjacent bony surface slide across one another Source: Quigley & Curley	
<b>braden Q nutrition CO</b>	Usual food intake pattern Source: Quigley & Curley	
<b>braden Q tissue perfusion and oxygenation CO</b>	Identifies any compromise in the cardiovascular (tissue perfusion and oxygenation) status that places the patient at higher risk for a pressure ulcer.	
<b>braden sensory perception CO</b>	Ability to respond meaningfully to pressure-related discomfort	

*Braden Q Friction and Shear**Type:*        **Enumeration**Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>Significant Problem</b>	Spasticity, contracture, itching, or agitation leads to almost constant thrashing and friction. Source: Quigley & Curley	1 <u>Vocabulary: { NOT Found in LOINC }</u>
<b>Problem</b>	Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Source: Quigley & Curley	2 <u>Vocabulary: { NOT Found in LOINC }</u>
<b>Potential Problem</b>	Moves freely or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relative good position in chair or bed most of the time but occasionally slides down. Source: Quigley & Curley	3 <u>Vocabulary: { NOT Found in LOINC }</u>
<b>No Apparent Problem</b>	Able to completely lift patient during position change, moves in bed and in chair independently and has sufficient muscle strength to life up completely during move. Maintains good position in bed or chair at all times. Source: Quigley & Curley	4 <u>Vocabulary: { NOT Found in LOINC }</u>

*Braden Q Nutrition*

Type: **Enumeration**

Constraints

- NOT Found in LOINC: (*Vocabulary*)

Attributes

Attribute	Notes	Constraints and tags
-----------	-------	----------------------

Attribute	Notes	Constraints and tags
<b>Very Poor</b>	NPO/or maintained on clear liquids, or IVs for more than 5 days OR albumin < 2.5 mg/dl OR never eats a complete meal. Rarely eats more than half of any food offered. Protein intake includes only 2 servings of meat or dairy products per day. Takes fluids poorly. Does not take a liquid dietary supplement. Source: Quigley & Curley	1 <u>Vocabulary: { NOT Found in LOINC }</u>
<b>Inadequate</b>	Is on liquid diet or tube feedings/TPN, which provides inadequate calories and minerals for age OR albumin < 3 mg/dl OR rarely eats a complete meal and generally eats only about half of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement. Source: Quigley & Curley	2 <u>Vocabulary: { NOT Found in LOINC }</u>
<b>Adequate</b>	Is on tube feedings or TPN, which provide adequate calories and minerals for age OR eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered. Source: Quigley & Curley	3 <u>Vocabulary: { NOT Found in LOINC }</u>
<b>Excellent</b>	Is on a normal diet providing adequate calories for age. For example, eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation. Source: Quigley & Curley	4 <u>Vocabulary: { NOT Found in LOINC }</u>

*Braden Q Pressure Ulcer Risk Total*Type: **Enumeration****Constraints**

**Constraints**

- LOINC: [38227-5]  
Braden scale score.total:Finding:Point in time:^Patient:Ordinal:Observed.Braden scale : (Vocabulary)

**Attributes**

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>No Risk</b>	No risk for developing a pressure ulcer in an adult patient. Source: Bolton, L.	17 or higher Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>At Risk</b>	At risk for developing pressure ulcers and a prevention protocol should be initiated. Source: Ayello & Braden	15-16 Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>Moderate Risk</b>	At moderate risk for developing pressure ulcers and a prevention protocol should be initiated. Source: Ayello & Braden	13-14 Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>High Risk</b>	At high risk for developing pressure ulcers and an aggressive prevention protocol should be initiated. Source: Ayello & Braden	10-12 Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }
<b>Severe Risk</b>	At extreme risk for developing pressure ulcers and an aggressive prevention protocol should be initiated. Source: Ayello & Braden	9 or below Vocabulary: { SNOMED CT: 278111002 Scale-rank (attribute) }

**Braden Q Tissue Perfusion and Oxygenation**

Type: **Enumeration**

**Constraints**

- NOT Found in LOINC: (*Vocabulary*)

**Attributes**

Attribute	Notes	Constraints and tags
<b>Extremely Compromised</b>	Hypotensive (MAP < 50 mm Hg; < 40 in a newborn) or the patient does not physiologically tolerate position changes. Source: Quigley & Curley	1 <u>Vocabulary: { Not found in LOINC }</u>
<b>Compromised</b>	Normotensive oxygen saturation may be < 95%; hemoglobin may be < 10 mg/dl; capillary refill may be > 2 seconds; serum pH is < 7.40. Source: Quigley & Curley	2 <u>Vocabulary: { Not found in LOINC }</u>
<b>Adequate</b>	Normotensive oxygen saturation may be < 95%; hemoglobin may be < 10 mg/dl; capillary refill may be 2 seconds; serum pH is normal. Source: Quigley & Curley	3 <u>Vocabulary: { Not found in LOINC }</u>
<b>Excellent</b>	Normotensive, oxygen saturation > 95%; normal hgb; capillary refill < 2 seconds. Source: Quigley & Curley	4 <u>Vocabulary: { Not found in LOINC }</u>

**Braden Neonatal**

Type: **Package**

**Braden Neonatal** - (*Logical diagram*)

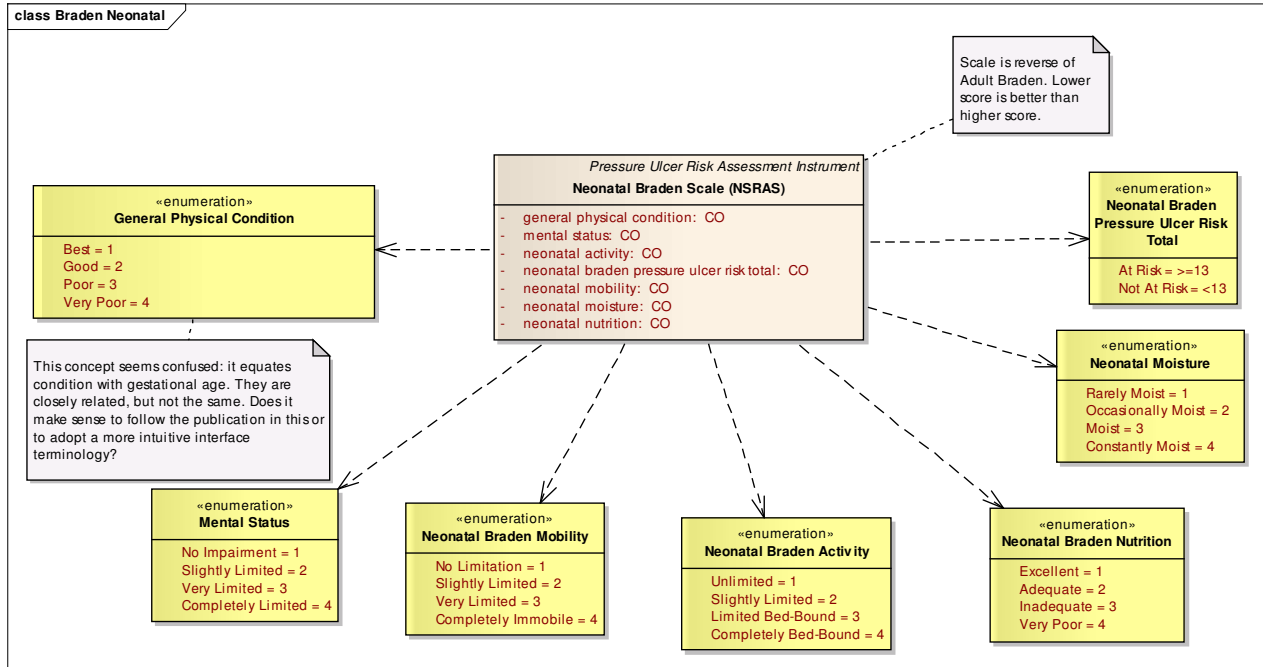


Figure: 25

Neonatal Braden Scale (NSRAS)

Type: **Class Pressure Ulcer Risk Assessment Instrument**

Neonatal Skin Risk Assessment Scale (NSRAS), an instrument to assess neonates at risk for skin breakdown, based on the Braden Scale for Predicting Pressure Sore Risk in adults.

(Source: The Neonatal Skin Risk Assessment Scale for Predicting Skin Breakdown in Neonates” Issues in Comprehensive Pediatric Nursing Volume 20 Issue 2, 1997 <http://www.ncbi.nlm.nih.gov/pubmed/9423386>)

Constraints

- Age Range: (Invariant)  
This scale is appropriate for neonatal patients, i.e., patient age is less than 21 days (confirm number)

Attributes

Attribute	Notes	Constraints and tags
general physical condition CO	Code for gestational age The barrier properties of the skin are dependent upon both gestational and chronological ages; therefore the infant's age is taken into consideration in calculation the overall risk for breakdown. Source: Huffines & Logsdon	

Attribute	Notes	Constraints and tags
<b>mental status</b> CO	Code for responsiveness An evaluation of the mental status or sensory perception of the infant. Source: Huffines & Logsdon	
<b>neonatal activity</b> CO	The amount of physical activity of the infant. Source: Huffines & Logsdon	
<b>neonatal braden pressure ulcer risk total</b> CO	The total score for identifying if a patient is at risk for pressure ulcers. Source: Huffines & Logsdon	
<b>neonatal mobility</b> CO	The infant's ability to change and control body position. Source: Huffines & Logsdon	
<b>neonatal moisture</b> CO	Code for skin moisture	
<b>neonatal nutrition</b> CO	The usual food intake of the infant. Source: Huffines & Logsdon	

Attribute	Notes	Constraints and tags

### General Physical Condition

Type: **Enumeration**

#### Constraints

- Not found in LOINC: (*Vocabulary*)

#### Attributes

Attribute	Notes	Constraints and tags
<b>Best</b>	Gestational Age > 38 Weeks To Postterm	1 <u>Vocabulary: { Not found in LOINC }</u>
<b>Good</b>	Gestational Age > 33 Weeks But < 38 weeks	2 <u>Vocabulary: { Not found in LOINC }</u>
<b>Poor</b>	Gestational Age > 28 Weeks But < 33 weeks	3 <u>Vocabulary: { Not found in LOINC }</u>
<b>Very Poor</b>	Gestational Age < 28 Weeks	4 <u>Vocabulary: { Not found in LOINC }</u>



Attribute	Notes	Constraints and tags

### Mental Status

Type: **Enumeration**

#### Constraints

- Not found in LOINC: (*Vocabulary*)

#### Attributes

Attribute	Notes	Constraints and tags
<b>No Impairment</b>	Alert and active. Source: Huffines & Logsdon	1 Vocabulary: { <u>Not found in LOINC</u> }
<b>Slightly Limited</b>	Lethargic. Source: Huffines & Logsdon	2 Vocabulary: { <u>Not found in LOINC</u> }
<b>Very Limited</b>	Responds only to painful stimuli (flinches, grasps, moans, increased blood pressure or heart rate). Source: Huffines & Logsdon	3 Vocabulary: { <u>Not found in LOINC</u> }

Attribute	Notes	Constraints and tags
<b>Completely Limited</b>	Unresponsive (does not flinch, grasp, moan, increase blood pressure, or heart rate) to painful stimuli due to diminished level of consciousness or sedation. Source: Huffines & Logsdon	4 Vocabulary: { <u>Not found in LOINC</u> }

### Neonatal Braden Mobility

Type: **Enumeration**

#### Constraints

- Not found in LOINC: (*Vocabulary*)

#### Attributes

Attribute	Notes	Constraints and tags
<b>No Limitation</b>	Makes frequent though slight changes in body or extremity position independently (e.g., turn head). Source: Huffines & Logsdon	1 Vocabulary: { <u>Not found in LOINC</u> }
<b>Slightly Limited</b>	Makes frequent though slight changes in body or extremity position independently. Source: Huffines & Logsdon	2 Vocabulary: { <u>Not found in LOINC</u> }
<b>Very Limited</b>	Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently. Source: Huffines & Logsdon	3 Vocabulary: { <u>Not found in LOINC</u> }

Attribute	Notes	Constraints and tags
<b>Completely Immobile</b>	Does not make even slight changes in body or extremity position without assistance (e.g., Pavulon). Source: Huffines & Logsdon	4 <u>Vocabulary: { Not found in LOINC }</u>

### Neonatal Braden Activity

Type: **Enumeration**

#### Constraints

- Not found in LOINC: (*Vocabulary*)

#### Attributes

Attribute	Notes	Constraints and tags
<b>Unlimited</b>	In an open crib. Source: Huffines & Logsdon	1 <u>Vocabulary: { Not found in LOINC }</u>
<b>Slightly Limited</b>	In a double walled isolette. Source: Huffines & Logsdon	2 <u>Vocabulary: { Not found in LOINC }</u>
<b>Limited Bed-Bound</b>	In a radiant warmer without a clear plastic “saran” tent. Source: Huffines & Logsdon	3 <u>Vocabulary: { Not found in LOINC }</u>

Attribute	Notes	Constraints and tags
<b>Completely Bed-Bound</b>	In a radiant warmer with a clear plastic “saran” tent. Source: Huffines & Logsdon	4 <u>Vocabulary: { Not found in LOINC }</u>

### Neonatal Braden Nutrition

Type: **Enumeration**

#### Constraints

- Not found in LOINC: (*Vocabulary*)

#### Attributes

Attribute	Notes	Constraints and tags
<b>Excellent</b>	Bottle/breastfeeds every meal which meets nutritional needs for growth. Source: Huffines & Logsdon	1 <u>Vocabulary: { Not found in LOINC }</u>
<b>Adequate</b>	Is on tube feedings which meet nutritional needs for growth. Source: Huffines & Logsdon	2 <u>Vocabulary: { Not found in LOINC }</u>
<b>Inadequate</b>	Receives less than optimum amount of liquid diet for growth (formula/ breast milk) and supplemented with intravenous fluids. Source: Huffines & Logsdon	3 <u>Vocabulary: { Not found in LOINC }</u>

Attribute	Notes	Constraints and tags
<b>Very Poor</b>	NPO on intravenous fluids. Source: Huffines & Logsdon	4 <u>Vocabulary: { Not found in LOINC</u> }

*Neonatal Moisture**Type:* **Enumeration**Attributes

Attribute	Notes	Constraints and tags
<b>Rarely Moist</b>	Skin is usually dry, linen requires changing only every 24 hours. Source: Huffines & Logsdon	1 <u>Vocabulary: { Not found in LOINC</u> }
<b>Occasionally Moist</b>	Skin is occasionally moist/damp. Requiring an extra linen change approximately once a day. Source: Huffines & Logsdon	2 <u>Vocabulary: { Not found in LOINC</u> }
<b>Moist</b>	Skin is often but not always moist/damp; linen must be changed at least once a shift. Source: Huffines & Logsdon	3 <u>Vocabulary: { Not found in LOINC</u> }
<b>Constantly Moist</b>	Skin is moist/damp every time infant is moved or turned. Source: Huffines & Logsdon	4 <u>Vocabulary: { Not found in LOINC</u> }

**Neonatal Braden Pressure Ulcer Risk Total***Type:*        **Enumeration****Constraints**

- Not found in LOINC: (*Vocabulary*)

**Attributes**

<b>Attribute</b>	<b>Notes</b>	<b>Constraints and tags</b>
<b>At Risk</b>	Infants that are at risk of developing a pressure ulcer. Source: Huffines & Logsdon	>=13 Vocabulary: { <u>Not found in LOINC</u> }
<b>Not At Risk</b>	Infants that are not at risk of developing a pressure ulcer. Source: Huffines & Logsdon	<13 Vocabulary: { <u>Not found in LOINC</u> }

**Skin Inspection***Type:*        **Package****Skin Inspection Detail** - (*Logical diagram*)

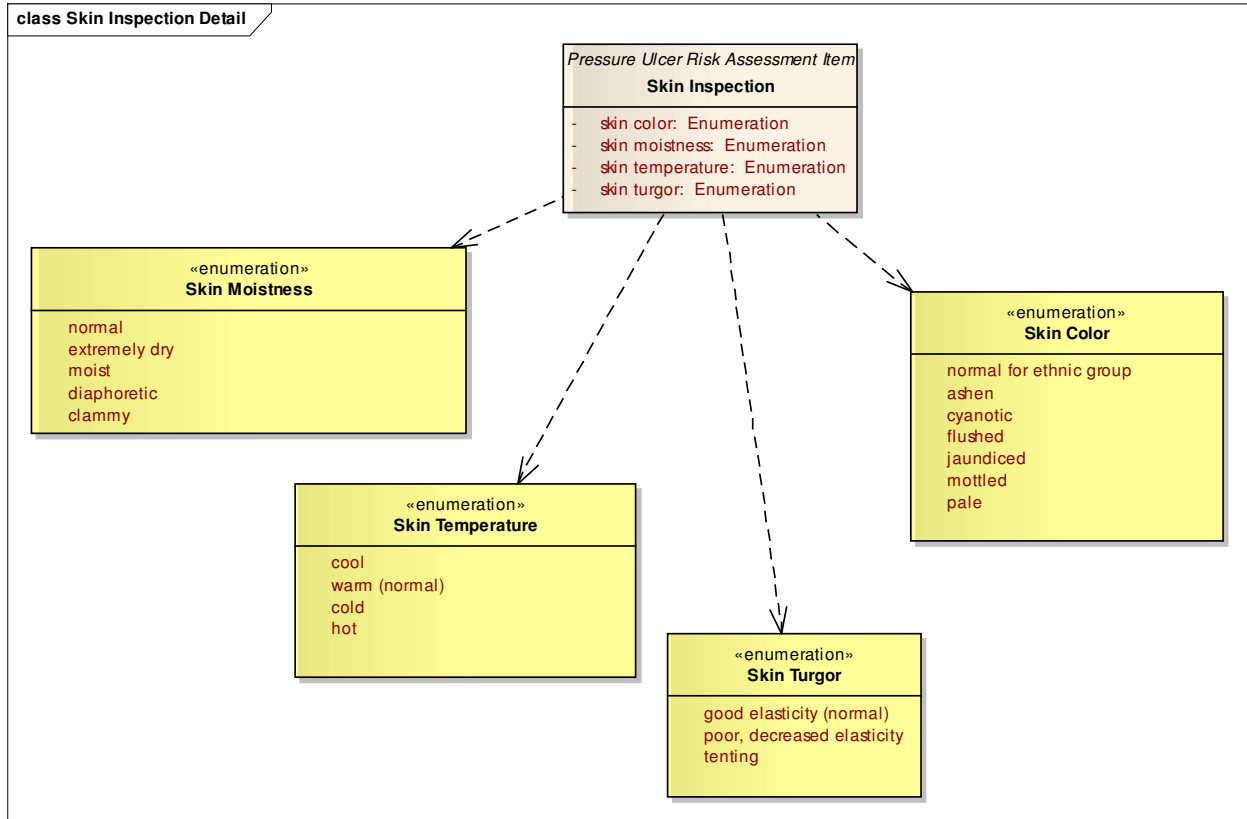


Figure: 26

### Skin Inspection

Type: **Class** Pressure Ulcer Risk Assessment Item

A holistic evaluation of the patient's systemic skin condition

#### Attributes

Attribute	Notes	Constraints and tags
<b>skin color</b> Enumeration	A holistic evaluation of the color of the patient's skin adjusted for ethnicity, used as an indicator of systemic problems	Vocabulary: { <u>LOINC: Color (39107-8)</u> } Vocabulary: { <u>SNOMED CT: color of skin (observable entity) (364533002)</u> }

Attribute	Notes	Constraints and tags
<b>skin moistness</b> Enumeration	A holistic evaluation of the moisture level of the patient's skin, used as an indicator of systemic problems	Vocabulary: { <u>LOINC: Moisture Status (39129-2)</u> } Vocabulary: { <u>SNOMED CT: moistness of skin (observable entity) (364532007)</u> }
<b>skin temperature</b> Enumeration	A holistic evaluation of the surface temperature of the patient's skin	Vocabulary: { <u>LOINC: Temperature (44968-6)</u> } Vocabulary: { <u>SNOMED CT: temperature of skin (observable entity) (364537001)</u> }
<b>skin turgor</b> Enumeration	The skin's ability to change shape and return to normal (elasticity). (Source: MedlinePlus)	Vocabulary: { <u>LOINC: Turgor (39109-4)</u> } Vocabulary: { <u>SNOMED CT: skin turgor (observable entity) (26669000)</u> }

## Skin Color

Type: **Enumeration**

### Constraints

- LOINC: Color (39107-8): (*Vocabulary*)
- SNOMED CT: color of skin (observable entity) (364533002): (*Vocabulary*)

### Attributes

Attribute	Notes	Constraints and tags
<b>normal for ethnic group</b>	Normally, the skin is a uniform whitish-pink or brown color, depending upon the patient's race. This normal finding indicates that the color of the patient's skin is normal or natural for ethnic group. ( <i>Ref: Zator Estes</i> ) or	Vocabulary: { <u>SNOMED CT: skin normal color (finding) (297952003)</u> }  [Comment = If charting by exception, this selection means normal for baseline;



Attribute	Notes	Constraints and tags
	<p>This normal finding indicates that the color of the patient's skin is normal or natural for ethnic group. (Ref: Zator Estes)</p>	<p>variation in ethnic groups; pigmentation (color and pigmentation = appropriate for race). ]</p>
<b>ashen</b>	<p>A grayish cast to the skin is abnormal. A grayish cast may be associated with chronic anemia. (Ref: Zator Estes)</p>	<p>Vocabulary: { SNOMED CT: <u>skin color poor (finding) (304232002)</u> }</p> <p>[Comment = Note: Dusky may be a synonym for ashen. ]</p>
<b>cyanotic</b>	<p>Cyanosis is a dusky blue appearance of the fingers, lips or mucous membranes, and is abnormal in both light-and dark-skinned individuals. Cyanosis occurs when there is greater than 5 g/dL of deoxygenated hemoglobin in the blood. The earlobes, lower eyelids, lips, oral mucosa, nail beds, and palmar and plantar surfaces may be especially cyanotic. Dark-skinned individuals have an ashen-gray to pale tint, and the lips and tongue are good indicators of cyanosis. (Ref: Zator Estes)</p>	<p>Vocabulary: { SNOMED CT: <u>cyanosis of skin (finding) (119419001)</u> }</p> <p>[Comment = This term often describes an underlying cardiovascular or perfusion problem vs. an integumentary system problem, however, it does also describe a skin color. ]</p>
<b>flushed</b>	<p>Sustained bright red or pink coloration in light-skinned individuals is abnormal. Dark-skinned individuals may have no underlying change in coloration. This may occur because of dilated superficial blood vessels, increased blood flow, febrile states, local inflammatory conditions, or excessive alcohol intake. (Ref: Zator Estes)</p>	<p>Vocabulary: { SNOMED CT: <u>flushed complexion (finding) (248213001)</u> }</p>
<b>jaundiced</b>	<p>Jaundice is a yellow-green to orange cast or coloration of the skin, sclera, mucous membranes, fingernails, and palmar or plantar surfaces in the light-skinned and may appear as yellow staining in the sclera, hard palate, and palmar or plantar surfaces in dark-skinned individuals. Jaundice is caused</p>	<p>Vocabulary: { SNOMED CT: <u>jaundice (finding) (18165001)</u> }</p>

Attribute	Notes	Constraints and tags
	<p>by an increased serum bilirubin level of greater than 2 mg/dL associated with liver disease or hemolytic disease. This is an abnormal finding. (Ref: Zator Estes)</p>	
<b>mottled</b>	<p>Patchy areas of white and darker pigmentation on the skin is abnormal. (Ref: Zator Estes)</p>	<p>Vocabulary: { SNOMED CT: <u>mottling of skin (finding)</u> (406128001) }</p> <p>[Comment = This term often describes an underlying cardiovascular or perfusion problem vs. an integumentary system problem, however, it does describe a skin color. ]</p>
<b>pale</b>	<p>A pale cast to the skin that may be most evident in the face, mucous membranes, lips and nail beds is abnormal in light-skinned individuals. A yellowish-brown to ashen-gray cast to the skin along with pale or gray lips, mucous membranes, and nail beds is abnormal in dark-skinned individuals. Pallor is due to decreased visibility of the normal oxyhemoglobin. This can occur when the patient has decreased blood flow in the superficial vessels, as in shock or syncope, or when there is a decreased amount of serum oxyhemoglobin, as in anemia. (Ref: Zator Estes)</p>	<p>Vocabulary: { SNOMED CT: <u>pale - symptom (finding)</u> (267029006) }</p>

**Skin Moistness**

Type: Enumeration

Constraints

- LOINC: Moisture Status (39129-2): (Vocabulary)

Constraints

- SNOMED CT: moistness of skin (observable entity) (364532007): (*Vocabulary*)

Attributes

Attribute	Notes	Constraints and tags
<b>normal</b>	Normally the skin is dry with a minimum of perspiration. Normal perspiration is most likely to occur on the hands, axilla, face, and in between the skin folds. ( <i>Ref: Zator Estes</i> )	Vocabulary: { SNOMED CT: skin appearance normal (finding) (225544001) }  [Comment = If charting by exception, this is the normal finding. ]
<b>extremely dry</b>	Excessive dryness of the skin, xerosis, as evidenced by flaking of the stratum corneum and associated pruritis. This is an abnormal finding. Hypothyroidism and exposure to extreme cold and dry climates can lead to xerosis. ( <i>Ref: Zator Estes</i> )	Vocabulary: { SNOMED CT: no code identified }  [Comment = Patchy dryness is described as a localized condition; this choice describes general extreme dryness. ]
<b>moist</b>	Presence of water in trace amounts. ( <i>Ref: Zator Estes</i> )	Vocabulary: { SNOMED CT: moist skin (finding) (16514006) }
<b>diaphoretic</b>	Diaphoresis is the profuse production of perspiration. This is an abnormal finding. Causes may include hyperthyroidism, increased metabolic rate, sepsis, anxiety or pain. ( <i>Ref: Zator Estes</i> )	Vocabulary: { SNOMED CT: excessive sweating (finding) (52613005) }
<b>clammy</b>	Clammy is defined as moist, cool and pale skin. This is an abnormal finding. Causes may include shock, stress, anxiety, sepsis, hypoglycemia and heat exhaustion, among others. "moist, cool, and sticky to the touch". ( <i>Ref: Zator Estes</i> )	Vocabulary: { SNOMED CT: no code identified }

## Skin Temperature

Type: **Enumeration**

### Constraints

- LOINC: Temperature (44968-6): (*Vocabulary*)
- SNOMED CT: temperature of skin (observable entity) (364537001): (*Vocabulary*)

### Attributes

Attribute	Notes	Constraints and tags
<b>cool</b>	Skin that is cool to the touch is abnormal and may be generalized or localized. It can be indicative an early sign of shock or some other circulatory dysfunction. Localized hypothermia is indicative of arterial insufficiency in the affected area. ( <i>Ref: Zator Estes</i> )	<u>Vocabulary: { SNOMED CT: cool skin (finding) (427733005) }</u>
<b>warm (normal)</b>	It is a normal finding for skin surfaces to be warm and equal bilaterally. Hands and feet may be slightly cooler than the rest of the body. ( <i>Ref: Zator Estes</i> )	<u>Vocabulary: { SNOMED CT: warm skin (finding) (102599008) }</u>  [ <u>Comment</u> = This is the normal finding for charting by exception. ]
<b>cold</b>	Hypothermia, or cold skin, is indicative of shock or some other circulatory dysfunction. ( <i>Ref: Zator Estes</i> )	<u>Vocabulary: { SNOMED CT: Feels cold (finding) (64713002) }</u>
<b>hot</b>	Hyperthermia, or hot skin, is the excessive warming of the skin and may be generalized or localized. If generalized, it may be indicative of a febrile state, hyperthyroidism, or increased metabolic state. Localized hyperthermia may be caused by infection, trauma, sunburn or windburn. ( <i>Ref: Zator Estes</i> )	<u>Vocabulary: { SNOMED CT: feels hot (finding) (373932008) }</u>

## Skin Turgor

Type: **Enumeration**

### Constraints

- LOINC: Turgor (39109-4): (*Vocabulary*)
- SNOMED CT: skin turgor (observable entity) (26669000): (*Vocabulary*)

### Attributes

Attribute	Notes	Constraints and tags
<b>good elasticity (normal)</b>	Normal skin turgor is present when the skin returns to its original contour rapidly after being pinched. ( <i>Ref: Zator Estes</i> )	<u>Vocabulary: { SNOMED CT: skin turgor normal (finding) (297956000) }</u>  [ <u>Comment</u> = This is the normal finding for charting by exception. ]
<b>poor, decreased elasticity</b>	Decreased skin turgor is present when the skin is released and it remains pinched, and slowly returns to its original contour. This is an abnormal finding and is mainly caused by dehydration. ( <i>Ref: Zator Estes</i> )	<u>Vocabulary: { SNOMED CT: decreased skin turgor (finding) (425244000) }</u>
<b>tenting</b>	Tenting is evidenced by a slow return of the skin to its normal position after being pinched, a sign of either dehydration or aging, or both. ( <i>Ref: Zator Estes</i> )	<u>Vocabulary: { SNOMED CT: stretched skin (finding) (297957009) }</u>