New concept proposal

Nutrition Intake

Author	**Nora Toussaint, Rita Achermann, DIT team PSSS/IICU, IICU-NDS Data Management Team**	**Date last updated**	**23.10.2023**
Project	PSSS/IICU, ADONIS	**Contact**	DCC
Dataset release	2024.1	**Consulted expert**	ICU physicians, data scientist UH PSSS/IICU, ADONIS DM team

1. Rationale

The amount of energy critically ill patients should take in is an ongoing research topic and the nutritional needs of critically ill patients have been the subject of intense controversy. In intensive care units, the intake of energy (kcal, Joules) and macronutrients like fat, protein and carbohydrates is monitored continuously to ensure that patients receive the appropriate amount of energy and amount and type of macronutrients. In paediatrics, e.g., the type and amount of milk consumed by a newborn as well as the mode of administration are of interest. To know what a patient/person is consuming could also be of interest in other settings, for example in a weight gain or loss program.

2. Comparison to other standards/data models

OpenEHR contains two related concepts:

NutritionIntake (https://ckm.openehr.org/ckm/archetypes/1013.1.3564). To record total intake of nutrients at a point in time or interval of time. With the archetype *Item Consumed*, macronutrients and dietary nutrients https://ckm.openehr.org/ckm/archetypes/1013.1.2745 can be represented.

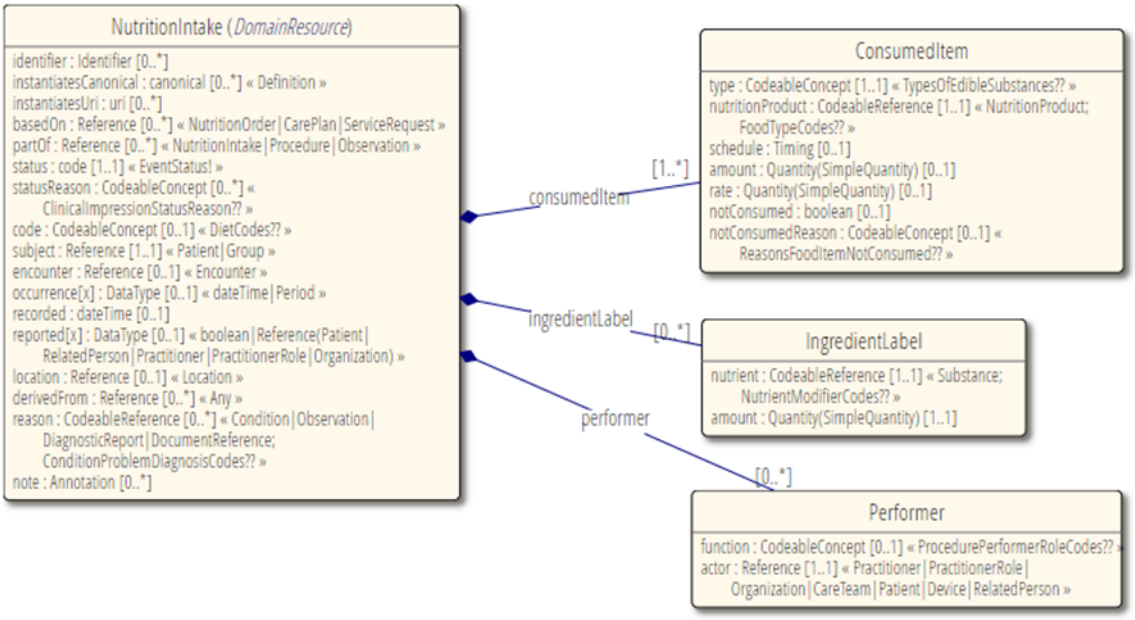
Energy Intake is part of the archetype *DietaryNutrients* (https://ckm.openehr.org/ckm/archetypes/1013.1.2745). The archetype is still under development and it is unclear how the time/period during which the calories were ingested will be/are modelled.

FHIR:

There is a concept for *Nutrition Intake* (https://build.fhir.org/nutritionintake.html). According to FHIR documentation, the following limitations and boundaries hold:

- Oral intake of food, fluids, oral nutritional supplements (i.e. Ensure), or enteral nutrition should be recorded using the *NutritionIntake* resource.
- Supplements, such as vitamins, minerals, herbals, should be recorded using the *Medication Resources*
- Parenteral nutrition should be recorded using the *Medication Resources*

The FHIR resource *Nutrition Intake* provides much more information: provider, diet plan, frequency, location where the food was taken in, food labels etc. The *Nutrition Intake* is linked to FHIR:*Consumed Item* that is similar to the proposed SPHN concept *Nutrition Intake*.



FHIR UML representation of resource *Nutrition Intake* (https://build.fhir.org/nutritionintake.html)

SNOMED CT contains two related concepts: 226320007 |Nutrient intake (observable entity)| describes intake of specific foods/nutrients mostly in a 24h period. Our concept allows a more flexible time interval.

787787004 |Energy intake (observable entity)| describes the measured or estimated energy intake in a 24h period. Our concept allows a more flexible time interval.

3. Concept information

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Standard	Value set or subset	Meaning binding	Cardinality for composedOf
concept	**Nutrition Intake**	intake of nutritious substance and/or the respective amount of energy consumed	Nutrition Intake	intake of nutritious substance and/or the respective amount of energy consumed					
composedOf	substance	substance associated to the concept	nutritious substance	nutritious substance consumed	Substance	SNOMED CT	descendant of: 105590001 |Substance (substance)|		0:n
composedOf	energy quantity	amount of energy of the concept	energy quantity	amount of energy (calories or joules) consumed	Quantity				0:1
composedOf	mode code	mode associated to the concept	feeding mode code	mode of nutrient administration (parenteral, enteral, per-os, etc.)	Code	SNOMED CT	926365009 |Parenteral nutrition infusion finding (finding)|; 926364008 |Enteral nutrition infusion finding (finding)|; 289002003 |Does feed self (finding)|;		0:1

							169741004 |Breast fed (finding)|; 268472006 |Infant bottle fed (finding)|		
composedOf	start datetime	datetime at which the concept started	start datetime	date and time the nutrition intake started	temporal				1:1
composedOf	end datetime	datetime at which the concept ended	end datetime	date and time the nutrition intake ended. Equals start date time for single events	temporal				0:1

General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider	Cardinality for concept to Subject Pseudo Identifier	Cardinality for concept to Source System
Nutrition Intake	0:1	1:1	1:1	1:1

4. Impact on the SPHN Dataset

None.

5. Discussion

The proposed concept *Nutrition Intake* is related to the SNOMED CT concepts 226320007 | Nutrient intake (observable entity) | and 787787004 |Energy intake (observable entity)|. It is composed of the amount, energy, mode of administration, and time/period when a nutrient was consumed and is similar to the FIHR resource *Consumed Item*.

As the concept has some similarities with SPHN *Drug Administration Event*, the question arises whether the two concepts should have a common parent that models the intake of a substance or drug.

The quantity of the consumed nutrients is covered through a composedOf of substance, where it is also possible to specify how accurately the quantity is known.

6. Example

Nutrition Intake

substance:
- code:
  - identifier: 88878007
  - name: Protein (substance)
  - coding system and version: SNOMED-CT-2022-12-31
- generic name: protein
- quantity:
  - value: 22
  - unit:
    - name: gram
    - coding system and version: UCUM 2.1 (20171121)
    - identifier: g

energy quantity:
- value: 88
- unit:
  - identifier: kcal
  - name: kilocalorie
  - coding system and version: UCUM 2.1 (20171121)

feeding mode code:
- identifier: 926365009
- name: Parenteral nutrition infusion finding (finding)
- coding system and version: SNOMED-CT-2022-12-31

start datetime: 2023-06-07T14:30:00+01:00

end datetime: 2023-06-07T14:30:00+01:00