New concept proposal

Fluid Balance

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Project	IICU	**Contact**	DCC
Dataset release	2024.1	**Consulted expert**	ICU and others

1 Rationale

Fluid balance is a key area of critical care clinical practice of which all staff who care for patients need to be aware. Small fluctuations can have a significant impact on patient outcomes and progress, so careful charting and review is needed from the multidisciplinary team [https://www.nursingtimes.net/clinical-archive/critical-care/essential-critical-care-skills-5-management-of-fluid-balance-21-02-2022/] and is also of interest for research. “Fluid Balance” is defined as the difference between fluid intake (drinking, infusions, transfusions etc.) and fluid output (urine, dialysis, blood loss, vomiting, etc.) over a defined time period. The single items that contribute to the fluid balance are listed in the documents of the concept ‘Fluid Input Output’.

Remarks: Fluid Balance depends on the implementation in the clinical IT system of a hospital and may deviate between the hospitals.

2 Comparison to other standards/data models

2.1 FHIR

We did not find a concept standard that represents fluid balance. Some aspects are part of the FHIR Resource 12.20 NutritionIntake (https://build.fhir.org/nutritionintake.html).

2.2 OpenEHR

Archetyp Fluid Balance (https://ckm.openehr.org/ckm/archetypes/1013.1.1682). The attributes are similar but instead of quantity alone, three separate quantities for input, output and balance are present. Also, there is a fourth quantity, insensible loss (the amount of fluid loss by evaporation from the skin and respiratory tract), that is not available in the clinical IT systems of the participating hospitals.

Data delivery for registries, government or other institutions:
We are not aware of data delivery that includes this information. It is not part of the MINIMALER DATENSATZ DER SGI MDSi.

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	Fluid Balance	difference between fluid input and output during a specified time interval	Fluid Balance	difference between fluid input and output during a specified time interval				SNOMED CT: 364396009 |Fluid balance observable (observable entity)|	
composedOf	quantity	an amount or a number of the concept	fluid balance quantity	amount or number of net fluid intake and output during a specified time interval	Quantity				1:1
composedOf	start datetime	date time at which the concept started	start date and time	start date and time of the time interval	temporal				1:1
composedOf	end datetime	date time at which the concept ended	end date and time	end date and time of the time interval	temporal				1:1
composedOf	fluid input output	individual fluid input and output that form the concept	fluid input output	individual fluid input and output that form the concept	Fluid Input Output				0:n

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
Fluid Balance	0:1	1:1	1:1	1:1

4 Impact on the SPHN Dataset

None.

5 Discussion

The directionality of the Fluid Balance is handled through the sign of the composedOf “quantity”. For overall fluid loss, the quantity would be negative.

Some hospitals record duration rather than end datetime. If this applies, the end datetime needs to be approximated by adding the duration to the start datetime.

6 Example

6.1 Example 1: Positive fluid balance

Fluid Balance

quantity
- value: 100
- unit:
  - identifier: ml
  - name: milliliter
  - coding system and version: UCUM 2.1 (20171121)

start datetime: 2023-06-07T14:30:00+01:00
end datetime: 2023-06-08T14:30:00+01:00

6.2 Example 2: Negative fluid balance (fluid loss)

Fluid loss is indicated by the negative sign of quantity-value.

Fluid Balance

quantity
- value: -48
- unit:
  - identifier: ml
  - name: milliliter
  - coding system and version: UCUM 2.1 (20171121)

start datetime: 2023-06-07T14:30:00+01:00
end datetime: 2023-06-08T14:30:00+01:00