Concept change request

Respiratory Rate

Author	**Kristin Gnodtke**	**Date of request**	**01.07.2021**
Project	PSSS	**Contact person**	Rita Achermann
Dataset release	2022.1	**Consulted expert**	Christophe Gaudet-Blavignac

1 Change request input/rationale

In the PSSS Dataset, the concept *Respiratory Rate* has been extended with a composedOf data determination method. It seems to make sense to capture this additional metadata in general.

2 Comparison to other systems

2.1 FHIR

In FHIR, Respiratory Rate is represented by the resource observation, identified by the LOINC code {LOINC code '9279-1' = 'Respiratory rate'}. The FHIR resource observation does not contain data determination methods such as measured, calculated, estimated, etc.

3 Change content

3.1 Currently released concept

SPHN Dataset version: 2021.1

Unique concept ID: 0000000304

3.2 Concept information Respiratory Rate

Concept name	Description	Type	Value set	Meaning binding SNOMED CT
Respiratory Rate	frequency at which the breathing occurs			86290005 |Respiratory rate (observable entity)|
rate	measured respiratory rate, and unit	Frequency		
datetime	datetime of measurement	temporal		

SIB Swiss Institute of Bioinformatics
Personalized Health Informatics Group (PHI)
Elisabethenstrasse 43
CH-4051 Basel

3.3 Proposed new concept

Contextualized concept name	Description	Type	Value set	Meaning binding SNOMED CT
Respiratory Rate	frequency at which the breathing occurs			86290005 |Respiratory rate (observable entity)|
rate	determined respiratory rate, and unit	Quantity		
determination datetime	datetime of determination	temporal		
data determination method	indicates whether the value was measured, calculated or set as a parameter of the ventilator	Data Determination	258104002 |Measured (qualifier value)|; 258090004 |Calculated (qualifier value)|; 87982008 |Manual (qualifier value)|; 263760002 |Forced (qualifier value)|; 261665006 |Unknown (qualifier value)|	

4 Pros and cons

4.1 Advantages

- Additional information about the data determination can be captured for respiratory rate values
- Differences between respiratory rate values over time, which may be related to the data determination method, can be correctly classified by the data analyst

4.2 Disadvantages

- none

4.3 Impact and effort

4.3.1 Impact on SPHN Dataset

Additional value (263760002 |Forced (qualifier value)|) needs to be added to the *Data Determination* concept.

5 Example

In the following there are examples outlined for each value in the value set of data determination method. These examples can help when mapping source data to the defined value set, which consists of SNOMED CT concepts.

- **258104002 |Measured (qualifier value)|**
  the respiratory rate has been measured electronically, e.g. via patches on the patients thorax connected to ECG electrodes and wireless transmission of data to a radio receiver
- **258090004 |Calculated (qualifier value)|**
  calculated respiratory rate, e.g. based on the respiratory blood pressure fluctuations: the mean arterial pressure (MAD) drops to a minimum at the beginning of an inspiration (inhalation) and to the maximum during expiration (exhalation); the respiratory curve is derived from the temporal course
- **87982008 |Manual (qualifier value)|**
  manual measurement of the respiratory rate performed by the nurse, doctor or yourself, e.g. by using a stop watch
- **263760002 |Forced (qualifier value)|**
  the patient is mechanically ventilated and the respiratory rate has been set, therefore the patient is forced to breath at the given frequency
- **261665006 |Unknown (qualifier value)|**
  based on availability of metadata, it is unknown how the respiratory rate value has been determined

6 Discussion

To capture the data determination method for the respiratory rate value is not specific to the intensive care unit (ICU). Other medical disciplines use different data determination methods as well and making this information explicitly available benefits interpretation of results during data analysis. The meaning of the different values in the value set need to be understood by the data engineers so that a harmonized mapping of source data to the value set across different sites can take place. The examples given in this document support a harmonized mapping.