

# New concept proposal

## Measurement & related concepts

<b>Author</b>	<b>Vasundra Touré</b>	<b>Date request updated</b>	<b>01.11.2023</b>
<b>Project</b>	General interest	<b>Contact person</b>	DCC
<b>Dataset release</b>	2024.1	<b>Consulted expert</b>	-

### 1 Rationale

The measurement concepts in the SPHN Dataset are currently mixing in their definitions the process of the measurement event with the results which are the measured values. To be consistent with the knowledge-centric approach adopted in SPHN, the measurement concepts have to be redesigned and split into a concept assessing the measurement (with the method and datetime) and a concept which relates to the result, being an output of the measurement. This document will suggest the new concepts to have a clean distinction between the process of measurement and the output of these measurements.

The following concepts are affected:

- Blood Pressure
- Body Height
- Body Temperature
- Body Weight
- Cardiac Output
- Circumference
- Heart Rate
- Oxygen Saturation
- Respiratory Rate

In addition, with the new release, time series information (see new concept proposal for Time Series Data File) will be handled by integrating metadata connected to these time series data files as a possible result item of the relevant concepts. These changes are reflected in the document with an additional composedOf 'data file' (of type Time Series Data File) to the following: Blood Pressure, Body Temperature, Heart Rate, Respiratory Rate, Oxygen Saturation, Cardiac Output.

## 2 Comparison to other standards/data models

### 2.1 SNOMED CT

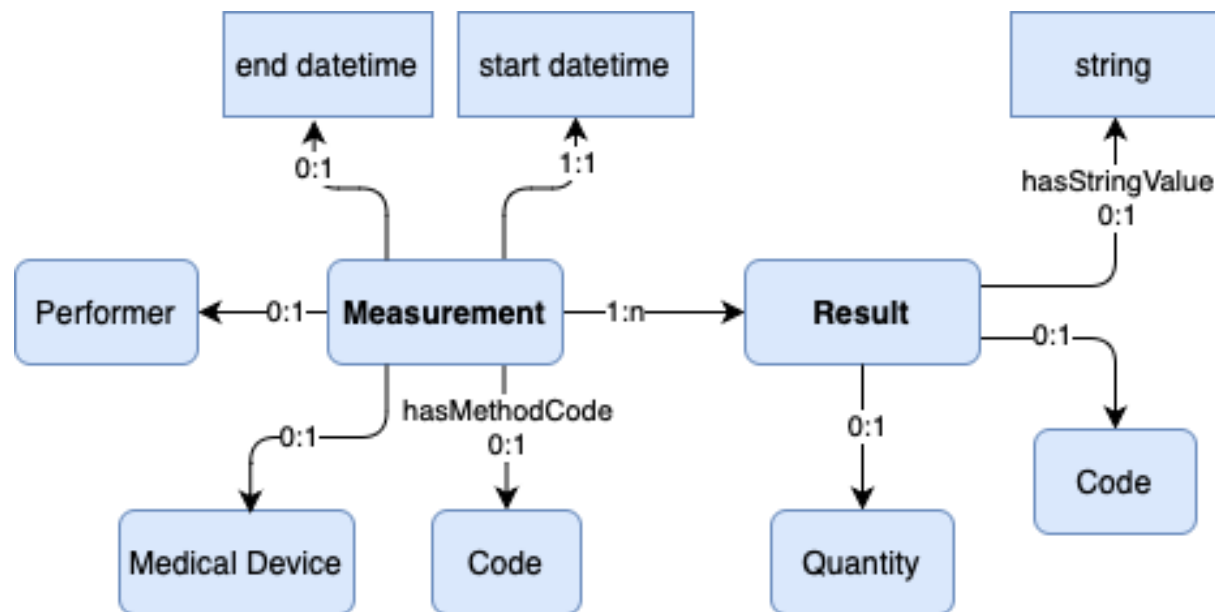
SNOMED CT describes measurement procedures (i.e. SNOMED CT: 122869004|Measurement procedure (procedure)), items that can be measured (e.g. SNOMED CT: 27113001 |Body weight (observable entity)), and ordinal or nominal values (e.g. SNOMED CT: 10828004 |Positive (qualifier value)), 260385009 |Negative (qualifier value)).

### 2.2 FHIR

In FHIR, a measurement is described using the 'Observation' resource where the code would describe the type of measurement and the 'valueQuantity' resource enables the representation of the outcome of the measurement.

### 3 Concept information

#### 3.1 Higher level concept: Measurement



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	Measurement	process of quantitatively defining the value or magnitude of an attribute or characteristic in comparison to a defined standard	Measurement	process of quantitatively defining the value or magnitude of an attribute or characteristic in comparison to a defined standard (e.g. mass, pressure)				SNOMED CT: 122869004  Measurement procedure (procedure)	
composedOf	result	evaluation outcome associated to the concept	measurement result	result of the measurement	Result				1:n
composedOf	start datetime	datetime at which the concept started	measurement start datetime	datetime at which the measurement started	temporal				1:1
composedOf	end datetime	datetime at which the concept ended	measurement end datetime	datetime at which the measurement ended	temporal				0:1
composedOf	method code	coded information specifying the method of the concept	measurement method code	coded information specifying the method of the measurement	Code	SNOMED CT	descendant of: 128927009  Procedure by method (procedure)		0:1
composedOf	medical device	medical device of the concept	medical device	medical device used for the measurement	Medical Device				0:1
composedOf	performer	type of person who performs or reports the concept	measurement performer	person that did the measurement	Performer				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
Measurement	0:1	1:1	1:1	1:1

### 3.2 Blood Pressure

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	Blood Pressure Measurement	measurement process of a blood pressure on an individual	Blood Pressure Measurement	measurement process of a blood pressure on an individual	Measurement			SNOMED CT: 46973005  Blood pressure taking (procedure)	
inherited	result	evaluation outcome associated to the concept	blood pressure result	result or value of the blood pressure measured	Blood Pressure				1:n
inherited	start datetime	datetime at which the concept started	blood pressure measurement start datetime	datetime at which the measurement of the blood pressure started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	blood pressure measurement end datetime	datetime at which the measurement of the blood pressure ended	temporal				0:1
inherited	method code	coded information specifying the method of the concept	blood pressure measurement method code	coded information specifying the method of the blood pressure measurement	Code	SNOMED CT	descendant of: 716777001  Hemodynamic monitoring (regime/therapy) ; descendant of: 46973005  Blood pressure taking (procedure)		0:1
inherited	medical device	medical device of the concept	blood pressure measurement medical device	medical device used for the blood pressure measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	blood pressure measurement performer	person that did the blood pressure measurement	Performer				0:1

composedOf	body site	anatomical site or structure associated to the concept	blood pressure measurement body site	anatomical location where the blood pressure was measured, e.g. a blood vessel structure in case of invasive blood pressure measurements, or upper arm structure in case of a non-invasive measurement	Body Site	SNOMED CT	descendant of: 113257007  Structure of cardiovascular system (body structure)); descendant of: 40983000  Structure of upper extremity between shoulder and elbow (body structure)); descendant of: 68367000  Thigh structure (body structure)); descendant of: 8205005  Wrist region structure (body structure)); descendant of: 7569003  Finger structure (body structure)); descendant of: 344001  Ankle region structure (body structure)	0:1
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General concept name	Cardinality for concept to Administrative Case	Cardinality for concept to Data Provider	Cardinality for concept to Subject Pseudo Identifier	
Blood Pressure Measurement	0:1	1:1	1:1	1:1

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
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concept	Blood Pressure	blood pressure measured either in the artery, in the vein, or in the pulmonary circulation	Blood Pressure	blood pressure measured either in the artery, in the vein, or in the pulmonary circulation	Result			SNOMED CT: 75367002 [Blood pressure (observable entity)]	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	mean pressure	mean pressure of the concept	mean pressure	measured mean pressure value	Quantity	UCUM	unit -> code restricted to: mm[Hg]		0:1
inherited	string value	textual representation	string value	textual representation	string				0:1
composedOf	systolic pressure	systolic pressure of the concept	systolic pressure	measured systolic pressure value	Quantity	UCUM	unit -> code restricted to: mm[Hg]		0:1
composedOf	diastolic pressure	diastolic pressure of the concept	diastolic pressure	measured diastolic pressure value	Quantity	UCUM	unit -> code restricted to: mm[Hg]		0:1
composedOf	datetime	datetime of the concept	blood pressure datetime	datetime of the blood pressure	temporal				0:1
composedOf	data file	data file of the concept	time series data file	time series data file with the values of the blood pressure measurement	Time Series Data File				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
Blood Pressure				



### 3.3 Body Height

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	Body Height Measurement	measurement of the height of the individual	Body Height Measurement	measurement of the height of the individual	Measurement			SNOMED CT: 14456009  Measuring height of patient (procedure)	
inherited	result	evaluation outcome associated to the concept	body height result	result or value of the body height measured	Body Height				1:1
inherited	start datetime	datetime at which the concept started	body height measurement start datetime	datetime at which the measurement of the body height started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	body height measurement end datetime	datetime at which the measurement of the body height ended	temporal				0:1
inherited	method code	coded information specifying the method of the concept	body height measurement method code	coded information specifying the method of the body height measurement	Code				0:1
inherited	medical device	medical device of the concept	body height measurement medical device	medical device used for the body height measurement	Medical Device				0:1

inherited	performer	type of person who performs or reports the concept	body height measurement performer	person that did the body height measurement	Performer				0:1
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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
Body Height Measurement	0:1	1:1	1:1	1:1

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 composed Of
concept	Body Height	height of the individual	Body Height	height of the individual	Result			SNOMED CT: 50373000  Body height measure (observable entity)); LOINC: 8302-2 Body height	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	quantity	an amount or a number of the concept	height	measured height value	Quantity				1:1
inherited	string value	textual representation	string value	textual representation	string				0:1

composedOf	datetime	datetime of the concept	body height datetime	datetime of the body height	temporal				0:1
composedOf	data determination	indicates how the value was obtained	body height data determination	indicates how the body height was obtained	Data Determination				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
Body Height				

### 3.4 Body Temperature

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 composed Of
concept	Body Temperature Measurement	measurement of the body temperature of the individual	Body Temperature Measurement	measurement of the body temperature of the individual	Measurement			SNOMED CT: 56342008 [Temperature taking (procedure)]	
inherited	result	evaluation outcome associated to the concept	body temperature result	result of the measurement	Body Temperature				1:n
inherited	start datetime	datetime at which the concept started	body temperature measurement start datetime	datetime at which the measurement of the body temperature started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	body temperature measurement end datetime	datetime at which the measurement of the body temperature ended	temporal				0:1
inherited	method code	coded information specifying the method of the concept	body temperature measurement method code	coded information specifying the method of the body temperature measurement	Code				0:1
inherited	medical device	medical device of the concept	body temperature measurement medical device	medical device used for the body temperature measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	body temperature measurement performer	person that did the body temperature measurement	Performer				0:1
composedOf	body site	anatomical site or structure associated to the concept performed or collected	body temperature measurement body site	body site of measurement	Body Site				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
Body Temperature Measurement	0:1	1:1	1:1	1:1

Concept or concept compositions or inherited	General concept name	General description	Contextualized concept name	Contextualized description	Type	Stand ard	Value set or subset	Meaning binding	Cardinality for composed Of
concept	Body Temperature	body temperature of the individual	Body Temperature	body temperature of the individual	Result			SNOMED CT: 386725007  Body temperature (observable entity); LOINC: 8310-5 Body temperature	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	quantity	an amount or a number of the concept	temperature	measured body temperature value	Quantity				0:1
inherited	string value	textual representation	string value	textual representation	string				0:1
composedOf	datetime	datetime of the concept	body temperature datetime	datetime of the body temperature	temporal				0:1

composedOf	data file	data file of the concept	time series data file	time series data file with the values of the body temperature measurement	Time Series Data File				0:1
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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
Body Temperature				

### 3.5 Body Weight

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 composed Of
concept	Body Weight Measurement	measurement of the weight of the individual	Body Weight Measurement	measurement of the weight of the individual	Measurement			SNOMED CT: 39857003  Weighing patient (procedure)	
inherited	result	evaluation outcome associated to the concept	body weight result	result or value of the body weight measured	Body Weight				1:1
inherited	start datetime	datetime at which the concept started	body weight measurement start datetime	datetime at which the measurement of the body weight started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	body weight measurement end datetime	datetime at which the measurement of the body weight ended	temporal				0:1
inherited	method code	coded information specifying the method of the concept	body weight measurement method code	coded information specifying the method of the body weight measurement	Code				0:1
inherited	medical device	medical device of the concept	body weight measurement medical device	medical device used for the body weight measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	body weight measurement performer	person that did the body weight measurement	Performer				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
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SPHN   Swiss Personalized Health Network		
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Body Weight Measurement	0:1	1:1	1:1	1:1
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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 composed Of
concept	Body Weight	weight of the individual	Body Weight	weight of the individual	Result			SNOMED CT: 27113001  Body weight (observable entity) ; LOINC: 29463-7 Body weight	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	quantity	an amount or a number of the concept	weight	measured weight value	Quantity				1:1
inherited	string value	textual representation	string value	textual representation	string				0:1
composedOf	datetime	datetime of the concept	body weight datetime	datetime of the body weight	temporal				0:1
composedOf	data determination	indicates how the value was obtained	body weight data determination	indicates how the body weight was obtained	Data Determination				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
Body Weight				

### 3.6 Cardiac Output

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 composed Of
concept	Cardiac Output Measurement	measurement of the cardiac output of the individual	Cardiac Output Measurement	measurement of the cardiac output of the individual	Measurement			SNOMED CT: 117610000 [Measurement of cardiac output (procedure)]	
inherited	result	evaluation outcome associated to the concept	cardiac output result	result or value of the cardiac output measured	Cardiac Output				1:n
inherited	start datetime	datetime at which the concept started	cardiac output measurement start datetime	datetime at which the measurement of the cardiac output started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	cardiac output measurement end datetime	datetime at which the measurement of the cardiac output ended	temporal				0:1

inherited	method code	coded information specifying the method of the concept	cardiac output measurement method code	coded information specifying the method of the cardiac output measurement	Code	SNOMED CT	descendant of: 63075001   Monitoring of cardiac output/cardiac index (regime/therapy)  or descendant of: 117610000  Measurement of cardiac output (procedure)		0:1
inherited	medical device	medical device of the concept	cardiac output measurement medical device	medical device used for the cardiac output measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	cardiac output measurement performer	person that did the cardiac output measurement	Performer				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
Cardiac Output Measurement	0:1	1:1	1:1	1:1

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 composed Of

concept	Cardiac Output	volume of blood passing through the heart per unit of time	Cardiac Output	volume of blood passing through the heart per unit of time	Result			SNOMED CT: 82799009 [Cardiac output (observable entity)]	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	quantity	an amount or a number of the concept	cardiac output value	measured cardiac output value	Quantity				0:1
inherited	string value	textual representation	string value	textual representation	string				0:1
composedOf	datetime	datetime of the concept	cardiac output datetime	datetime of the cardiac output	temporal				0:1
composedOf	data file	data file of the concept	time series data file	time series data file with the values of the cardiac output measurement	Time Series Data File				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
Cardiac Output				

### 3.7 Circumference

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 composed Of
concept	Circumference Measurement	measurement of the circumference measure of a body site	Circumference Measurement	measurement of the circumference of a body site	Measurement				
inherited	result	evaluation outcome associated to the concept	circumference result	result or value of the measured circumference	Circumference				1:1
inherited	start datetime	datetime at which the concept started	circumference measurement start datetime	datetime at which the measurement of the circumference started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	circumference measurement end datetime	datetime at which the measurement of the circumference ended	temporal				0:1
inherited	method code	coded information specifying the method of the concept	circumference measurement method code	coded information specifying the method of the circumference measurement	Code				0:1
inherited	medical device	medical device of the concept	circumference measurement medical device	medical device used for the circumference measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	circumference measurement performer	person that did the circumference measurement	Performer				0:1
composedOf	body site	anatomical site or structure associated to the concept	circumference measurement body site	body site of measurement	Body Site	SNOMED CT	69536005  Head structure (body structure); 33673004  Structure of waist (surface region) (body structure);		0:1

							29836001  Hip region structure (body structure) ; 45048000  Neck structure (body structure)	
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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
Circumference Measure Measurement	0:1	1:1	1:1	1:1

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 composed Of
concept	Circumference	circumference of a body site	Circumference	circumference of a body site	Result			SNOMED CT: 248365001  Circumference measure (observable entity)	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	quantity	an amount or a number of the concept	circumference value	measured circumference value	Quantity				1:1
inherited	string value	textual representation	string value	textual representation	string				0:1
composedOf	datetime	datetime of the concept	circumference datetime	datetime of the circumference	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
Circumference				

### 3.8 Heart Rate

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 composed Of
concept	Heart Rate Measurement	measurement of the heart rate of the individual	Heart Rate Measurement	measurement of the heart rate of the individual	Measurement			SNOMED CT: 65653002 [Pulse taking (procedure)]	
inherited	result	evaluation outcome associated to the concept	heart rate result	result of the measurement	Heart Rate				1:n
inherited	start datetime	datetime at which the concept started	heart rate measurement start datetime	datetime at which the measurement of the heart rate started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	heart rate measurement end datetime	datetime at which the measurement of the heart rate ended	temporal				0:1

inherited	method code	coded information specifying the method of the concept	heart rate measurement method code	coded information specifying the method of the heart rate measurement	Code				0:1
inherited	medical device	medical device of the concept	heart rate measurement medical device	medical device used for the heart rate measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	heart rate measurement performer	person that did the heart rate measurement	Performer				0:1
composedOf	body site	anatomical site or structure associated to the concept	heart rate measurement body site	body site of measurement	Body Site				0:1
composedOf	subject physiologic state	physiologic state of the subject	subject physiologic state	finding related physiologic patient state, e.g. resting, exercise	Physiologic State				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
Heart Rate Measurement	0:1	1:1	1:1	1:1

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	Heart Rate	frequency of the heart beats, i.e. the number of time a heart beats per unit of time	Heart Rate	frequency of the heart beats, i.e. the number of time a heart beats per unit of time	Result			SNOMED CT: 364075005  Heart rate (observable entity)); LOINC: 8867-4 Heart rate	
inherited	regularity code	coded information specifying the regularity of the concept	heart rate regularity code	coded information specifying the regularity of the measured heart rate	Code	SNOMED CT	271636001  Pulse regular (finding); 61086009  Pulse irregular (finding)		0:1
inherited	quantity	an amount or a number of the concept	heart rate value	measured heart rate value	Quantity				0:1
inherited	string value	textual representation	string value	textual representation	string				0:1
composedOf	datetime	datetime of the concept	heart rate datetime	datetime of the heart rate	temporal				0:1
composedOf	data file	data file of the concept	time series data file	time series data file with the values of the heart rate measurement	Time Series Data File				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
Heart Rate				



### 3.9 Oxygen Saturation

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	Oxygen Saturation Measurement	measurement of the oxygen saturation of the individual	Oxygen Saturation Measurement	measurement of the oxygen saturation of the individual	Measurement			SNOMED CT: 104847001  Oxygen saturation measurement (procedure)	
inherited	result	evaluation outcome associated to the concept	oxygen saturation result	result or value of the oxygen saturation measured	Oxygen Saturation				1:n
inherited	start datetime	datetime at which the concept started	oxygen saturation measurement start datetime	datetime at which the measurement of the oxygen saturation started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	oxygen saturation measurement end datetime	datetime at which the measurement of the oxygen saturation ended	temporal				0:1
inherited	method code	coded information specifying the method of the concept	oxygen saturation measurement method code	coded information specifying the method of the oxygen saturation measurement	Code	SNOMED CT	extendable value set: SNOMED CT: 252465000   Pulse oximetry (procedure)		0:1

inherited	medical device	medical device of the concept	oxygen saturation measurement medical device	medical device used for the oxygen saturation measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	oxygen saturation measurement performer	person that did the oxygen saturation measurement	Performer				0:1
composedOf	body site	anatomical site or structure associated to the concept	oxygen saturation measurement body site	body site of measurement	Body Site	SNOMED CT	code restricted to: extendable value set: 29707007  Toe structure (body structure)); 7569003  Finger structure (body structure)); 48800003  Ear lobe structure (body structure)		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
Oxygen Saturation Measurement	0:1	1:1	1:1	1:1

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 composed Of
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concept	Oxygen Saturation	fraction of oxygen present in the blood	Oxygen Saturation	fraction of oxygen present in the blood	Result			SNOMED CT: 103228002 [Hemoglobin saturation with oxygen (observable entity)]	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	quantity	an amount or a number of the concept	oxygen saturation quantity	measured oxygen saturation value	Quantity		UCUM	unit -> code restricted to: %	0:1
inherited	string value	textual representation	string value	textual representation	string				0:1
composedOf	datetime	datetime of the concept	oxygen saturation datetime	datetime of the oxygen saturation	temporal				0:1
composedOf	data file	data file of the concept	time series data file	time series data file with the values of the oxygen saturation measurement	Time Series Data File				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
Oxygen Saturation				

### 3.10 Respiratory Rate

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 composed Of
concept	Respiratory Rate Measurement	measurement of the frequency at which the breathing occurs	Respiratory Rate Measurement	measurement of the frequency at which the breathing occurs	Measurement			SNOMED CT: 408867002 [Taking respiratory rate (procedure)]	
inherited	result	evaluation outcome associated to the concept	respiratory rate	frequency at which the breathing occurs	Respiratory Rate				1:n
inherited	start datetime	datetime at which the concept started	respiratory rate measurement start datetime	datetime at which the measurement of the respiratory rate started	temporal				1:1
inherited	end datetime	datetime at which the concept ended	respiratory rate measurement end datetime	datetime at which the measurement of the respiratory rate ended	temporal				0:1
inherited	method code	coded information specifying the method of the concept	respiratory rate measurement method code	coded information specifying the method of the respiratory rate measurement	Code				0:1
inherited	medical device	medical device of the concept	respiratory rate measurement medical device	medical device used for the respiratory rate measurement	Medical Device				0:1
inherited	performer	type of person who performs or reports the concept	respiratory rate measurement performer	person that did the respiratory rate measurement	Performer				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
Respiratory Rate Measurement	0:1	1:1	1:1	1:1

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 composed Of
concept	Respiratory Rate	frequency at which the breathing occurs	Respiratory Rate	frequency at which the breathing occurs	Result			SNOMED CT: 86290005  Respiratory rate (observable entity)	
inherited	code	coded information specifying the concept	code	coded information specifying the concept	Code				0:1
inherited	quantity	an amount or a number of the concept	respiratory rate quantity	respiratory rate value	Quantity				0:1
inherited	string value	textual representation	string value	textual representation	string				0:1

composedOf	datetime	datetime of the concept	respiratory rate datetime	datetime of the respiratory rate	temporal				0:1
composedOf	data file	data file of the concept	time series data file	time series data file with the values of the respiratory rate measurement	Time Series Data File				0:1
composedOf	data determination	indicates how the value was obtained	respiratory rate data determination	indicates how the respiratory rate was obtained	Data Determinati on	SNOME D CT	method code restricted to: 258104002 Measured (qualifier value); 258090004 Calculated (qualifier value); 87982008  Manual (qualifier value); 263760002  Forced (qualifier value		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
Respiratory Rate				

## 4 Impact on the SPHN Dataset

The concept Measurement Method is deprecated.  
The Inhaled Oxygen Concentration is not a Measurement anymore.  
The Respiratory Rate inherits from Measurement.

## 5 Discussion

The process of measuring something and its actual value are clearly separated with the definition of a concept for both the measurement and its 'result'. The measurement process holds additional information such as the time of the measurement, the method of measurement, the medical device used for measuring the value etc.

The measurements are not necessarily only measured, they can be calculated, estimated etc. This is why the Respiratory Rate is now added as a Measurement concept. However, we do **not** include concepts that can **never** be measured but that are always calculated or estimated for instance like the Body Mass Index or the Cardiac Index.

For concepts that can have time series data, there are two possibilities for providing such information. One instance of a measurement can hold one to many results, therefore time series can be represented as many results as there are values. This would be the default way to provide any kind of measurement result. However, for time series data files where there might be a substantial amount of values, there is also the possibility to provide the values in a data file which will be linked to a measurement, through the Result concept by the Time Series Data File concept. The Time Series Data File concept would point to a file that contains the measurement results and is therefore not processed in the RDF, only some metadata is represented in the graph (for more information, see new concept document on [Time Series Data File](#)).

## 6 Example

Blood Pressure Measurement (provided in a Time Series Data File)

datetime: 01.02.23 11:54  
method code: 77938009 |Arterial pressure monitoring, invasive method (regime/therapy)|  
medical device → type code: 462514007 |Arterial blood pressure catheter (physical object)|  
performer: -  
body site → code: 368236001 |Entire left wrist region (body structure)|  
blood pressure:  
time series data file:  
name: blood pressure patient x 12032023  
uniform resource identifier: <https://patientx-12032023-xfrtIso1>  
format code: EDAM:format\_3752 |CSV|  
hash:  
string value: 45DS0326RGHY  
algorithm: SHA-1

creation datetime: 01.02.23 12:05  
 encoding: UTF-8  
 entry count:  
   value: 14500  
   unit → code: {#}  
   comparator: -

#### Body Height Measurement (provided as a Quantity in the Result)

body height:  
   code: -  
   quantity:  
     value: 176  
     unit → code: cm  
     comparator: -  
   string value: -  
 datetime: 01.02.23 11:54  
 method code: -  
 body site → code: 368236001 |Entire left wrist region (body structure)|  
 time series data file: -  
 data determination → method code: 258104002 |Measured (qualifier value)|