Briefing Note for Member Forum
March 2022

SNOMED CT Laboratory Findings
Use of 'Reference Range' for Reporting

Purpose:

To inform the community of practice of the FSN changes that are proposed for the measurement findings that can be represented as above, within, or below the reference range for the analyte being measured. These concepts are found within the hierarchy of 118245000 |Measurement finding (finding)|.

Members of the community of practice are requested to indicate in the box below each proposal whether the impact of the proposed changes gives rise to concern.

Background:

SNOMED International is undertaking a Quality Initiative (QI) project focused on addressing concepts within the hierarchy of Clinical Findings. The purpose of the QI project is to improve the structural consistency of existing content and adherence to Editorial Policy.

Applying the principles of the QI project to the domain of laboratory findings gives us the opportunity to update the terminology to reflect current laboratory reporting practices and provide a consistent model for the addition of new content.

Existing SNOMED CT laboratory findings content:

Much of the existing laboratory findings content is based upon the notion that a given result is either normal, abnormal, increased, or decreased e.g.

- 102659003 | Normal glucose level (finding) |
- 102660008 |Abnormal glucose level (finding)|
- 68256003 |Increased glucose level (finding)|
- 51798006 |Decreased glucose level (finding)|

In addition, we have concepts that state that the level is:

- High/Very high
- Raised
- Borderline high
- Borderline low
- Low/Very low

.

The modeling of these concepts also varies, with use of attributes which either use the appropriate adjective or introduce the concept of a result which is in relation to a “reference range”.

Proposed solution:

It is our understanding that for many laboratories the interpretation of clinical laboratory tests involves comparing the patient's results with the test's "reference range" for that laboratory taking account of the patient's age, gender, etc.

It would therefore seem appropriate for SNOMED CT to adopt this approach to describe and model laboratory findings and where appropriate to update its content to reflect this approach.

Naming convention:

It is proposed that all content that represents a “measurement” or “level” finding within the hierarchy should conform to the following naming pattern:

Fully Specified Name:

<Laboratory test> <Reference range interpretation value> (finding):

- 165555003 |Platelet count normal (finding)| ***becomes:***
- 165555003 |Platelet within reference range (finding)|

Preferred Term:

<Laboratory test> <Reference range interpretation value>

- |Platelet count normal| ***becomes:***
- |Platelet count within reference range||

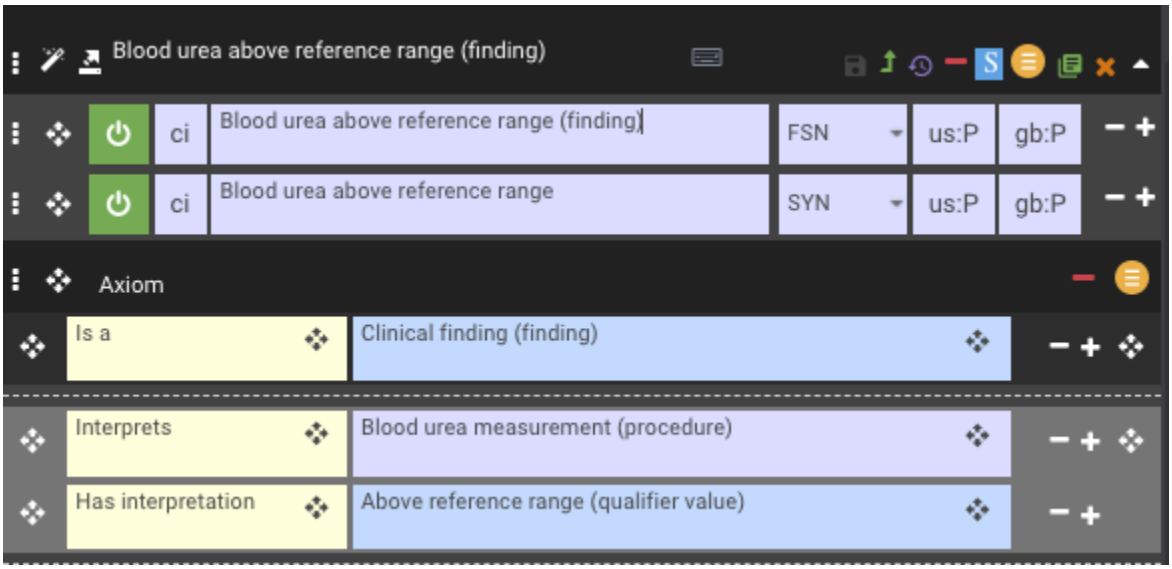
Synonym:

- |Platelet count normal|

Please note: The example synonym above represents the old preferred term. Where an existing concept already follows the terming guidance for the FSN and PT additional synonyms will not be added.

Modeling pattern:

The figure below illustrates the stated view for measurement finding concepts:



Groupers:

There are 2 categories of grouper within this section of the terminology, both of which can be sufficiently defined:

Measurement finding <Reference range interpretation value> (finding)

442082004 |Measurement finding within reference range (finding)

363714003 |Interprets (attribute)|:122869004 |Measurement procedure (procedure)||

363713009 |Has interpretation (attribute)|:281301001 |Within reference range (qualifier value)|

Finding of <Laboratory test> (finding)

365601007 |Finding of eosinophil count (finding)|

363714003 |Interprets (attribute)| : 71960002 |Eosinophil count (procedure)|

The content currently includes a number, but not all possible groupers of this type. The content in this domain will be fully modeled and therefore it is possible to use ECL for the purposes of analysis and data extraction. For this reason, additional groupers of this type will not be added as part of this exercise.

Therapeutic medication levels:

Where the measurement finding relates to medication therapeutic levels, new 281299008 |Therapeutic range comments (qualifier value)| values have been added and will be used to model the 363713009 |Has interpretation (attribute)|:

- 281303003 |Above therapeutic range (qualifier value)|
- 281306006 |Below therapeutic range (qualifier value)|
- 281304009 |Within therapeutic range (qualifier value)|

Migration of existing content:

The majority (1026 of 1336 concepts) of the findings content in the hierarchy of 118245000 |Measurement finding (finding)| are modeled with 363713009 |Has interpretation (attribute)| and 363714003 |Interprets (attribute)|. The remainder are groupers that only have 363714003 |Interprets (attribute)| or are dipstick findings.

The primary issue that requires resolution relates to the current FSNs which are often less precise than the modeling indicates.

The concept represents an interpretation of ‘within reference range’:

There are 139 concepts which are modeled with |Has interpretation (attribute)| and 281301001 |Within reference range (qualifier value)|. Of these 3 have an FSN of ‘X within reference range, the remaining 136 concepts have an FSN off either ‘X normal’ or ‘Normal x’.

We think it is reasonable to accept that the majority of clinicians would, within the context of the interpretation of laboratory results, consider ‘normal’ to be synonymous with ‘within the reference range’ for that individual.

Therefore, it is proposed that:

- The concept would not be inactivated.
- The FSN should be updated to be of the form ‘X within reference range’.
- Add a preferred term to match the FSN.
- Retain the original FSN description as a synonym.

Do you accept the proposal	Yes/No
If no, please explain your concern	

The concept represents an interpretation of 'above reference range':

There are 237 concepts which are modeled with |Has interpretation (attribute)| and 281301001 281302008 |Above reference range (qualifier value)|. Of these 30 have an FSN of 'X above reference range, the remaining 207 concepts have an FSN which includes one of the following:

- Increase /increased 138
- Raised 41
- Elevated 13
- High 43
- Very high 2

With the exception of "Very high", it is proposed that:

- The concept would not be inactivated.
- The FSN should be updated to be of the form 'X above reference range'.
- Add a preferred term to match the FSN.
- Retain the original FSN description as a synonym.

The 2 concepts that state "Very high', 165402007 |Hemoglobin very high (finding)| and 166831007 |Serum cholesterol very high (finding)| will remain unchanged but will be modeled with 281302008 |Above reference range (qualifier value)| and remain primitive.

Do you accept the proposal	Yes/No
If no, please explain your concern	

The concept represents an interpretation of 'below reference range':

There are 237 concepts which are modeled with |Has interpretation (attribute)| and 281300000 |Below reference range (qualifier value)|. Of these 37 have an FSN of 'X below reference range, the remaining 200 concepts have an FSN which includes one of the following:

- Decrease /decreased 113
- Reduced 4
- Low 81
- Very low 1

With the exception of “Very low”, it is proposed that:

- The concept would not be inactivated.
- The FSN should be updated to be of the form ‘X below reference range’.
- Add a preferred term to match the FSN.
- Retain the original FSN description as a synonym.

The concept that states “Very low’, 165396004 |Hemoglobin very low (finding)| will remain unchanged but will be modeled with 281300000 |Below reference range (qualifier value)| and remain primitive.

Do you accept the proposal	Yes/No
If no, please explain your concern	

Concepts that represent a level that is borderline between normal and above reference range and borderline between normal and below reference range:

There are 20 concepts with “borderline low” and 17 concepts with “borderline high” in the FSN. These are modeled with either 371933006 |Upper limit of reference range (qualifier value)| or 385524004 |Lower limit of reference range (qualifier value)|.

It is proposed that the concept is not inactivated and FSN’s be updated to:

- “X at the upper limit of reference range”
- “X at the lower limit of reference range”
- Add a preferred term to match the FSN.
- Retain the original FSN description as a synonym.

Do you accept the proposal	Yes/No
If no, please explain your concern	

Concepts that represent a measurement or level that is “Abnormal”:

There are 180 concepts that can be sufficiently defined using 394844007 |Outside reference range (qualifier value)| the meaning of these concepts within the measurement findings context is potentially ambiguous and could represent either a measurement that is above or below the reference range.

For this reason, it is proposed that these concepts should be inactivated as ambiguous with a historical association of POSSIBLY_EQUIVALENT_TO the concepts that represent the above and below reference ranges for that analyte:

165558001 |Platelet count abnormal (finding)| - inactivated as ambiguous

POSSIBLY_EQUIVALENT_TO

415115007 |Platelet count above reference range (finding)|

POSSIBLY_EQUIVALENT_TO

415116008 |Platelet count below reference range (finding)|

Where a specific measure of an analyte has a reference range of 0 to x the concept that states “abnormal level of x” will be inactivated as “Non-conformance to editorial policy” with a historical association of REPLACED_BY and a target concept that represents the above reference range value for that analyte.

Do you accept the proposal	Yes/No
If no, please explain your concern	

Action required:

Please review each element of the proposal and indicate whether you find it acceptable. If there are any issues with what is being proposed, please explain in a few sentences what the issue is and if appropriate suggest an alternative.

Approved for release by the Chief Terminologist James T. Case MS, DVM, PhD, FACMI