Process to create laboratory observable concepts for LOINC Terms in the LOINC Extension

Note: This document is a work in progress. The table below lists which version of this document was used to create the corresponding versions of the LOINC Ontology. The Google Version History feature should be used to obtain the exact set of instructions that were in use during the creation of each successive LOINC Ontology release. Future work in the LOINC Ontology may require a different set of instructions and/or processing document(s).

Process Document History Date	LOINC Ontology Release Version	Based on LOINC version	Dependent on International SNOMED CT version
2025-03-12	Version 1.0 Released 2025-03-21	2.80	2025-01-01
2025-08-13	Version 2.0 Planned Release 2025-09-21	2.81	2025-07-01

1. Use the latest list of accepted mapped LOINC Parts, which are in scope for release.
    a. This file is created based on the latest Loinc_Detail_Type_1_Active_Lab_NonVet.xlsx provided by the LOINC team for each release and the latest LP mapping provided in https://snap.snomedtools.org/
    b. Use LOINC parts mapped to SNOMED CT that have the status of "Accepted" as per the general workflow:
        i. Unmapped → Draft (in progress) → Mapped (ready for review) → In Review → **Accepted (can be included for the release)** OR Rejected (Requires review by the map author)
        ii. There are concepts created in the LOINC extension or later release of core that are not accessible in the mapping tool. For these, create a ticket (LE) and submit changes directly.
            1. If needed, SSA and FAS to send a list of these concepts to Peter for promotion to main before mapping tool update.
        iii. LOINC Components that have mapping to multiple concepts are handled outside of the mapping tool since the 1:many functionality is not available there yet. For these create a ticket (LE) and submit changes directly
            1. Discussed with Anne. Peter will implement existing Snap2SNOMED functionality in code next time multiple component mapping is needed.
2. Use those accepted mapped LOINC Parts in the modeling of any LOINC Terms in scope:
    a. Unlike the RF2 files (used previously for mapping concepts in the Proof of Concepts), this file does not contain a field for "Attribute ID". The process of assigning attributes is essentially replaced by the process of using LOINC Term Property value to determine the

appropriate template to use for modeling the LOINC Term. The template contains a list of the attributes needed to model the LOINC Term.

b. If the LOINC Property is not in the list below, do not include it

c. ~~If the word "panel" is included in the name of any LP used to define a LOINC Term, do not create a concept for the LOINC Term. Panels are out of scope of this phase of the project.~~

d. If a LOINC Part (with the exception of **LOINC Property, LOINC component mapping to SI Component or Inheres in or Towards, LOINC Component LP442509-8 Observation, LOINC Component LP19577-3 Specimen volume or** **LOINC divisor)** map is not provided (regular part or subpart), include the LOINC Term with modeling for whatever LOINC Parts are mapped. The LOINC Term concept will need to be designated as primitive in this case (**except for terms defined by LOINC Component LP442509-8 Observation LOINC Component LP19577-3 Specimen volume)** since all Parts of the Term are not modeled. EXCEPTION made for concepts defined by LOINC Time of LP6969-2 XXX which will have Time unmapped but will be marked as sufficiently defined. Update FSN and PT per rules below (section f.x and f.xi).

   i. An exception is made for LOINC DIVISORs when the property is one that would require a template with Relative to, e.g., AFr, CFr, MFr, NFr, SFr, VFr, MRto, Ratio, SRto, and the Component value is <<540091010000105 |Calculation (calculation)|. In this case the DIVISOR (Relative to) is not required. The concept can be created and marked as sufficiently defined, following all other rules.

   ii. An exception is made for LOINC DIVISORs when the property is one that would require a template with Relative to, e.g., AFr, CFr, MFr, NFr, SFr, VFr, MRto, Ratio, SRto, but there is no DIVISOR LP provided in the detail file, or the DIVISOR LP is LP443411-6 Specimen Volume. In this case the DIVISOR (Relative to) is not required. The concept can be created and marked as sufficiently defined, following all other rules. Examples:

      1. 57800-5| Oxygen content in Blood by calculation would be termed as Volume fraction of oxygen in blood at point in time by calculation (observable entity). 57800-5 has no DIVISOR in the detail file.
      2. 31100-1|Hematocrit [Volume Fraction] of Blood by Impedance would be termed Volume fraction of erythrocyte component of blood in blood at point in time by electrical impedance (observable entity). The divisor for this term in the detail file is LP443411-6 Specimen Volume.

   iii. An exception is made for LOINC concepts that have a CLASS value of LABORDERS.ONTOLOGY. In this case, all the LPs that define the LOINC grouper concept MUST be mapped and the concept marked as sufficiently defined. If all the LPs are not mapped for the LOINC grouper concept, then do not create the concept.

e. Some LP COMPONENTS include two or more components values that need to be mapped to more than one SNOMED concept. The following scenarios occur. Note at this

time the mapping tool cannot handle 1:many maps so these maps are held outside of the usual place by Peter.

i. When LOINC Component includes a + sign and LOINC Property is a type of concentration (including MCnc, SCnc at this point in the project), then include all Component values in a single role group. Example for 62292-8 25-Hydroxyvitamin D3+25-Hydroxyvitamin D2 [Mass/volume] in Serum or Plasma:
    1. LP182450-9 Calcidiol+ercalcidiol to be mapped to 259337002 |Calcifediol (substance)| and to 67517005 |25-hydroxyergocalciferol (substance)|
    2. Modeling representation of LOINC concept within a single role group:
        a. Component (attribute) with value of 259337002 |Calcifediol (substance)|
        b. Component (attribute) with value of 67517005 |25-hydroxyergocalciferol (substance)|
        c. Property (attribute) with value of 118539007 |Mass concentration (property) (qualifier value)|
        d. Other attributes as usual…
    3. Terming to include “and” in FSN and PT
ii. If LOINC COMPONENT is LP36683-8 ABO & Rh group, this is a one off exception: include Component values in separate role groups. Example for 881-3 ABO and Rh group [Type] in Blood from Blood product unit:
    1. LP36683-8 ABO & Rh group to mapped to 106202009 |Antigen in ABO blood group system (substance)| and 16951006 |Antigen in Rh blood group system (substance)|
    2. Modeling representation of LOINC concept with multiple role groups:
        a. First role group:
            i. Component (attribute) with value of 106202009 |Antigen in ABO blood group system (substance)|
            ii. Property (attribute) with value of 410656007 |Type (property) (qualifier value)|
            iii. Other attributes as usual…
        b. Second role group:
            i. Component (attribute) with value of 16951006 |Antigen in Rh blood group system (substance)|
            ii. Property (attribute) with value of 410656007 |Type (property) (qualifier value)|
            iii. Other attributes as usual..
    3. Terming to include “and” in FSN and PT
iii. Other scenarios:
    1. When LOINC Component includes a + sign and LOINC Property is Presence (e.g. PRID) --> model using GCI (need to create template for

future work in this area; at this point we are modeling them manually) and use and/or in terming for FSN and PT.

2. If property = "-" (e.g. Panels) --> each observation has it's own result - N/A at this stage

f. The LOINC Property type will determine which template to use for modeling the LOINC Term. Here is the list of applicable properties (Property LPs) and their associated template. This list will be updated regularly as the new properties and/or templates are considered for inclusion in the project:
   i. **https://docs.google.com/spreadsheets/d/11pLczLTnDWFilSk5H1RebMcWQexl3Le7qaxWl_RyXsQ/edit#gid=0**

g. In general, TIME_PN is the TIME subpart to be used from the "Loinc_Detail_Type_1" file when modeling LOINC concepts.

h. Model LOINC Term based on template type:
   i. For the "Quality observable with Component for LOINC" template, the LOINC axes are modeled as such:
      1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
      2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
      3. LOINC Time -> SNOMED 370134009 |Time aspect (attribute)|
      4. LOINC System -> 704327008 |Direct site (attribute)|
      5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case "LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
      6. LOINC Component -> 246093002 |Component (attribute)|plus possible other attributes as noted in the following considerations:
         a. Use the "Loinc_Detail_Type_1" file sent recently by RII (the " Loinc_Detail_Type_1_Parts" sheet should have all the information needed). For every LOINC Term:
            i. If the "PartNumber" and "Part" fields (column B and D) are the same for COMPONENT_PN and COMPNUM_PN → use COMPNUM_PN LOINC Part map to model SCT Component
            ii. If the "PartNumber" and "Part" fields (column B and D) are not the same for COMPONENT_PN and COMPNUM →
               1. Check if there is any COMPSUBPART2_PN
                  a. If yes, use COMPNUM_PN LOINC Part map as SCT Component and use COMPSUBPART2 LOINC Part map as SCT Precondition
                  b. Go to the next step
               2. Check if there is any COMPSUBPART3_PN

a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART3) and make concept definition status primitive
b. Go to next step

3. Check if there is any COMPSUBPART4_PN
    a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART4) and make concept definition status primitive

ii. For the "Quality observable with Inheres in for LOINC" template, the LOINC axes are modeled as such:

1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
3. LOINC Time -> SNOMED 370134009 |Time aspect (attribute)|
4. LOINC System -> 704327008 |Direct site (attribute)|
5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case "LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
6. LOINC Component -> 704319004 |Inheres in (attribute)| plus possible other attributes as noted in the following considerations:
    a. Use the "Loinc_Detail_Type_1" file sent recently by RII (the " Loinc_Detail_Type_1_Parts" sheet should have all the information needed). For every LOINC Term:
        i. If the "PartNumber" and "Part" fields (column B and D) are the same for COMPONENT_PN and COMPNUM → use COMPNUM_PN LOINC Part map to model SCT Inheres in
            1. EXCEPTION: When Property value is Type (PROPERTY LP6886-8 Type mapped to 410656007 |Type (property) (qualifier value)| AND COMPNUMSUFFIX_PN is either LP438877-5 phage type mapped to 718496006 |Bacterial bacteriophage typing (qualifier value)| OR LP438878-3 biotype mapped to 264788002 |Biotyping (qualifier value)| OR LP134392-2 serovar mapped to 258075003 |Serotyping (qualifier value)|:
                a. Model concept with appropriate SI technique value concept and Inheres in value concept as in the map, but

instead of using the SNOMED technique qualifier value concept and SNOMED Inheres in concept to populate the FSN and PT, use the COMPNUM_PN LP name.

i. Note the Technique attribute value will come from the COMPNUMSUFFIX_PN rather than from a METHOD LP.
ii. Note the Technique attribute value will not appear in the FSN
iii. Note the SNOMED Inheres in attribute value will not appear in the FSN
iv. (The COMPNUM_PN LP value contains both the technique and inheres in values)

b. Example: 65756-9 Salmonella sp serovar [Type] in Isolate
   i. FSN: Type of **Salmonella sp serovar** in microbial isolate at point in time (observable entity)
   ii. Technique (attribute) value of 258075003 |Serotyping (qualifier value)|
   iii. Inheres in value of 27268008 |Genus Salmonella (organism)|
   iv. (Note: LP174087-9 COMPNUM_PN is Salmonella sp serovar)
   v. Other attributes as usual

ii. If the “PartNumber” and “Part” fields (column B and D) are not the same for COMPONENT_PN and COMPNUM →
   1. Check if there is any COMPSUBPART2
      a. If yes, use COMPNUM_PN LOINC Part map as SCT Inheres in and use COMPSUBPART2 LOINC Part map as SCT Precondition
      b. Go to the next step
   2. Check if there is any COMPSUBPART3

a. If yes, use COMPNUM_PN LOINC Part map as SCT Inheres in (do not map COMPSUBPART3) and make concept definition status primitive
b. Go to next step

3. Check if there is any COMPSUBPART4
    a. If yes, use COMPNUM_PN LOINC Part map as SCT Inheres in (do not map COMPSUBPART4) and make concept definition status primitive

7. As noted in the templates, concept definition status should be sufficiently defined for most concepts unless specified above where noted as primitive.

iii. For the "Quality observable with Inheres in (System, no Component) for LOINC" template, the LOINC axes are modeled as such. Note so far this template is mainly used in LOINC Terms where LP442509-8 COMPONENT Observation is included in term definition.This LP is unmapped and should be ignored.:

1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
3. LOINC Time -> SNOMED 370134009 |Time aspect (attribute)|
4. LOINC System -> 704319004 |Inheres in (attribute)|
5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case "LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
6. Note: do not model LOINC Component

iv. For the "Susceptibility observable for LOINC" template, the LOINC axes are modeled as such:

1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
3. LOINC Time -> SNOMED 370134009 |Time aspect (attribute)|
4. LOINC System -> 704327008 |Direct site (attribute)|
    a. Also add 704319004 |Inheres in (attribute)| with value of 410607006 |Organism (organism)| to all concepts created using this template
5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case "LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
6. LOINC Component ->704320005 |Towards (attribute)| plus possible other attributes as noted in the following considerations:

a. Use the “Loinc_Detail_Type_1” file sent from RII (the “ Loinc_Detail_Type_1_Parts” sheet should have all the information needed). For every LOINC Term:
    i. If the “PartNumber” and “Part” fields (column B and D) are the same for COMPONENT_PN and COMPNUM_PN → use COMPNUM_PN LOINC Part map to model SCT Component
    ii. If the “PartNumber” and “Part” fields (column B and D) are not the same for COMPONENT_PN and COMPNUM →
        1. Check if there is any COMPSUBPART2_PN
            a. If yes, use COMPNUM_PN LOINC Part map as SCT Component and use COMPSUBPART2 LOINC Part map as SCT Precondition
            b. Go to the next step
        2. Check if there is any COMPSUBPART3_PN
            a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART3) and make concept definition status primitive
            b. Go to next step
        3. Check if there is any COMPSUBPART4_PN
            a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART4) and make concept definition status primitive

v. For the “Quality observable with Component and Relative to for LOINC” template, the LOINC axes are modeled as such:
    1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
    2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
    3. LOINC Time -> SNOMED 370134009 |Time aspect (attribute)|
    4. LOINC System -> 704327008 |Direct site (attribute)|
    5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case “LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
    6. LOINC Component -> 246093002 |Component (attribute)| and 704325000 |Relative to (attribute)|possible other attributes as noted in the following considerations:

a. Use the “Loinc_Detail_Type_1” file sent recently by RII (the “ Loinc_Detail_Type_1_Parts” sheet should have all the information needed). For every LOINC Term:
    i. If the “PartNumber” and “Part” fields (column B and D) are the same for COMPONENT_PN and COMPNUM → use COMPNUM_PN LOINC Part map to model SCT Component
    ii. If the “PartNumber” and “Part” fields (column B and D) are **not** the same for COMPONENT_PN and COMPNUM →
        1. Check if there is COMPDENOM_PN LP
            a. If yes, use COMPNUM_PN LOINC Part in mapping as SCT Component and use COMPDENOM LOINC Part in mapping as SCT Relative to
            b. Exception: When the COMPDENOM_PN contains “100“, e.g., “100 leukocytes”, proceed with the following after completing step above:
                i. Also include another attribute 246514001 |Units (attribute)| with value 415067009 |Percentage unit (qualifier value)|
                ii. Update FSN and PT per rules below
            c. Go to next step
        2. Check if there is any COMPSUBPART2_PN
            a. If yes, use COMPNUM_PN LOINC Part map as SCT Component and use COMPSUBPART2_PN LOINC Part map as SCT Precondition
            b. Go to the next step
        3. Check if there is any COMPSUBPART3_PN
            a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART3) and make concept definition status primitive
            b. Go to next step
        4. Check if there is any COMPSUBPART4_PN
            a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map

COMPSUBPART4) and make concept definition status primitive

vi. For the “Process Observable for LOINC” template, the LOINC axes are modeled as such

1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
3. LOINC Time -> SNOMED 704323007 |Process duration (attribute)|
4. LOINC System -> 704327008 |Direct site (attribute)|
    a. When SYSTEM is urine and 704324001 |Process output (attribute)| value is <<105590001 |Substance (substance)|:
        i. Add 704322002 |Process agent (attribute)| = 64033007 |Kidney structure (body structure)|
        ii. Add 704321009 |Characterizes (attribute)| = 718500008 |Excretory process (qualifier value)|
5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case “LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
6. LOINC Component -> 704324001 |Process output (attribute)|plus possible other attributes as noted in the following considerations:
    a. Use the “Loinc_Detail_Type_1” file sent recently by RII (the “ Loinc_Detail_Type_1_Parts” sheet should have all the information needed). For every LOINC Term:
        i. If the “PartNumber” and “Part” fields (column B and D) are the same for COMPONENT_PN and COMPNUM_PN → use COMPNUM_PN LOINC Part map to model SCT Component
        ii. If the “PartNumber” and “Part” fields (column B and D) are not the same for COMPONENT_PN and COMPNUM →
            1. Check if there is any COMPSUBPART2_PN
                a. If yes, use COMPNUM_PN LOINC Part map as SCT Component and use COMPSUBPART2 LOINC Part map as SCT Precondition
                b. Go to the next step
            2. Check if there is any COMPSUBPART3_PN
                a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART3) and make concept definition status primitive
                b. Go to next step

3. Check if there is any COMPSUBPART4_PN
    a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART4) and make concept definition status primitive

vii. For the “Process Observable for LOINC - No Process output, With Time Aspect” template, the LOINC axes are modeled as such

1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
3. LOINC Time -> SNOMED 370134009 |Time aspect (attribute)|
4. LOINC System -> 704327008 |Direct site (attribute)|
5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case “LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
6. LOINC Component -> 704321009 |Characterizes (attribute)|plus possible other attributes as noted in the following considerations:
    a. Use the “Loinc_Detail_Type_1” file sent recently by RII (the “ Loinc_Detail_Type_1_Parts” sheet should have all the information needed). For every LOINC Term:
        i. If the “PartNumber” and “Part” fields (column B and D) are the same for COMPONENT_PN and COMPNUM_PN → use COMPNUM_PN LOINC Part map to model SCT Component
        ii. If the “PartNumber” and “Part” fields (column B and D) are not the same for COMPONENT_PN and COMPNUM →
            1. Check if there is any COMPSUBPART2_PN
                a. If yes, use COMPNUM_PN LOINC Part map as SCT Component and use COMPSUBPART2 LOINC Part map as SCT Precondition
                b. Go to the next step
            2. Check if there is any COMPSUBPART3_PN
                a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART3) and make concept definition status primitive
                b. Go to next step
            3. Check if there is any COMPSUBPART4_PN
                a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map

COMPSUBPART4) and make concept definition status primitive

viii. For the “Quality observable with Component and Relative to for LOINC Ratios” template, the LOINC axes are modeled as below. Note the stated Is a parent will be 540131010000107 |Ratio observable (observable entity)|. Note formatting of descriptions in the template as the PT here is different than the FSN.

1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
2. LOINC Scale -> SNOMED 370132008 |Scale type (attribute)|
3. LOINC Time -> SNOMED 370134009 |Time aspect (attribute)|
4. LOINC System -> 704327008 |Direct site (attribute)|
5. LOINC Method -> SNOMED 246501002 |Technique (attribute)|EXCEPT if the value concept in LP map file is to a concept < 49062001 |Device (physical object)| in which case “LOINC Method -> SNOMED 424226004 |Using device (attribute)|.
6. LOINC Component -> 246093002 |Component (attribute)| and 704325000 |Relative to (attribute)|possible other attributes as noted in the following considerations:
    a. Use the “Loinc_Detail_Type_1” file sent recently by RII (the “ Loinc_Detail_Type_1_Parts” sheet should have all the information needed). For every LOINC Term:
        i. If the “PartNumber” and “Part” fields (column B and D) are the same for COMPONENT_PN and COMPNUM → use COMPNUM_PN LOINC Part map to model SCT Component
        ii. If the “PartNumber” and “Part” fields (column B and D) are **not** the same for COMPONENT_PN and COMPNUM →
            1. Check if there is COMPDENOM_PN LP
                a. If yes, use COMPNUM_PN LOINC Part in mapping as SCT Component and use COMPDENOM LOINC Part in mapping as SCT Relative to
                b. Go to next step
            2. Check if there is any COMPSUBPART2_PN
                a. If yes, use COMPNUM_PN LOINC Part map as SCT Component and use COMPSUBPART2_PN LOINC Part map as SCT Precondition
                b. Go to the next step
            3. Check if there is any COMPSUBPART3_PN
                a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map

COMPSUBPART3) and make concept definition status primitive

b. Go to next step

4. Check if there is any COMPSUBPART4_PN
    a. If yes, use COMPNUM_PN LOINC Part map as SCT Component (do not map COMPSUBPART4) and make concept definition status primitive

ix. For the "Quality observable with Component for LOINC Grouper" template, the LOINC axes are modeled as such:

1. LOINC Property -> SNOMED 370130000 |Property (attribute)|
2. LOINC System -> 704327008 |Direct site (attribute)|
3. LOINC Component -> 246093002 |Component (attribute)|plus possible other attributes as noted in the following considerations:
    a. Use the "Loinc_Detail_Type_1" file sent recently by RII (the " Loinc_Detail_Type_1_Parts" sheet should have all the information needed). For every LOINC Term:
        i. If the "PartNumber" and "Part" fields (column B and D) are the same for COMPONENT_PN and COMPNUM_PN → use COMPNUM_PN LOINC Part map to model SCT Component
        ii. If the "PartNumber" and "Part" fields (column B and D) are not the same for COMPONENT_PN and COMPNUM → do not create concept.

i. FSN and acceptable descriptions to be created using the descriptions table in the templates and then modified as follows:

i. Descriptions from LOINC added via script:

1. LOINC Long Common Name -> this is PT as noted in template
2. LOINC Display Name -> acceptable description
3. LOINC Fully Specified Name -> acceptable description

~~ii. Note: scale no longer appears in the FSN and PT (the templates have been updated). Scale is still included in the modeling.~~

iii. Note: Scale generally does not appear in the SNOMED FSN and acceptable description. Scale is still included in the modeling. An exception is made for the SNOMED FSN and acceptable description when exclusion of scale in the terming would result in a duplicate FSN. For these concepts, scale should be included in the SNOMED FSN and acceptable description using a format where the descriptions begins with: "[scale] of [property]...." The scale term should be derived from the SNOMED CT property value. Examples:

1. 106433-6cefoxitin:Susc:Pt:Isolate:Ord should have FSN of "Ordinal value of susceptibility to cefoxitin in microbial isolate at point in time

(observable entity)" and acceptable description of "Ordinal value of susceptibility to cefoxitin in microbial isolate at point in time"

2. 18888-8cefOXitin:Susc:Pt:Isolate:OrdQn should have FSN of "Ordinal or quantitative value of susceptibility to cefoxitin in microbial isolate at point in time (observable entity) and acceptable description of "Ordinal or quantitative value of susceptibility to cefoxitin in microbial isolate at point in time"
3. 19765-7 Observation:Prid:Pt:Cvx/Vag:Nom:Cyto stain would have FSN of "Nominal value of microscopic observation of finding in specimen from cervix or vagina at point in time by cytology stain (observable entity)" and acceptable description of "Nominal value of microscopic observation of finding in specimen from cervix or vagina at point in time by cytology stain"
4. 19766-5 Observation:Prid:Pt:Cvx/Vag:Nar:Cyto stain would have FSN of "Narrative value of microscopic observation of finding in specimen from cervix or vagina at point in time by cytology stain (observable entity) and acceptable description of "Narrative value of microscopic observation of finding in specimen from cervix or vagina at point in time by cytology stain"

iv. Remove "technique" and semantic tag from the value of Technique (attribute) FSN

1. Example: for 702873001 |Calculation technique (qualifier value)|, use "calculation" in the FSN of the observable entity concept (this is the FSN "Calculation technique" with "technique" and semantic tag removed)
2. EXCEPTION:
    a. When the value of Technique (attribute) is 570101010000100 |Automated technique (qualifier value)|, then keep "technique" in the descriptions generated from SNOMED concepts (FSN and acceptable descriptions), e.g., include "Color of urine in specimen by automated technique" rather than "Color of urine in specimen by automated"
    b. When the value of Technique (attribute) is 703690001 |Confirmatory technique (qualifier value)|, then keep "technique" in the descriptions generated from SNOMED concepts (FSN and acceptable descriptions), e.g., include "Presence of xylazine in urine at point in time by confirmatory technique (observable entity)" rather than "Presence of xylazine in urine at point in time by confirmatory (observable entity)"

v. Remove "calculation" and if needed semantic tag from the value of Component (attribute) when this is being populated from the Component (attribute) value

1. Example: for 540101010000101 |Anion gap calculation (calculation)|, use “anion gap” in the FSN and PT of the observable entity concept

vi. Remove “single” and semantic tag when using 123029007 |Single point in time (qualifier value)|. Terming should just include “point in time.”

vii. If the value of 370134009 |Time aspect (attribute)| includes “hours,” then changes the “at” to “in” in the descriptions.

1. Example: for 123027009 |24 hours (qualifier value)|, in the FSN and PT use “in 24 hours” instead of “at 24 hours”

viii. Remove “specimen” and “structure” and “**submitted as specimen”**and words like “of,” “from,” “at,” etc from the FSN in the terming of the observable entity concept when bringing in the descriptions from the Direct site (attribute) value FSN

1. Example:
    a. For 122575003 |Urine specimen| in Direct site (attribute), “urine” should be used in the FSN and PT of the observable entity concept rather than “urine specimen”
    b. For 119365002 |Specimen from wound (specimen)| in Direct site (attribute), use “wound” in the FSN and PT of the observable entity concept rather than “specimen from wound”
2. Exception:
    a. Keep “specimen” in the FSN and PT of concepts modeled by “specimen” or “XXX specimen”. E.g., see ~~74384-9~~ or Barbital:PrThr:Pt:XXX:Ord. This is applicable to all LOINC terms that are defined by a generic SYSTEM LOINC Parts i.e.:
        i. LP7593-9 Specimen
        ii. LP7735-6 XXX
        iii. LP189538-4 XXX.body fluid
    b. Keep “specimen” in the FSN and descriptions of concepts that have COMPNUM_PN = LP442509-8 - Observation
    c. Keep “specimen” in the FSN and descriptions of concepts that include “obtained by” in the SNOMED specimen concept value, e.g., for concepts modeled with 119295008 |Specimen obtained by aspiration (specimen)| the FSN should be “Presence or identity of Amoeba in specimen obtained by aspiration at point in time by immunohistochemistry (observable entity)” rather than “Presence or identity of Amoeba in obtained by aspiration at point in time by immunohistochemistry (observable entity)”.

ix. Remove “(property)” if it appears in the descriptions of any of the observable entity concepts, e.g,. If 734842000 |Source (property) (qualifier value)| with current PT “Source (property)” is used as a value of Property (attribute), it should be rendered as “Source…” rather than “Source (property)” in the FSN of the LOINC observable concept.

x. Remove taxon rank from the FSN of any concept from the organism hierarchy. Use FSN of organism name (minus semantic tag and minus taxon rank designation, e.g, "genus"). The list of taxon rank terms which should be excluded from the descriptions include:
    a. Clade
    b. Class
    c. Division
    d. Domain
    e. Family
    f. Genus
    g. Infraclass
    h. Infraclass
    i. Infrakingdom
    j. Infraorder
    k. Infraorder
    l. Kingdom
    m. Order
    n. Phylum
    o. Species
    p. Subclass
    q. Subdivision
    r. Subfamily
    s. Subgenus
    t. Subkingdom
    u. Suborder
    v. Subphylum
    w. Subspecies
    x. Superclass
    y. Superdivision
    z. Superfamily
    aa. Superkingdom
    bb. Superorder
    cc. Superphylum
2. Example:
    a. For 409822003 |Domain Bacteria (organism)| in Inheres in (attribute), use “Bacteria” in the FSN and PT of the observable entity concept rather than “Domain Bacteria.”

xi. When the the LP includes “/100” and the Units (attribute) has value 415067009 |Percentage unit (qualifier value)|, then the descriptions are updated as follows:
1. Do not include the value of 370130000 |Property (attribute)| in the FSN.
2. Include “percentage” in the [property] slot in the FSN

3. Example, for LOINC “Monocytes/100 leukocytes,” the FSN would include “percentage of monocytes to leukocytes” (when population rule is incorporated as well)

xii. Case sensitivity of the term values should be followed
   1. Example, for 702873001 |Calculation technique (qualifier value)|, use “calculation” rather than “Calculation” in the FSN and PT of the observable entity concept as the case sensitivity for the PT “Calculation technique” is ci (entire term case insensitive)

xiii. If the LOINC Term Component contains a COMPSUBPART3_PN or COMPSUBPART4_PN LP, as previously noted, do not model the COMPSUBPART3_PN or COMPSUBPART4_PN LP but **do** include the name of the COMPSUBPART3_PN or COMPSUBPART4_PN LP in the description in the FSN and PT, *appended to* the associated attribute value (Component or Inheres in depending on template).
   1. **Note that the COMPNUM_PN LP is still mapped to Component or Inheres in depending on the template**
   2. Examples:
      a. 17938-2 Bacteria # 3 identified in Burn by Culture is currently shown in the test file as Presence or identity of [COMPONENT] in specimen burn injury at point in time by microbial culture (observable entity) in the latest file.
         i. Would be included as the following using the new rule: Presence or identity of Bacteria identified^^^3 in specimen burn injury at point in time by microbial culture (observable entity)
         ii. Note the COMPNUM_PN is still mapped to Bacteria for Inheres in
      b. 19254-2 Oxygen [Partial pressure] adjusted to patient's actual temperature in Blood
         i. Would be included as the following using the new rule: Partial pressure of oxygen^^adjusted to patient's actual temperature in blood at point in time (observable entity)
         ii. Note the COMPNUM_PN is still mapped to Oxygen for Component
      c. 91671-8 Transferrin.carbohydrate deficient.disialo/Transferrin.total standardized per IFCC-RMP for CDT in Serum or Plasma
         i. Would be included as the following using the above rule: Mass fraction of disialotransferrin to transferrin.total standardized per IFCC-RMP for CDT in serum or plasma at point in time (observable entity)

ii. **Note the COMPNUM_PN is still mapped to Disialotransferrin (substance) for Component and COMPDENOM_PN is still mapped to Transferrin (substance) for Relative to**

xiv. Similar to above if an attribute is not mapped, do not model it, but do include the name of the attribute in the description in the FSN and PT in place of the associated attribute value. The name should be taken from the part list.

1. EXCEPTIONS:
    a. TIME LP6969-2 XXX will be unmapped but we do not want the name of the LP appearing in the FSN and PT in place of the associated attribute value.
    b. LOINC concepts defined by an LP of * from the following list. These LPs are not mapped to any SNOMED CT concept but we do not want the name of the LP to appear in the SNOMED CT FSN and acceptable description in place of the associated attribute value.
        i. TIME LP6901-5 *
        ii. METHOD LP28805-7 *
        iii. SYSTEM LP6975-9 *
2. Examples:
    a. 85773-0 - Presence of Escherichia coli in microbial isolate at point in time (observable entity)" should be Presence of Escherichia coli in microbial isolate at point in time using Non-probe.amp.tar (observable entity)
        i. LP METHOD Non-probe.amp.tar will not be mapped to any SNOMED concept but should appear in the concept descriptions
    b. Example of exception: "33599-2 Amylase [Enzymatic activity/volume] in Urine collected for unspecified duration" should be "Catalytic concentration of amylase in urine (observable entity)."

xv. If the **LP COMPNUM_PN** or LP COMPDENUM, or LP SYSTEM_PN contains one (or more) of the following words: "unidentified", "other", "NOS", "unk sub", "unknown", "unspecified", "Abnormal", "total", **"Hemoglobin XXX", "tested for"**, then model the concept as per usual but include the LP COMPNUM_PN or LP SYSTEM_PN or COMPDENOM_PN part name in the FSN and PT (rather than SNOMED concept name) and make the concept primitive.

1. Example: for 48704-1 Unidentified cells [#/volume] in Blood
    a. FSN: Number concentration of unidentified cells in blood (observable entity)

b. LP18501-4 COMPNUM_PN Unidentified cells is mapped to 4421005 |Cell structure (cell structure)| (and modeled as Component (attribute) value for this template type)
c. Concept status is primitive

xvi. Case sensitivity of all LOINC descriptions (e.g., LOINC long common name) should be CS

3. Add in the following names from LOINC as acceptable descriptions to the SNOMED observable entity concepts (note LOINC long common name is PT as shown in templates):
    a. LOINC FSN
    b. LOINC display name
4. Add in LOINC Term identifier to observable entity concept and add in LOINC Part identifier to SNOMED foundational hierarchy concepts -> alternate identifier file
5. Create new observable entity concepts in the LOINC Extension project in the AP
6. FAS and SSA to review concepts, classify, validate, etc and report back any issues to Peter
7. Example of how content should look:
    a. For LOINC Term 10834-0 (https://loinc.org/10834-0/).
        i. Template to be used. See property-template modeling rules noted above:
            1. LOINC Property of MCnc uses the "Quality observable with Component for LOINC" template (https://confluence.ihtsdotools.org/x/2xb8CQ)
        ii. Terming. When updating descriptions, consider the rules noted above:
            1. FSN: Mass concentration of globulin in serum at point in time by calculation (observable entity)
            2. PT: Mass concentration of globulin in serum at point in time by calculation
            3. Acceptable description of the LOINC long common name added to SNOMED concept: Globulin [Mass/volume] in Serum by calculation
            4. Acceptable description of the LOINC FSN added to SNOMED concept: Globulin:MCnc:Pt:Ser:Qn:Calculated
        iii. Modeling:
            1. Is a 363787002 |Observable entity (observable entity)|
            2. 370130000 |Property (attribute)| with value 118539007 |Mass concentration (property) (qualifier value)
            3. 370132008 |Scale type (attribute)| with value 30766002 |Quantitative (qualifier value)|
            4. 370134009 |Time aspect (attribute)| with value 123029007 |Single point in time (qualifier value)|
            5. 704327008 |Direct site (attribute)| with value 119364003 |Serum specimen (specimen)|
            6. 246501002 |Technique (attribute)| with value 702873001 |Calculation technique (qualifier value)|
            7. 246093002 |Component (attribute)| with value 81905004 |Globulin (substance)|

iv. LOINC Identifier: LOINC Term ID represented in SNOMED concept - TBD by Tech Team

8. For the following LPs, the SCT mapping is to 4421005 |Cell structure (cell structure)| with the PT of " Cell structure". We have changed the PT to "Cell" for the next release, but in the meantime "structure" need to be removed from the descriptions (FSN and PT):
    a. LP18364-7 Unspecified cells
    b. LP29015-2 Cells counted.total
    c. LP174115-8 cells
    d. LP32021-5 Cells.total
9. When PROPERTY is Prid and LOINC Component is LP442509-8 Observation, update the SNOMED FSN and SNOMED descriptions as below.
    a. Property value is not included in FSN
    b. LOINC Component LP442509-8 Observation is unmapped and not included in FSN (and is an allowed exception in 2.d. at beginning of this document)
    c. Include "Microscopic observation of finding" in place of [property] and include "in" in place of "of" prior to [inheres in] in the SNOMED descriptions.
    d. Examples:
        i. 32188-5 with long common name of "Microscopic observation [Identifier] in Cerebral spinal fluid by Acid fast stain" would be rendered as:
            1. FSN: Microscopic observation of finding in cerebrospinal fluid at point in time by acid fast stain (observable entity)
            2. PT: Microscopic observation [Identifier] in Cerebral spinal fluid by Acid fast stain
            3. Acceptable description: Microscopic observation of finding in cerebrospinal fluid at point in time by acid fast stain
        ii. 105059-0 with long common name of "Microscopic observation [Identifier] in Specimen" would be rendered as:
            1. FSN: Microscopic observation of finding in specimen at point in time (observable entity)
            2. PT: Microscopic observation [Identifier] in Specimen
            3. Acceptable description: Microscopic observation of finding in specimen at point in time