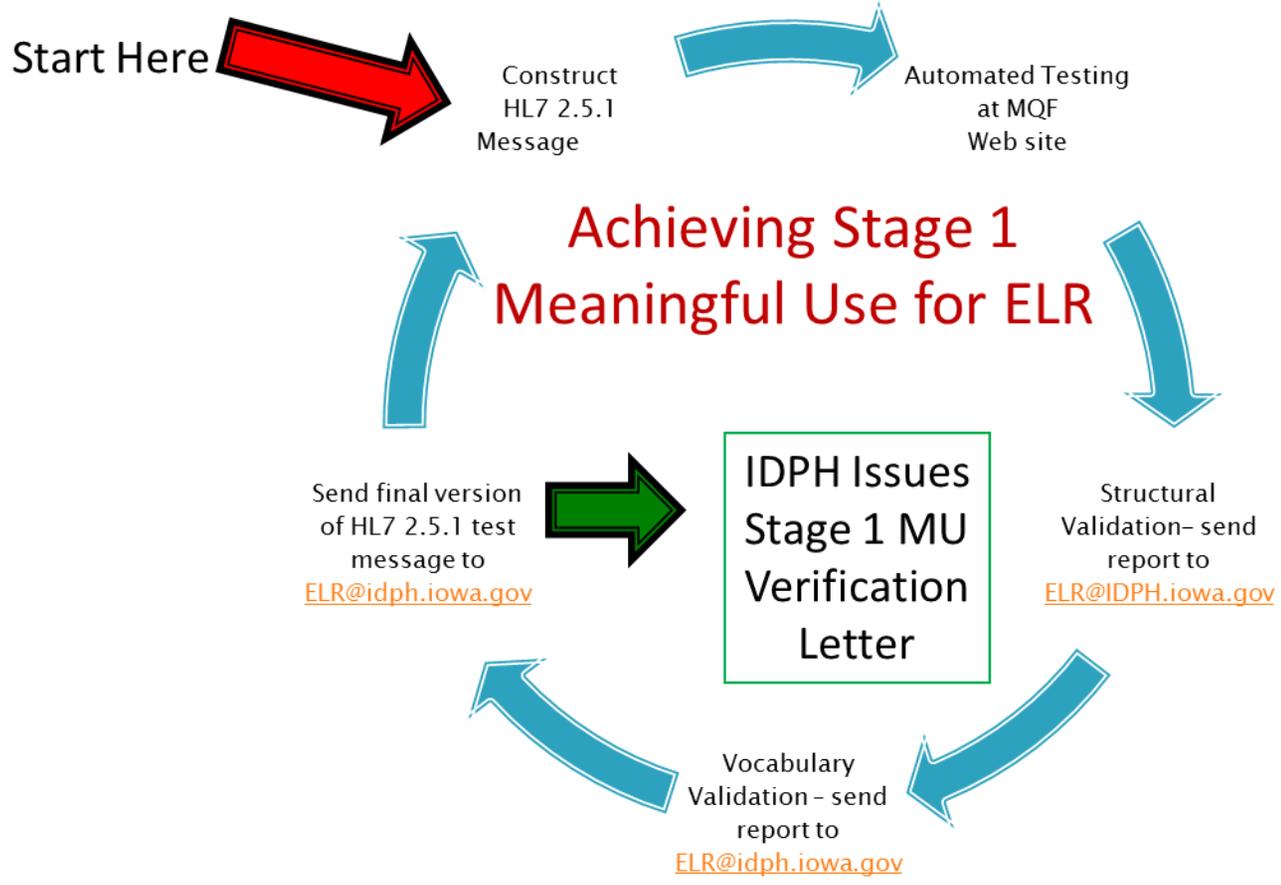


# Achieving Stage 1 Submitting the HL7 2.5.1 Test Message



(Excerpt from Page 17-19 of the IDPH Implementation Guide and Constrained Profile)

## The Message Quality Framework (MQF) – Initial Step towards Stage 1 Meaningful Use

Any Iowa reporting facility pursuing the Stage 1 Meaningful Use for electronic laboratory reporting objective is directed to use the MQF as the initial step before contacting IDPH for test message validation. The MQF is a web site maintained by the Centers for Disease Control and Prevention capable of providing detailed feedback on test messages to instruct senders on proper message construction. A feature of this website allows for a pre-validation (both structural and vocabulary/content validation) of standard HL7 2.5.1 messages. The results can be sent from the MQF web site directly to IDPH to indicate the first steps in constructing the message (structural and content pre-validation) have been achieved. Use of the MQF allows reporting facilities to achieve a high-level of compliance with the HL7 2.5.1 message standard as quickly as its resources allow, without requiring feedback from IDPH.

The following specific steps should be followed when using the MQF to pre-validate the standard HL7 2.5.1 ELR message:

- A. Construct a message according to the specifications found in this IDPH Constrained ELR251 Lab Sender Profile for an **enteric culture** test identifying **Salmonella Species** as the organism. See example message in the section Appendix A on page 136.
- B. Navigate to the MQF web site at <https://phinmqf.cdc.gov/default.aspx>
- C. Review the MQF release notes by clicking on the Release Notes hyperlink under References in the left margin of the web page
- D. Select the preferred message domain
  1. The '**Iowa Enteric Culture Profile**' is the preferred message domain, if available at the time of the test
  2. The '**Meaningful Use-Electronic Laboratory Reporting Receiver Profile**' is an acceptable message domain
- E. Select the appropriate "Load From" setting
  1. Select 'File' if uploading the message
  2. Select 'Cut and Paste Message' if pasting the test message
- F. Load the message
- G. Click the Submit button to perform the first of two levels of pre-validation: Structural validation
  1. Make modifications in the source system that generates the test message **until you achieve a result that contains only the known errors** found in the document referenced in 2 below.
  2. See the 'MQF Known Errors' document at <http://www.idph.state.ia.us/adper/idss.asp>.
  3. At this stage, **do not modify** the test message itself to achieve this objective. The purpose of this pre-validation is to get the originating system to generate a compliant message
- H. Send the pre-validation report to IDPH
  1. Click on the Print or Save button to save a copy of the report

2. Click on the Email button to open the e-mail function
3. Insert information on the e-mail template
  - I. Insert [ELR@idph.iowa.gov](mailto:ELR@idph.iowa.gov) in the To: field
  - II. Insert the official name of your facility and point of contact (POC) in the message box
  - III. Insert POC name, telephone #, and e-mail address
  - IV. If testing identifies another error that should be on the MQF Known Errors list, indicate so in the comment box.
4. Click on the Send Email button to send the report to IDPH
- I. Perform the second of two levels of pre-validation: Vocabulary validation
  1. Carefully review the errors specified in the **structural validation** report
  2. **Modify the actual test message** as needed to pass the **structural validation** without errors
  3. Click on the Yes button next to 'Perform Vocabulary Validation?'
  4. There are known errors with vocabulary validation on the MQF site. These known errors are posted under Meaningful Use for Electronic Laboratory Reporting (ELR) at <http://www.idph.state.ia.us/adper/idss.asp>
    - I. Make appropriate changes to the source system until the content of the test message reaches the point where the validation identifies only the known vocabulary validation errors
    - II. Repeat steps in H above to send the vocabulary pre-validation report to IDPH
  5. Send the final, **unmodified system-generated** message as an attachment in text format (accessible with Notepad) to the same e-mail address ([ELR@idph.iowa.gov](mailto:ELR@idph.iowa.gov)).
  6. IDPH will test this message against the MQF as a first step in its validation and expects to experience only the known errors:
    - I. The known structural validation errors
    - II. The known vocabulary validation errors
  7. If the message does not exhibit the expected results, the message will be returned to the facility point of contact, without further review by IDPH, so the sending facility can make further modifications.

In summary, the pre-validation consists of both structural and vocabulary validation performed against an enteric culture test message that identifies Salmonella Species as the result and **requires that two pre-validation reports be sent from the MQF web site to IDPH.**

Once both reports and the final, **unmodified system-generated** message have all been received, IDPH will evaluate the test message to confirm the MQF pre-validation, and issue a document verifying that your facility has achieved the Stage 1 Meaningful Use for ELR objective to the provided point of contact (POC). This places your facility in the ELR Queue. The ELR Queue concept provides a way for reporting facilities to achieve the Stage 1 objective while IDPH either completes internal infrastructure development or establishing connections with other facilities in the ELR Queue.

# Constructing the Test Message: The Scenario

---

Dr. Tom Sawyer, of the Missouri Department of Public Health, sees a patient named Injun Joe on March 1, 2012. Injun Joe is complaining of stomach cramps and diarrhea that won't go away. The patient cannot provide a symptom onset date. Dr. Sawyer obtains a stool specimen from Injun Joe.

**Patient's legal name:** Joe, Injun

**Date of birth:** 8/15/1963

**Gender:** Male

**Race:** half white, half American Indian or Alaska Native

**Ethnicity:** Hispanic

**Marital Status:** Married

**Patient Address:** 721 SPRING STREET, GRINNELL, IA 50112 USA

---

Dr. Tom Sawyer provides the stool specimen to the Missouri Department of Health Laboratory requesting an enteric culture test. The lab manager sends the specimen to the IA Public Health Lab for testing.

The IA Public Health Lab receives the stool specimen in good condition on 3/6/2012 at 1:51 PM. The information on the test request contains the patient demographic information and details about specimen collection, but no symptom information.

**Test Performed:** Bacterial Culture test

**Result:** preliminary result- Salmonella species (further testing is required to subtype the organism)

**Result Date & Time:** 3/14/2012

**Order Status:** "Some, but not all, results available" - more tests are scheduled to be performed.

# The Entire Sample Message (simple form)

---

```
MSH|^~\&|IA PHIMS Stage^2.16.840.1.114222.4.3.3.5.1.2^ISO|IA Public Health
Lab^2.16.840.1.114222.4.1.10411^ISO|IA.DOH.IDSS^2.16.840.1.114222.4.3.3.19^ISO|IA
DOH^2.16.840.1.114222.4.1.3650^ISO|201203142359||ORU^R01^ORU_R01|2.16.840.1.114222.4.3.3.5.1.2-
20120314235954.325|T|2.5.1|||AL|NE|USA|||PHLabReport-Ack^^2.16.840.1.113883.9.10^ISO
SFT|Orion Health^L|2.4.3.52854|Rhapsody|2.4.3.52854||20070725111624
PID|1||14^^^IA PHIMS Stage&2.16.840.1.114222.4.3.3.5.1.2&ISO^PI^IA Public Health
Lab&2.16.840.1.114222.4.1.10411&ISO||Joe^Injun^^^^L||19630815|M||2106-
3^White^CDCREC^^^^04/24/2007~1002-5^American Indian or Alaska Native^CDCREC^^^^04/24/2007|721
SPRING STREET^^GRINNELL^IA^50112^USA^H|||M^Married^HL70002^^^^2.5.1|||H^Hispanic or
Latino^HL70189^^^^2.5.1
ORC|RE||986^IA PHIMS Stage^2.16.840.1.114222.4.3.3.5.1.2^ISO||A|||||^SAWYER TOM
MD^^^^^^L|||||MISSOURI DEPARTMENT OF HEALTH LABORATORY - MISSOURI DEPARTMENT OF HEALTH
LABORATORY^L|307 W MCCARTY ST^^JEFFERSON CITY^MO^65101^USA^B|^WPN^PH^1^^555555
OBR|1||986^IA PHIMS Stage^2.16.840.1.114222.4.3.3.5.1.2^ISO|625-4^Bacteria identified in Stool by
Culture^LN^^^^2.33^^Enteric Culture|||20120301|||||^SAWYER TOM
MD^^^^^^L|||||201203140957||P
NTE|1|L|Enteric culture includes testing for Salmonella, Shigella, Campylobacter, Yersinia, E.coli
O157:H7 \T\ other STECs, and Aeromonas|RE^Remark^HL70364^^^^2.5.1
OBX|1|CWE|625-4^Bacteria identified in Stool by Culture^LN^^^^2.33^^result1|1|27268008^
Salmonella^SCT^^^^20090731^^Salmonella species|||A^A^HL70078^^^^2.5|||P|||20120301||||^^^^^^
Bacterial Culture||201203140957||||State Hygienic Laboratory^L^^^^IA Public Health
Lab&2.16.840.1.114222.4.1.10411&ISO^FI^^16D0648109|State Hygienic Laboratory^UI Research Park -
Coralville^Iowa City^IA^52242-5002^USA^B^^19103|^Atchison^Christopher^^^^^^L
SPM|1|^2012999999&IA PHIMS Stage&2.16.840.1.114222.4.3.3.5.1.2&ISO||119339001^Stool specimen
(specimen)^SCT^SL^Stool^L^20090731^v unknown|||||P^Patient^HL70369^^^^2.5.1|||||20120301|
201203061451
```

**Required (R)** – The field must be in the message and the field must be populated with a value.

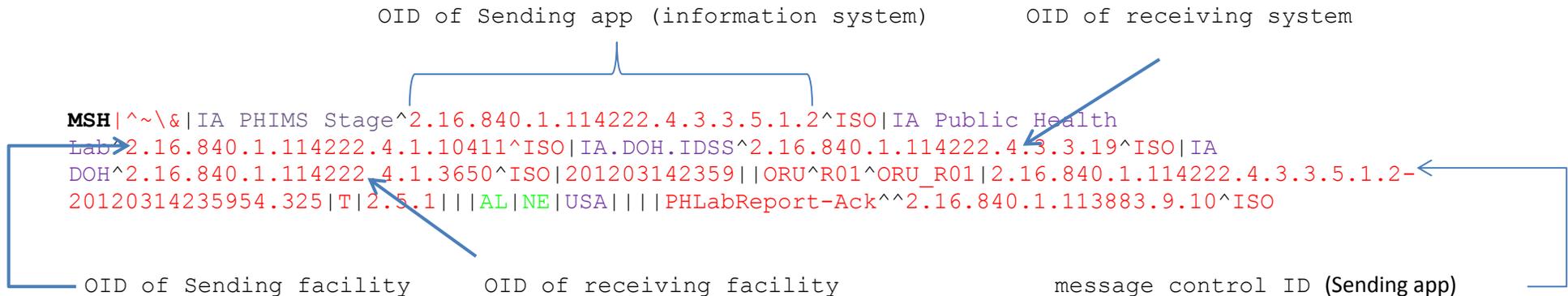
**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Message Header (MSH) Segment

The Message Header provides sending system and facility information as well as receiving system and agency information. It also contains the message control ID used to uniquely identify each message sent from the facility.



You must obtain OIDs specific to your system either from your vendor or from an organization that maintains an OID registry. See page 27 in the IDPH Implementation Guide and Constrained Profile.

OID = Universal Object Identifier

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Software (SFT) Segment

---

The software segment provides information about the sending application or the integration engine used to manipulate the message before the receiving application processes the message (preferred since sending app or information system already identified in the MSH segment).

Software release number                      Software install date

**SFT**|Orion Health^L|2.4.3.52854|Rhapsody|2.4.3.52854||20070725111624

Software binary ID  
(or repeat of Software release number)

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Patient Identification (PID) Segment

---

The Patient Identification Segment is used to provide basic demographics regarding the subject (person) being tested. The subject can be a person or an animal.

OID of Sending app (information system)

```
PID|1||14^^^IA PHIMS Stage&2.16.840.1.114222.4.3.3.5.1.2&ISO^PI^IA Public Health
Lab&2.16.840.1.114222.4.1.10411&ISO||Joe^Injun^^^^L||19630815|M||2106-
3^White^CDCREC^^^^04/24/2007~1002-5^American Indian or Alaska Native^CDCREC^^^^04/24/2007|721
SPRING STREET^^GRINNELL^IA^50112^USA^H||||M^Married^HL70002^^^^2.5.1||||H^Hispanic or
Latino^HL70189^^^^2.5.1
OID of Sending facility
```

Repeating value separator ('\~' tilt symbol) followed by a 2nd race for a biracial patient.

A Note about data types: The Data type column in the IDPH Implementation Guide identifies the Component data type, which determines the general rule to follow for the entire component even though subcomponents may have different data types.

Example: PID10 is Race and is a CWE data type. All components that use standard codes are identified as the CWE data type. So this component will follow a common pattern for CWE regardless of which segment the CWE data type component is found. Refer to IDPH Comments associated with each specific component or its subcomponent.

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Common Order Information (ORC) Segment

---

The Common Order Segment identifies basic information about the order for testing the specimen. This segment includes identifiers for the order, who placed the order, when it was placed, what action to take regarding the order, etc.

Order status code



```
ORC|RE||986^IA PHIMS Stage^2.16.840.1.114222.4.3.3.5.1.2^ISO||A|||||^SAWYER TOM  
MD^^^^^^^L|||||||MISSOURI DEPARTMENT OF HEALTH LABORATORY - MISSOURI DEPARTMENT OF HEALTH  
LABORATORY^L|307 W MCCARTY ST^^JEFFERSON CITY^MO^65101^USA^B|^WPN^PH^^1^^555555
```

The ordering physician name is required. If your system has only one field for this information, populate 12.2.1 with the first, last, and title as seen above.

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Observation Request (OBR) Segment

---

The Observation Request Segment is used to capture information about one test being performed on the specimen. Most importantly, the OBR identifies the type of testing that was requested on the specimen and ties that information to the healthcare provider ordering the test.

```
OBR|1||986^IA PHIMS Stage^2.16.840.1.114222.4.3.3.5.1.2^ISO|625-4^Bacteria identified in Stool by  
Culture^LN^^^^2.33^Enteric Culture|||20120301|||||^SAWYER TOM  
MD^^^^^L|||||201203140957|||P
```

LOINC code

LOINC Long name description

Name of coding system; LN=LOINC

LOINC codes are required in 2 different places in the HL7 2.5.1 standard message:

1. OBR4 - above
2. OBX3 - below

Whenever considering a standard code (LOINC or SNOMED), there is always a 'triplet' associated with each location. The 'triplet' refers to the 3 components that always are used together:

1. The code value itself
2. The description of the code (either the Long Name or the Short Name description)
3. The name of the coding system.

The standard code set should always occupy the first triplet position and the local code set, if included, should always occupy the second triplet position. The example above does not include populated values for the local codes set.

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Notes and Comments (NTE) Segment

---

The Notes and Comments Segment is used to convey additional comments regarding the associated segment. The NTE segment is not intended for automatic processing. The contents of the NTE segment are primarily intended for human use. Automated process should not be based upon the contents of NTE-3 (Comment); rather the content of that field should be displayed to humans.

```
NTE|1|L|Enteric culture includes testing for Salmonella, Shigella, Campylobacter, Yersinia, E.coli  
0157:H7 \T\ other STECs, and Aeromonas|RE^Remark^HL70364^^^^2.5.1
```

An NTE segment may, but is not required to, accompany the PID segment, the OBR segment, or the OBX segment. At IDPH, OBR and OBX NTE segments will be combined into the ELR Notes associated with each separate result. NTE segments linked to the PID segment are not presently mapped at IDPH and will be ignored unless IDPH learns that a PID NTE segment is commonly used.

IDPH is unable to perform text analysis of the Comments component of the NTE segment. For this reason, information that is assumed for automatic processing due to the very nature of interoperability should not be inserted into the NTE segment. Information sent using the Comments in the NTE segment are for human consumption only.

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Observation Result (OBX) Segment

---

The Observation/Result Segment contains information regarding a single observation related to a single test (OBR segment) or specimen (SPM segment). This includes identification of the specific type of observation, the result for the observation, when the observation was made, as well as other information related to the observation such as the onset date of symptoms.

OBX5.9=CWE9                      OBX8 Abnormal Flags                      SNOMED code OBX5.1=CWE1

```
OBX|1|CWE|625-4^Bacteria identified in Stool by Culture^LN^^^^2.33^^result1|1|27268008^
Salmonella^SCT^^^^20090731^^Salmonella species|||A^A^HL70078^^^^2.5|||P|||20120301|||^^^^^^
Bacterial Culture||201203140957|||State Hygienic Laboratory^L^^^^IA Public Health
Lab&2.16.840.1.114222.4.1.10411&ISO^FI^^^^16D0648109|State Hygienic Laboratory^UI Research Park -
Coralville^Iowa City^IA^52242-5002^USA^B^^19103|^Atchison^Christopher^^^^^^L
```

CWE is the expected data type for non-quantitative lab results. The data type in OBX2 changes the layout of OBX5 and the rules that apply (see p. 113 in the IDPH Implementation Guide "OBX.5 Table: Observation Value data types," which addresses different data types).

In electronic laboratory reporting (ELR), SNOMED codes are used to communicate laboratory results, specimen types, and specimen body site information.

There are 3 places where SNOMED codes are required in this simple message:

1. OBX5 – the laboratory result in this segment above
2. SPM4 – the specimen type in the next segment below; example: 25840006^Cerebrospinal fluid sample (specimen)^SCT
3. SPM8 – the specimen source site in the next segment below; example: 314221009^Ascending spinal cord tract (body structure)^SCT.

**smartLab –related revision: note about the first and second triplet on next page.**

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.

# The Specimen Information (SPM) Segment

The Specimen Information Segment describes the characteristics of a single sample. The SPM segment carries information regarding the type of specimen, where and how it was collected, who collected it and some basic characteristics of the specimen.

```
SPM|1|^2012999999&IA PHIMS Stage&2.16.840.1.114222.4.3.3.5.1.2&ISO|119339001^Stool specimen  
(specimen)^SCT^SL^Stool^L^20090731^v unknown|||372237002^Rectum part (body structure)^SCT|||  
P^Patient^HL70369^^^2.5.1|||||20120301|201203061451
```

SNOMED code (specimen type)

SNOMED code (specimen source site)

Name of coding system; SCT=SNOMED CT

SNOMED description

## SNOMED Code resources:

1. A decent free SNOMED browser can be found at <http://vtsl.vetmed.vt.edu/>
2. RCMT Table found at <https://phinvads.cdc.gov/vads/SearchHome.action>

**smartLab-related Revision:** the smartLab looks at the values of the second triplet (e.g. SPM4.4 & 4.5) and finds the corresponding code in the IDPH code set in the facility-specific mapping profile and overwrites the first triplet values with the corresponding IDPH code set values. IDPH internal systems then look at values in the first triplet of the messages received from the smartLab. The values that appear in the second triplet of the HL7 message are the values that should be mapped in the smartLab.

**Required (R)** – The field must be in the message and the field must be populated with a value.

**Required/Empty (R/E)** – The field must be in the message, but it does not have to be populated. Send it if you have it.

**Conditional (C)** – If the condition is met, this field must be in the message and must be populated with a value.

**Conditional/Empty (CE)** – If the condition is met, this field must be populated; if the condition is not met, this field must be empty.