V2.1

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# Introduction

The *HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health (US Realm), Release 1(*ELR251R1) is the public health version of the *HL7 U.S. Realm - Interoperability Specification: Lab Result Message to EHR.*. The use case describes the transmission of laboratory-reportable findings to appropriate local, state, territorial and federal health agencies using the HL7 2.5.1 ORU^R01 message. It includes a reference to batch processing. It does not cover querying patient demographics or querying of laboratory results.

## Current Release

HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health (US Realm), Release2 (ERL251R2) is the successor to ELR251R1. It is the product of several related efforts that directly impacted Release 1 as well a wealth of experience gained through the implementation of ELR251R1. We integrated the errata and clarifications document was approved by the HL7 Public Health and Emergency Response Work Group (PHER WG) in September of 2011 and published as part of the ELR251R1 IG package. We also incorporated the 2.5.1 Clarification Document for EHR Technology Certification V1.1 that was created for 2014 EHR certification criteria which summarized conformance statements and condition predicates based upon the release1 IG as well as identifying further clarifications, errata and non-implementable elements. http://www.cdc.gov/ehrmeaningfuluse/Docs/1ELR251\_Clarification\_EHR\_Tech\_Cert\_v1\_1-20121016.pdf. References to other receiver profiles based on the Lab Result Message to EHR.and the NHSN Receiver were removed from this document, because these guides have been superseded by more recent documents including the .

Moreover, the guide was rewritten to conform to the base profile based on the HL7 Version 2.5.1 Implementation Guide: S&I Framework Lab Results Interface, Release 1 – US Realm (LRI DSTU). All References to other receiver profiles based on the Lab Result Message to EHR.and the NHSN Receiver were removed from this document, because these guides have been superseded by more recent documents including the LRI guide. This allowed us to create a Public Health component that can be combined with the LRI base profile to create an ELR message profile, but is fully backwards compatible with release 1. The decision was made to create the Draft Standard for Trial Use to further align the ELR guide development with the family S&I framework laboratory guides.

## Purpose

This guide contains the necessary specifications for laboratory results reporting to local, state, territorial and federal health agencies. In particular, this guide addresses messaging content and dynamics related to the transmission of Laboratory Reportable Result Messages. Each state and territory has requirements for laboratories to report certain findings to health officials. In the past, these reports were written by hand on forms provided by health departments and mailed to appropriate offices. With computerization of laboratories, it has become possible for laboratories to send reportable data to health departments electronically. The message described in this guide is not specific to any pathogen or reportable condition and is applicable for most biological and chemistry laboratory-reportable findings

This document is intended to meet the needs and requirements of implementation guidance in Public Health entities, replacing the previous documentation regarding Electronic Laboratory Reporting (ELR). However, it does not replace the need for each public health jurisdiction to document the constraints of their specific implementation. Further guidance on how to do this is given in section 1.4.4 Usage Conformance Testing Recommendations below.

## Condition Reporting

Authority to establish a list of reportable conditions and to specify the content of those reports resides with the individual public health jurisdiction. A joint Centers for Disease Control and Prevention (CDC) – Council of State and Territorial Epidemiologists (CSTE) project is underway, which has the goal of creating a national knowledge management system containing this information. For information on current status, email [PHIN@cdc.gov](mailto:PHIN@cdc.gov).

Until the knowledge management system is completed, reporters can access further information about reportable conditions at the website for their own Public Health jurisdiction, or for information on the national defintions, at the CSTE web site:   
<http://www.cste.org/dnn/ProgramsandActivities/PublicHealthInformatics/tabid/346/Default.aspx>

## Audience

This guide is designed for use by analysts and developers who require guidance on data elements and components of the *HL7 Version 2.5.1 ORU Unsolicited Observation Message* relative to the *Public Health Lab Result/ELR Use Case*. Users of this guide must be familiar with the details of HL7 message construction and processing. This guide is not intended to be a tutorial on that subject.

### Requisite Knowledge

* HL7 V2.5.1, V2.7, V2.7.1 Messaging ([www.HL7.org](http://www.HL7.org))
* SNOMED (www. <http://www.ihtsdo.org/snomed-ct>)
* LOINC (<http://loinc.org>)
* UCUM (<http://unitsofmeasure.org>)
* OIDS (<http://www.hl7.org/oid>)
* [Standards and Interoperability Laboratory Results Interface Use Case, *Laboratory Results Reporting to Primary Care Providers (in an Ambulatory Setting) v1.0*](http://sibrowser.siframework.org/siclient/view?type=artifact&id=39481918-9dc7-4f55-aa77-f978b4c13d8b&name=SIFramework_LRI_UC.docx)

## Organization of this Guide

### Conventions

This guide adheres to the following conventions:

* The guide is constructed assuming the implementer has access to the 2.5.1 and 2.7.1 versions of the HL7 Standard. Although some information from the standard is included in this implementation guide, much information from the standard has not been repeated here.
* The rules outlined in *HL7 2.7.1*, *Chapter 2B*, *Section 2B5*, *Conformance Using Message Profiles*, were used to document the use case for, and constraints applied to, the messages described in this guide.
* Data types have been described separately from the fields that use the data types.
* No conformance information is provided for optional message elements (“O”) or unsupported (“X”). This includes cardinality, value sets and descriptive information. Implementers who want to use optional message elements should refer to the base HL7 V2.5.1 Standard to determine how these optional message elements will be used.
* For details regarding data type field lengths, please refer to *Section* , *Lengths*, in this document.
* This guide uses “X” as a conformance usage indicator very sparingly. Where the underlying standard indicates the segments/field/component is present for backwards compatibility (“B”) or withdrawn ("W") an “X” will be used. A small number of other message elements that are clearly out of scope for the use case have been given the "X" usage. All other message elements have either been further constrained to “R”/”RE”/”C(a/b)” or have been marked as "O" to enable trading partners to explore additional capabilities. Labs would have insufficient information to populate these fields and if they would, it could cause potential confusion with information present on the provider's system. Note that without a clearly agreed to complementary profile between trading partners, a Lab does not have to send any elements marked as "O", nor does a receiver of a lab result have to process any elements marked as "O". Neither trading partners can mandate the other to accept any such complementary profiles to enable basic laboratory results interfacing "out-of-the-box".

### Message Element Attributes

The following table describes the various attributes used by this guide to document data type attribute tables, message structure attribute tables and segment attribute tables. Not all attributes apply to all attribute tables.Message Element Attributes

| Table 1‑1. Message Element Attributes | |
| --- | --- |
| Attribute | Definition |
| Seq | Sequence of the elements as numbered in the HL7 message element. The Seq attribute applies to the data type attribute table and the segment attribute table. |
| Segment | Three-character code for the segment and the abstract syntax (*e.g.*, the square and curly braces).  [ XXX ] Optional  { XXX } Repeating  XXX Required  [{ XXX }] Optional and Repeating  Note that for segment groups there is no segment code present, but the square and curly braces will still be present.  The Segment attribute only applies to the Message attribute table. |
| Length | Maximum length of the element. Lengths are provided only for primitive data types.  The length attribute apples to data type attribute tables and segment attribute tables.  Lengths should be considered recommendations, not absolutes. The receiver can truncate fields, components and sub-components that are longer than the recommended length. The receiver should continue to process a message even when a field, component, or sub-component length exceeds the maximum recommended length identified in this specification.  The length attribute may contain a character indicating how the data may be truncated by a receiver. The truncation characters are defined as follows:   * = Truncation not allowed * # Truncation allowed * No character indicates the truncation behavior is not defined. |
| DT | Data type used by this profile for HL7 element.  The data type attribute applies to data type attribute tables and segment attribute tables. |
| Usage | Usage of the message element for this profile. Indicates whether the message element (segment, segment group, field, component, or subcomponent) is R, RE, O, X or C(a/b) in the corresponding message element. Usage applies to the message attribute table, data type attribute table and the segment attribute table, see Section 1.4.4 Usage Conformance Testing Recommendations below. |
| Cardinality | Minimum and maximum number of times the element may appear.  [0..0] Element never present.  [0..1] Element may be omitted and can have, at most, one occurrence.  [1..1] Element must have exactly one occurrence.  [0..n] Element may be omitted or may repeat up to *n* times.  [1..n] Element must appear at least once, and may repeat up to *n* times.  [0..\*] Element may be omitted or repeat an unlimited number of times.  [1..\*] Element must appear at least once, and may repeat unlimited number of times.  [m..n] Element must appear at least *m*, and at most, *n* times.  Cardinality applies only to message attribute tables and segment attribute tables.  See section **Error! Reference source not found.** for additional information on how cardinality is handled in this guide. |
| Value Set | The set of coded values to be used with the field. The value set attribute applies only to the data type attribute tables and the segment attribute tables. The value set may equate with an entire code system part of a code system, or codes drawn from multiple code systems. Constrained tables are included in Section 6.1.1 **Error! Reference source not found.**. |
| Name | HL7 descriptor of the message element. Name applies to the message attribute table, data type attribute table and the segment attribute table. |
| Condition Predicate | If the usage code of an element is C, then a conditionality predicate must be associated with this element that identifies the conditions under which the element must be or is allowed to be present. The predicate must be testable and based on other values within the message. This predicate may be expressed as a mathematical expression or in text and may utilize operators such as equivalence, logical AND, logical OR and NOT. The conforming sending and receiving applications shall both evaluate the predicate. When the Usage is not 'C', the conditionality predicate will not be valued.  Unless Otherwise stated it is assumed the Condition Predicate pertains to the PHLabReport Component Profile. |
| Conformance Statement | This may contain formatting markup or added ability to communicate pattern matching and element relationships. These, as well as condition predicate, will allow for formal testable constraints.  Unless Otherwise stated it is assumed the Conformance Statements pertain to the PHLabReport Component Profile**.** |
| Description/Comments | Descriptions and Comments may include:  Definition: An explanation of the meaning of the element.  Implementation Note(s): Implementation Notes provide a general description about how the element is intended to be used, as well as hints on using or interpreting the it.  Example: An example instance  Other Annotation: Additional content related to the element. |

**Note:** In the tables throughout this document, Yellow = This Interoperability Specification does not support the use of this item. This corresponds with the Usage code “X”.

### Keywords

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL** **NOT**", "**SHOULD**", "**SHOULD** **NOT**", "**RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this document are to be interpreted as described in RFC 2119[[1]](#footnote-1). The following definitions are excerpted from the RFC:

**MUST** or the terms "**REQUIRED**" or "**SHALL**", mean that the definition is an absolute requirement of the specification.

**MUST** **NOT** or the phrase "**SHALL NOT**", mean that the definition is an absolute prohibition of the specification.

**SHOULD** or the adjective "**RECOMMENDED**", mean that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

**SHOULD NOT** or the phrase "**NOT RECOMMENDED**" mean that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

**MAY** or the adjective "**OPTIONAL**", mean that an item is truly optional. One software supplier may choose to include the item to enable certain capabilities while another software supplier may omit the same item. In either case, the communication partner cannot be expected to either provide it (sender) or process it (receiver) without clear and voluntary agreement between the partners.

An implementation which does not include a particular segment/field/component marked as optional **MUST** be prepared to interoperate with another implementation which does include the optional segment/field/component, though perhaps with reduced functionality. In the same vein an implementation which includes a particular segment/field/component marked as optional **MUST** be prepared to interoperate with another implementation which does not include the optional segment/field/component.

### Usage Conformance Testing Recommendations

The following text is pre-adopted from the HL7 V2.7.1 Conformance (Chapter 2B, 2.B.7.5). Please refer to the base standard documentation for a full explanation of conformance concepts.

*---------- start citation---------*

#### 2.B.7.5 Usage

Message content is governed by the cardinality specification associated (explicitly or implicitly) with each element of an HL7 message. Usage rules govern the expected behavior of the sending application and receiving application with respect to the element. The usage codes expand/clarify the optionality codes defined in the HL7 standard. Usage codes are employed in a message profile to constrain the use of elements defined in the standard. The usage code definitions are given from a sender and receiver perspective and specify implementation and operational requirements.

The standard allows broad flexibility for the message structures that HL7 applications must be able to receive without failing. But while the standard allows that messages may be missing data elements or may contain extra data elements, it should not be inferred from this requirement that such messages are conformant. In fact, the usage codes specified in a message profile place strict conformance requirements on the behavior of the application.

##### Definition of Conditional Usage

The conditional usage is defined as follows:

C(a/b) - “a” and “b” in the expression are placeholders for usage codes representing the true (“a”) predicate outcome and the false (“b”) predicate outcome of the condition. The condition is expressed by a conditional predicate associated with the element (“See section 2.b.7.9, "Condition predicate"). “a” and “b” shall be one of “R”, “RE”, “O” and/or “X”. The values of “a” and “b” can be the same.

The example C(R/RE) is interpreted as follows. If the condition predicate associated with the element is true then the usage for the element is R-Required. If the condition predicate associated with the element is false then the usage for the element is RE-Required but may be empty.

There are cases where it is appropriate to value “a” and “b” the same. For example, the base standard defines the usage of an element as “C” and the condition predicate is dependent on the presence or non-presence of another element. The profile may constrain the element that the condition is dependent on to X; in such a case the condition should always evaluate to false. Therefore, the condition is profiled to C(X/X) since the desired effect is for the element to be not supported. Note it is not appropriate to profile the element to X since this breaks the rules of allowable usage profiling (see table HL7 Optionality and Conformance Usage).

Usage Rules for a Sending Application

| Optionality/Usage Indicator | Description | Implementation Requirement | Operational Requirement |
| --- | --- | --- | --- |
| R | Required | The application shall implement “R” elements. | The application shall populate “R” elements with a non-empty value. |
| RE | Required but may be empty | The application shall implement “RE” elements. | The application shall populate “RE” elements with a non-empty value if there is relevant data. The term “relevant” has a confounding interpretation in this definition[[2]](#footnote-2). |
| C(a/b) | Conditional | An element with a conditional usage code has an associated condition predicate (See section 2.B.7.9, “Condition predicate” that determines the operational requirements (usage code) of the element.  **If the condition predicate associated with the element is true, follow the rules for *a* which shall be one of “R”, “RE”, “O” or X”:**  **If the condition predicate associated with the element is false, follow the rules for *b* which shall be one of “R”, “RE”, “O” or X”**.  ***a*** and ***b*** can be valued the same. | |
| X | Not supported | The application (or as configured) shall not implement “X” elements. | The application shall not populate “X” elements. |
| O | Optional | None. The usage indicator for this element has not yet been defined. For an implementation profile all optional elements must be profiled to R, RE, C(a/b), or X. | Not Applicable. |

Usage Rules for a Receiving Application

| Optionality/Usage Indicator | Description | Implementation Requirement | Operational Requirement |
| --- | --- | --- | --- |
| R | Required | The application shall implement “R” elements. | The receiving application shall process (save/print/archive/etc.) the information conveyed by a required element.  A receiving application shall raise an exception due to the absence of a required element. A receiving application shall not raise an error due to the presence of a required element, |
| RE | Required but may be empty | The application shall implement “RE” elements. | The receiving application shall process (save/print/archive/etc.) the information conveyed by a required but may be empty element. The receiving application shall process the message if the element is omitted (that is, an exception shall not be raised because the element is missing). |
| C(a/b) | Conditional | The usage code has an associated condition predicate true (See section 2.B.7.9, “Condition predicate").  **If the condition predicate associated with the element is true, follow the rules for *a* which shall one of “R”, “RE”, “O” or X”:**  **If the condition predicate associated with the element is false, follow the rules for *b* which shall one of “R”, “RE”, “O” or X”**.  ***a*** and ***b*** can be the same. | |
| X | Not supported | The application (or configured) shall not implement “X” elements. | None, if the element is not sent.  If the element is sent the receiving application may process the message, shall ignore the element, and may raise an exception. The receiving application shall not process (save/print/archive/etc.) the information conveyed by a not-supported element. |
| O | Optional | None. The usage indicator for this element has not yet been defined. For an implementation profile all optional elements must be profiled to R, RE, C(a/b), or X. | None. |

*--------- end citation ---------*

## Scope

The use case describes the transmission of laboratory-reportable findings to appropriate local, state, territorial and federal health agencies using the HL7 2.5.1 ORU^R01 message.

*In Scope*

* Defining the core data elements required for electronic laboratory reporting of reportable laboratory test results to Public Health.
* Reporting of clinical laboratory test results to public health in the US Realm.
* Sending laboratory test results as standardized structured data so they can be incorporated that way into a Public Health Disease Surveillance System.
* Supporting Stage 3 certification criteria and Meaningful Use (MU).
* Reporting laboratory test results for an order that was placed either manually or electronically.
* Harmonization of data elements that are used in both laboratory orders and results.
* Covering all CLIA reporting requirements.
* Receiving of laboratory results as a non-order placer.
* Batch processing
* Laboratory results for individual living subjects (persons and animals).

*Out of Scope*

* Specifications and implementation guidance on laboratory ordering transactions. However, the establishment of requirements in the laboratory result message that will allow the matching of the reported result to an existing order initiated from the ordering clinician’s EHR-S is within the scope of this effort.
* Reporting of results from laboratory to laboratory.
* Querying for laboratory results.
* Querying for historical laboratory results.
* Receiving historical laboratory results.
* Querying patient demographics
* Advanced error messages related to application transport.
* Results not transmitted using a standardized structured format.
* Reporting of laboratory results from one public health jurisdictional entity to another.
* Situation where public health is the originator of the order for testing
* The use case for public health laboratory test orders and reporting of related results
* Reporting of results to Cancer Registries
* Results from nonliving subjects (water, food, air)
* Reporting of Healthcare associated infections to the National Healthcare Safety Network (NHSN)

## Use Case and Context Diagrams

The *Public Health Laboratory Messaging Use Case* focuses on the use case describing the transmission of laboratory-reportable findings to appropriate local, state, territorial, and federal health agencies using the *HL7 2.5.1* ORU message. It includes optional acknowledgments of receipt of transactions. The use case does allow the optional use of batch processing to transmit results. The goal of the use case is to provide safe, reliable delivery of reportable laboratory results to public health. If PHIN MS is used for transport, then use of the HL7 Acknowledgments may be un-necessary, although PHIN MS does not ensure that the payload conforms to HL7 formatting rules, it does provide safe and reliable transport.

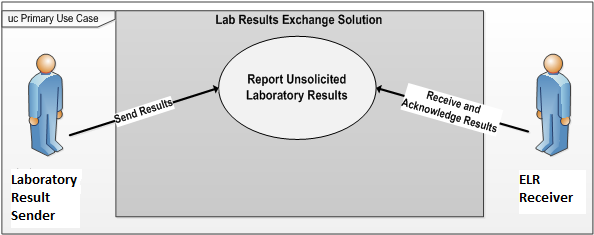


Figure 1. Use Case Diagram

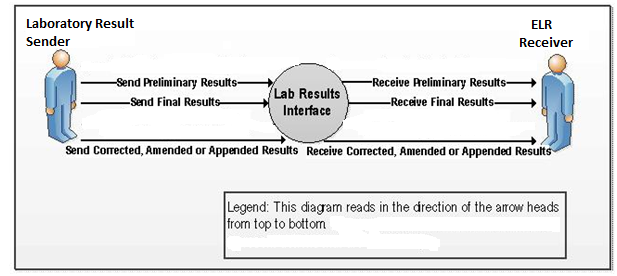


Figure 2. Context Diagram

## ACTORS

The Use Case Model has two primary participating actors, the Laboratory Result Sender and the ELR Receiver.

**Laboratory Result Sender** – The laboratory result sender actor is an application capable of transmitting the results of laboratory testing on specimens. This may be the laboratory itself or some aggregator of laboratory result data. The laboratory result sender application is capable of transmitting the results of laboratory testing to a receiver, optionally capable of batching result messages and optionally capable of receiving HL7 acknowledgments. If the Laboratory Result Sender is an actual laboratory system, it is often referred to as “Filler.”  
The Laboratory Result Sender application is an HL7 Application as defined by HL7 Version 3 Standard: Abstract Transport Specification, Normative Edition 2009. One point of confusion is what role data aggregators play in this use case. In typical circumstances, a data aggregator is considered an HL7 Application, and as such directly takes on the role of Laboratory Result Sender for this use case. The HL7 Version 3 Standard: Abstract Transport Specification, Normative Edition 2009 also describes several roles typically played by interface engines, include gateway, bridge and intermediary roles. The abstract transport specification considers the gateway role to be an HL7 Application, so for this use case an interface engine playing the gateway role and originating the transaction in this IG would be a Laboratory Result Sender actor.

**ELR Receiver** – The laboratory result receiver is an application capable of receiving results of laboratory testing, optionally transmitting an acknowledgment and optionally capable of receiving a batch of laboratory results. The laboratory result receiver may be associated with the local, state, territorial and federal health agencies that require access to the results. Note that the Laboratory Result Receiver should not be confused with the “Placer” of the laboratory order that the laboratory results are associated. The placer of the order is typically a provider who is responsible for treating the patient. In this case, the Laboratory Result Receiver is an interested party who receives a copy of the results

These two actors have responsibilities related to the conformance profiles defined in this document

* Laboratory Result Sender – A sender of laboratory result messages that declares conformance to a profile defined in this guide.
* ELR Receiver – A receiver of laboratory result messages that declares conformance to a profile defined in this guide.

## Use Case Assumptions

The following assumptions are preconditions for the use of this profile:

Each public health jurisdictional entity has previously defined the reportable conditions appropriate to its jurisdiction.

Laboratory result senders are responsible for the setup of their system with the reportable conditions appropriate to its jurisdiction.

## SEquence Diagrams

The Figures below show the interactions between the Lab Results Sender and the ELR Receiver in the order that they occur. The horizontal lines are used to identify the specific activity between the systems. The solid lines represent the data being transmitted using an HL7 message. Each step has a number associated with it to emphasize the order of the events. Internal Lab system functions (retry, next and log options) are shown as closed loops on the side of the Lab Results Sender.

### Sequence Diagram for Laboratory Result without Acknowledgement

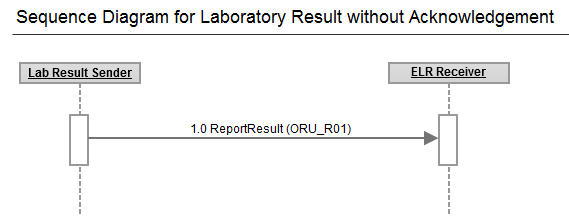


Figure 3. Sequence Diagram for Laboratory Result without Acknowledgment

The sequence consists of Lab Results Sender transmitting an ELR ORU\_R01 message to the ELR Receiver (1.0). No acknowledgement is sent by the ELR Receiver.

### Sequence Diagram for Laboratory Result with Acknowledgement

#### Message accepted

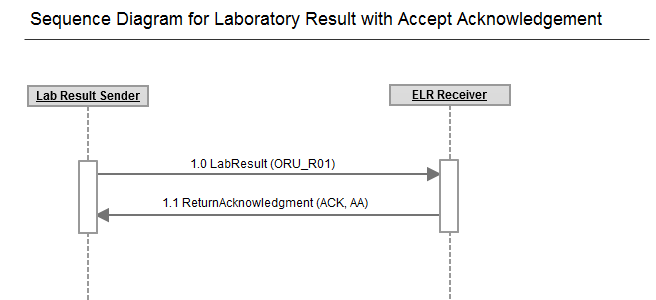


Figure 4. Sequence Diagram for Laboratory Result with Acknowledgement - Message Accepted

The sequence begins with the Lab Results Sender transmitting an ELR ORU\_R01 message to the ELR Receiver (1.0). The message is accepted by the ELR Receiver and an ELR ACK AA or ELR ACK CA message is returned to the Lab system (1.1).

#### Message rejected

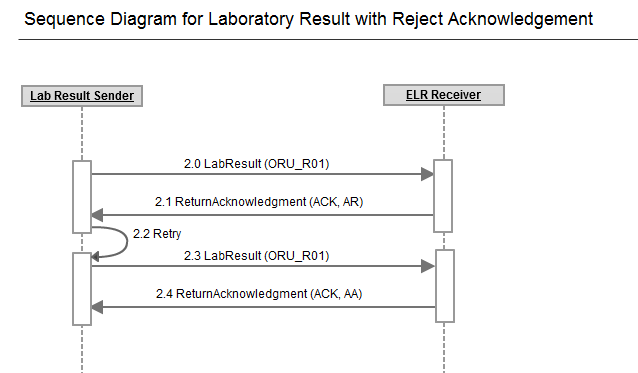


Figure 5. Sequence Diagram for Laboratory Result with Acknowledgement - Message Rejected

The sequence begins with the Lab Results Sender transmitting an ELR ORU\_R01 message to the ELR Receiver (2.0). The message is rejected by the ELR Receiver and an ELR ACK AR or ACK CR message is returned to the Lab system (2.1) which may fix the problem and retry (2.2). The resulting transaction (2.3) is acknowledged as correct (2.5).

#### Message error

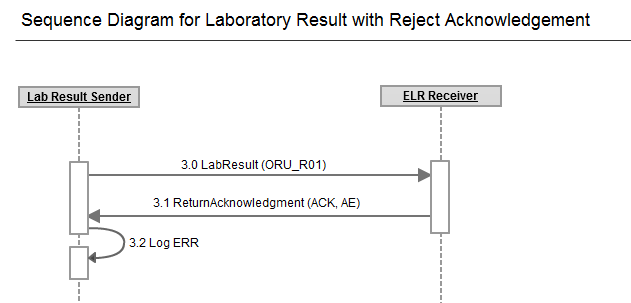


Figure 6. Sequence Diagram for Laboratory Result with Acknowledgement - Message Accepted

The sequence begins with the Lab Results Sender transmitting an ELR ORU\_R01 message to the ELR Receiver (1.0). The message contains serious errors and is rejected by the ELR Receiver, and an ELR AE or ACK CE message is returned to the Lab system which may log the error (3.3).

### 

Figure 7. Sequence Diagram for Batch Processing of Laboratory Result without Acknowledgements

The sequence consists of Lab Results Sender transmitting an zero or more ELR ORU\_R01 message using the batch protocol to the ELR Receiver (1.0). No acknowledgement is sent by the ELR Receiver.

### Interactions

| Table 1‑2 Interactions  Individual Transaction with Acknowledgements (Ack),  Individual Transaction without Acknowledgements (NoAck),  Individual Transaction without Acknowledgements/Batch (Batch) | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Event | Description | Use Case | Message Type | Receiver Action | Sender | Data Values |
| Preliminary Result | Preliminary: A verified early result is available; final results not yet obtained | Ack[[3]](#footnote-3)  NoAck  Batch | ORU^R01^ORU\_R01 | Commit Accept, Commit Reject or Commit Error | Laboratory Result Sender | ORC-1=RE  OBR-25=P |
| Final Result | Final results; results stored and verified. Can be changed only with a corrected result. | Ack  NoAck  Batch | ORU^R01^ORU\_R01 | Commit Accept, Commit Reject or Commit Error | Laboratory Result Sender | ORC-1=RE  OBR-25=F |
| Correction | Correction to results | Ack  NoAck  Batch | ORU^R01^ORU\_R01 | Commit Accept, Commit Reject or Commit Error | Laboratory Result Sender | ORC-1=RE  OBR-25=C |
| No Results Available | No results available; Order canceled, Testing Not Done | Ack  NoAck  Batche | ORU^R01^ORU\_R01 | Commit Accept, Commit Reject or Commit Error | Laboratory Result Sender | ORC-1=RE  OBR-25=X |
| Commit/Application Accept | Accept acknowledgment/ Application Accept/ Application acknowledgment | Ack | ACK^R01^ACK | None | ELR Receiver | MSA-1=CA/AA |
| Commit/Application Error | Accept acknowledgment:/ Application Error/ Application acknowledgment:  Error | Ack | ACK^R01^ACK | None | ELR Receiver | MSA-1=CE/AE |
| Commit/Application Reject | Accept acknowledgment/ Application Reject/Application acknowledgment:  Reject | Ack | ACK^R01^ACK | None | ELR Receiver | MSA-1=CR/AR |

## key TEchnical Decisions

One of the primary features of this implementation guide is its focus on broad interoperability

### Use of ISO Object Identifier (OID)

OIDs, or Object Identifiers, provide a strong identifier that uniquely identifies the object in question and is global in scope. Examples of information that OIDs can identify are items about patients, orders, providers and organizations. This means the identifier includes enough information to remain unique when taken out of the context within which the identifier was created. The ISO OID specification (ISO/IEC 8824:1990(E)) is the globally accepted technology for this purpose and is recommended as the means to satisfy the requirement for a universally unique identifier.

HL7 has ***published HL7 Implementation Guidance for Unique Object Identifiers, Release 1*** [[4]](#footnote-4) to provide guidance on how organizations can manage OIDs.

### Use of Vocabulary Standards

This guide calls for specific vocabulary standards for the exchange of laboratory information. Use of standard vocabularies is important for a number of reasons not the least of which is semantic interoperability, the ability for a computer to understand and process exchanged data. Use of standard vocabularies allows broad distribution of healthcare information without the need for individual institutions to exchange master files for data such as test codes, result codes, etc. Each institution maps its own local vocabularies to the standard code, allowing information to be shared broadly, rather than remaining isolated as a single island of information. Standard vocabularies, particularly coded laboratory tests using LOINC and coded results using SNOMED CT enables more automated decision support for patient healthcare, as well as more automated public health surveillance of populations.

### Snapshot Mode

Result messages shall always be sent in snapshot mode, meaning that all information related to the smallest individually identifiable unit are complete. For this message type that would be the OBR and all related segments (OBX, NTE and SPM, OBX). I.e., if a correction and/or status update to at least one of the OBX segments under one OBR is necessary, all OBX segments, even if previously sent, shall be resent with the correction and/or current status and/or current values. For example, in the case of a co-infection when a Culture is ordered, the preliminary results of the culture (isolation and identification) may be released if one organism is identified but the results of the second is pending. At a later time the second organism is identified and released. Snapshot reporting will send all previous results as well as the new results, in this case the identification of both organisms.

### Lengths

In *HL7 Version 2.5*, HL7 assigned lengths to the components of data types, but did not standardize the lengths of the fields that use those data types. This guide pre-adopts the length rules from *HL7 Version 2.7.1*: Starting with v2.7, HL7 allows documentation of both a minimum and maximum length for an element.

In *HL7 Version 2.7*.*1* length is specified for primitive data types (i.e., those without components). Length is not specified for composite elements. For composite data types, the actual minimum and maximum lengths can be very difficult to determine due to the interdependencies on the component content, and the specification of actual lengths is not useful either. In general, this guide will adopt lengths from *HL7 Version 2.7.1*

The concept of truncation is being pre-adopted from HL7 Version 2.7.1 as well, but only in regards to length documentation. The transmission of the truncation character in message data is not being pre-adopted.

Note: In HL7 Version 2.5.1, the length of 65536 has a special meaning: For HL7, "If the maximum length needs to convey the notion of a Very Large Number, the number 65536 should be displayed to alert the user."  
In this implementation guide, fields or components with length 65536 should be understood as having no prescribed length. Receivers should be prepared to accept any size chunk of data carried in the field or component*.*

### Use Of Escape Sequences In Text Fields

Senders and receivers using the ELR profile shall handle escape sequence processing as described in *HL7 Version 2.5.1*, *Chapter 2, Section 2.7.4 (Special Characters*). This requirement applies to the ST, TX and FT data types. Implementers shall not support escape sequences described in *Sections 2.7.2 (Escape sequences supporting multiple character sets), 2.7.3 (Highlighting), 2.7.5 (Hexadecimal), 2.7.6 (Formatted Text)* and *2.7.7 (Local).* This restriction applies to the TX and FT data types.

### EH comment

## Referenced Profiles - Antecedents

The following profile was used as source materials in the development of this guide:

1. *HL7 U.S. Realm – Interoperability Specification: Lab Result Message to EHR, Version 1.0,* November 2007
2. *Harmonized Use Case for Electronic Health Records (Laboratory Result Reporting)*
3. *Implementation Guide for Transmission of Laboratory-Based Reporting of Public Health Information using version 2.3.1 of Health Level Seven (HL7) Standard Protocol,* March 2005*.*
4. *HL7 Version 3 Standard: Abstract Transport Specification, Normative Edition 2009*
5. *HL7 Version 2.5.1 Implementation Guide: Laboratory Results Interface for US Realm, Release 1,v49, HL7 Version 2.5.1: ORU^R01, Draft Standard for Trial Use, July 2012*
6. [Standards and Interoperability Laboratory Results Interface Use Case, *Laboratory Results Reporting to Primary Care Providers (in an Ambulatory Setting) v1.0*](http://sibrowser.siframework.org/siclient/view?type=artifact&id=39481918-9dc7-4f55-aa77-f978b4c13d8b&name=SIFramework_LRI_UC.docx)
7. *HL7 Version 2.5.1 Implementation Guide: S&I Framework Laboratory Orders from EHR, Release 1 – US Realm January 2013 10 HL7 DSTU Ballot*

## Conformance to this Guide

This implementation guide defines components that are combined into profiles to define specific conformance requirements.

The Components must be combined to create a valid Profile for a particular transaction. As of this version a valid profile consists of a minimum of a single component:

1. PHLabReport.

Additional components can be provided to further define the message structure and use. This guide defines one such component:

1. PHLabReport-NoAck – Acknowledgement not used

MSH-21 (Message Profile Identifier) is populated with the profile identifiers. Multiple profiles or component profiles can be present in MSH.21 provided the combination of profiles do not conflict with each other. Additional definitions and guidance for MSH-21 can be found in Section **Error! Reference source not found.** **Error! Reference source not found.**.

### Results Profile Components

Note: OIDs will be updated once comment resolution is completed

#### PHLabReport – ID: 2.16.840.1.113883.9.NNN

This message profile component indicates that the message adheres to the rules set out in this implementation guide for the results message use case described above where acknowledgements are required This component sets the minimum constraints on the base specification for all profiles defined by this guide and may be further constrained by additional components.

#### PHLabReport-NoAck -ID: 2.16.840.1.113883.9.NNN

The combination of this message profile component and the PHLabReport component profile adheres to the rules set out in this implementation guide for the results message use case described above where acknowledgements are not used.

Support for this profile component is optional.

### Optional LRI component profile for use with the LRI results message.

#### LRI\_PH\_COMPONENT – ID: 2.16.840.1.113883.9.NNN

When a laboratory result is sent to public health, additional data is required to be sent along in the result message when compared to the LRI use case. This component specifies the conformance attributes for the additional elements needed for the public health reporting use case. Specifically a message profile constructed using a pre- or post-coordinated LRI\_GU\_RU\_Profile + LRI\_PH\_COMPONENT message is identical to the PHLabReport message profile. In the context of the LRI guide, support for this component is optional. However it is required to send a conformant message to an ELR receiver. See Appendix A for the additional constraints on the base LRI specification that define this component profile.

### Response Profiles

Note: OIDs will be updated once comment resolution is completed

This Guide defines one base ELR 251 R2 acknowledgement response profile.

#### PHReturnAck – ID: 2.16.840.1.113883.9.NNN

This message profile indicates that the acknowledgement message adheres to the rules set out in this implementation guide

# Data types

Note numbering for conformance statements will be updated once the comment resolution is completed

The following sections detail the structure of each datatype, including segment name, usage, cardinality and description. See section 1.4.2 (Message Element Attributes) for a description of the columns in the Abstract Message Syntax Tables. Note: Unless otherwise stated in table it is assumed the Condition Predicate and Conformance statements pertains to the PHLabReport Component Profile. The reader is referred to Sections 1.12 above regarding the Component Profiles.

Documents what data types are used within profile. Refer to the HL7 2.5.1 base standard for any/all datatypes used but not described in this guide.

Types

| Table 0‑1. Datatypes | |
| --- | --- |
| Data type | Data Type Name |
| CE | Coded element |
| CNN | Composite ID Number and Name Simplified |
| CQ | Composite Quantity with Units |
| CWE | Coded with Exceptions |
| CX | Extended Composite ID with Check Digit |
| DR | Date/Time Range |
| DT | Date |
| DTM | Date/Time |
| ED | Encapsulated Data |
| EI | Entity Identifier |
| EIP | Entity Identifier Pair |
| FN | Family Name |
| FT | Formatted Text Data |
| HD | Hierarchic Designator |
| ID | Coded Values for HL7 Tables |
| IS | Coded value for User-Defined Tables |
| MSG | Message Type |
| NDL | Name with Date and Location |
| NM | Numeric |
| PRL | Parent Result Link |
| PT | Processing Type |
| RP | Reference Pointer |
| SAD | Street Address |
| SI | Sequence ID |
| SN | Structured Numeric |
| ST | String |
| TM | Time |
| TS | Time Stamp |
| TX | Text Data |
| VID | Version Identifier |
| XAD | Extended Address |
| XCN | Extended Composite ID Number and Name |
| XON | Extended Composite Name and ID Number for Organizations |
| XPN | Extended Person Name |
| XTN | Extended telecommunications number |

## CE – Coded Element

| Table 0‑2. CE – Coded Element | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Comments |
| 1 | 1..20= | ST | R |  | Identifier |  |  |
| 2 | 1..199# | ST | RE |  | Text |  | It is strongly recommended that text be sent to accompany any identifier. When a coded value is not known, text can still be sent, in which case no coding system should be identified. |
| 3 | 1..12 | ID | R | HL70396 | Name of Coding System |  |  |

## CNN – Composite ID Number and Name Simplified

| Table 0‑3. CNN – Composite ID Number and Name Simplified | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Conformance Statement | Comments |
| 1 | 1..15= | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE |  | ID Number |  |  | The ID Number component combined with the Assigning Authority – Universal ID component (component 10) must uniquely identify the associated person. Note - despite the component being named “ID Number” this component is an ST string data type, not numeric, so the component is not limited to just numbers. |
| 2 | 1..50# | ST | RE |  | Family Name |  |  |  |
| 3 | 1..30# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE |  | Given Name |  |  | I.e., first name. |
| 4 | 1..30# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE |  | Second and Further Given Names or Initials Thereof |  |  |  |
| 5 | 1..20# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE |  | Suffix (e.g., JR or III) |  |  |  |
| 6 | 1..20# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE |  | Prefix (e.g., DR) |  |  |  |
| 7 | 1..5= | [IS](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#IS) | RE | HL70360 | Degree (e.g., MD) |  |  | Guidance: LEN may need to be expanded upon implementation to accommodate all values. |
| 8 |  |  | X |  |  |  |  | Not supported. |
| 9 | 1..20= | IS | RE | Local | Assigning Authority – Namespace ID |  |  | The coding system for this component is locally managed. |
| 10 | 1..199= | ST | C(R/X) |  | Assigning Authority - Universal ID | If CNN.1 (Identifier) is valued. | **ELR-002:** CNN.10 (Assigning Authority - Universal ID) SHALL be valued with an ISO-compliant OID. |  |
| 11 | 1..6 | ID | C(R/X) | HL70301 | Assigning Authority - Universal ID Type | If CNN.10 (Assigning Authority - Universal ID) is valued. | **ELR-003:** CNN.11 (Assigning Authority - Universal ID Type) SHALL contain the value "ISO". |  |

## CQ – Composite Quantity with Units

| Table 0‑4 CQ - Composite Quantity with Units | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Comments |
| 1 |  | NM | R |  | Quantity |  |
| 2 |  | CWE | RE | Unified Code for Units of Measure (UCUM) | Units |  |

## CWE types – Coded with Exception types

| Table 0‑5. CWE\_Types – Coded with Exceptions | |
| --- | --- |
| CWE Type | Comments |
| CWE\_CRE – Code-Required, but may be empty | This type of the CWE is used with all CWE elements except OBR-4, OBX-3 and OBX-5 |
| CWE\_CR - Code Required | This type of the CWE is used only with OBR-4 and OBX-3 . A code is required in the first component (CWE\_CR.1) |
| CWE\_CRO - Code and Original Text Required | This type of the CWE is used only with OBX-5 . A code is required in the first component (CWE\_CRO.1) and “original text” in the ninth component (CWE\_CRO.9) |

### CWE\_CRE – Coded with Exceptions – Code Required, but May Be Empty

| Table 0‑6. CWE\_CRE – Coded with Exceptions- Code Required, but May Be Empty | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Conformance Statement | Comments |
| 7 | 1..10= | ST | RE |  | Coding System Version ID |  |  |  |
| 8 | 1..10= | ST | RE |  | Alternate Coding System Version ID |  |  |  |
| 15 |  |  | X |  | Value Set OID |  |  | Not supported. |
| 16 |  |  | X |  | Value Set Version ID |  |  | Not supported. |
| 17 |  |  | X |  | Alternate Coding System OID |  |  | Not supported. |
| 18 |  |  | X |  | Alternate Value Set OID |  |  | Not supported. |
| 19 |  |  | X |  | Alternate Value Set Version ID |  |  | Not supported. |
| 20 |  |  | X |  | Second Alternate Coding System OID |  |  | Not supported. |
| 21 |  |  | X |  | Second Alternate Value Set OID |  |  | Not supported. |
| 22 |  |  | X |  | Second Alternate Value Set Version ID |  |  | Not supported. |

### CWE\_CR – Coded with Exceptions – Code Required

| Table 0‑7. CWE\_CR – Coded with Exceptions – Code Required | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Conformance Statement | Comments |
| 7 | 1..10= | ST | RE |  | Coding System Version ID |  |  |  |
| 8 | 1..10= | ST | RE |  | Alternate Coding System Version ID |  |  |  |
| 15 |  |  | X |  | Value Set OID |  |  | Not supported. |
| 16 |  |  | X |  | Value Set Version ID |  |  | Not supported. |
| 17 |  |  | X |  | Alternate Coding System OID |  |  | Not supported. |
| 18 |  |  | X |  | Alternate Value Set OID |  |  | Not supported. |
| 19 |  |  | X |  | Alternate Value Set Version ID |  |  | Not supported. |
| 20 |  |  | X |  | Second Alternate Coding System OID |  |  | Not supported. |
| 21 |  |  | X |  | Second Alternate Value Set OID |  |  | Not supported. |
| 22 |  |  | X |  | Second Alternate Value Set Version ID |  |  | Not supported. |

ble values and its use is described in Chapter 2A, Section 2.A.13 under Data Missing. This will be allowed for all uses of CWE\_CR..

### CWE\_CRO – Coded with Exceptions – Code and Original Text Required

| Table 0‑8. CWE\_CRO – Coded with Exceptions – Code and Original Text Required | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Comments |
| 7 | 1..10= | ST | RE |  | Coding System Version ID |  |  |
| 8 | 1..10= | ST | RE |  | Alternate Coding System Version ID |  | . |
| 15 |  |  | X |  | Value Set OID |  | Not supported. |
| 16 |  |  | X |  | Value Set Version ID |  | Not supported. |
| 17 |  |  | X |  | Alternate Coding System OID |  | Not supported. |
| 18 |  |  | X |  | Alternate Value Set OID |  | Not supported. |
| 19 |  |  | X |  | Alternate Value Set Version ID |  | Not supported. |
| 20 |  |  | X |  | Second Alternate Coding System OID |  | Not supported. |
| 21 |  |  | X |  | Second Alternate Value Set OID |  | Not supported. |
| 22 |  |  | X |  | Second Alternate Value Set Version ID |  | Not supported. |



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## DR – Date/Time Range



## DT – Date



## DTM – Date/Time



## EI \_GU– Entity Identifier



## EIP\_GU – Entity Identifier PAIR

| Table 0‑14. EIP\_GU – Entity Identifier Pair | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Comments |

## FN – Family Name



## FT – Formatted Text Data



## HD\_GU – Hierarchic Designator

| Table 0‑17. HD\_GU – Hierarchic Designator | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Conformance Statement | Comments |
| 3 | 1..6 | ID | R | HL70301 | Universal ID Type | **ELR-007:** HD.3 (Universal ID Type) IF element is MSH-4.3 (Universal ID type) , then HD.3 (Universal ID type) SHALL contain the value "ISO" OR "CLIA", ELSE HD.3 (Universal ID type) SHALL contain the value "ISO" | Constrained to the value ‘ISO’ except for Sending Facility (MSH-4) where the value ‘CLIA’ is allowed. |

## ID – Coded Value for HL7-Defined Tables



## IS – Coded Value for User-Defined Tables



## MSG – Message Type



## NDL - Name With Date And Location

| Table 0‑20. NDL - NAME WITH DATE AND LOCATION | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Comments |
| 1 |  | CNN | R |  | Name |  |
| 2 |  | TS | X |  | Start Date/time | Not supported. |
| 3 |  | TS | X |  | End Date/time | Not supported. |
| 4 | 1..20= | IS | X | HL70302 | Point of Care | Not supported. |
| 5 | 1..20= | IS | X | HL70303 | Room | Not supported. |
| 6 | 1..20= | IS | X | HL70304 | Bed | Not supported. |
| 7 |  | HD | X |  | Facility | Not supported. |
| 8 | 1..20= | IS | X | HL7306 | Location Status | Not supported. |
| 9 | 1..20= | IS | X | HL70305 | Person Location Type | Not supported. |
| 10 | 1..20= | IS | X | HL7307 | Building | Not supported. |
| 11 | 1..20= | IS | X | HL7308 | Floor | Not supported. |

## NM – Numeric



## PRL – Parent Result Link



.

## PT – Processing Type



|

## RP – Reference Pointer

| Table 0‑24. RP – Reference Pointer | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Comments |
| 1 | 1..999# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | R |  | Pointer | Pointer to the object. For URIs, it contains the path and query parts.  Example:  /phin/library/documents/pdf/DRAFT\_PHIN\_ORU\_ELR\_v2.5.1\_20061221.pdf |
| 2 |  | [HD](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#HD) | R |  | Application ID | Unique identifier of the application that holds the object being pointed to. For URIs, it contains the scheme and authority parts.  Note that the HD data type used for this component is specialized for use in the RP data type, and is different that what is defined in section (HD). |
| 2.1 |  |  | O |  |  |  |
| 2.2 | 1..199= | ST | R |  | Universal ID | This component is restricted to a universal resource identifier (URI). For URIs, contains the scheme and authority parts. Example: http://www.cdc.gov |
| 2.3 | 1..6 | ID | R | HL70301 | Universal ID Type | This component is constrained to support only universal Resource Identifier. Literal value: ‘URI’ |
| 3 | 4..11 | [ID](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ID) | RE | HL70834 (2.7) | Type of Data | Identifier of the type of data pointed to. For the URI example referenced above, this is '"application."  See section For details of HL70834. |
| 4 | 1..32= | [ID](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ID) | RE | HL7[0291](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#Heading407) (2.7) | Subtype | Identifier of the subtype of data pointed to. For the URI example above, this is "pdf," indicating portable document format.  See section for details of HL70291.  Guidance: LEN may need to be expanded upon implementation to accommodate all values. |

Implementation Note The field uses the RP data type to allow communication of pointers to images, sound clips, XML documents, HTML markup, etc. The RP data type is used when the object being pointed to is too large to transmit directly.

This specification defines the mechanism for exchanging pointers to objects, but does not address the details of applications actually accessing and retrieving the objects over a network.

This guide constrains this data type to support only Universal Resource Identifiers (URI). See <http://ietf.org/rfc/rfc2396.txt> for a detailed definition. The general format of a URI is in the form <scheme>://<authority><path>?<query>. The scheme and authority portions appear in the Application ID component, Universal ID subcomponent. The path and query portion of the URI appear in the Pointer component of the RP data type.

## SAD – Street Address



## SI – Sequence ID



## SN – Structured Numeric



## ST – String Data



## TM – Time

| Table 0‑29. TM - Time | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Comments |
| 1 | 2..16 | - | R |  | Time | Format: HH[MM[SS[.S[S[S[S]]]]]][+/-ZZZZ] |

Implementation Note It is strongly recommended that the time zone offset always be included in the TM. Specific fields in this implementation guide may require time to a specific level of granularity, which may require the time zone offset.

## TS\_0 – Time STAMP



## TS\_1 – Time Stamp

| Table 0‑31. TS\_1 Time Stamp | | | | | |
| --- | --- | --- | --- | --- | --- |
| SEQ | DT | Usage | Value Set | Component Name | Comments |
|  |  | R |  | +/- ZZZZ |  |

## TS\_3 – Time Stamp



## TS\_4 – TIME STAMP



## TS\_5 – Time stamp



## TX\_6 – Time Stamp



## TX – Text Data



## VID – Version Identifier



## XAD – Extended Address



## XCN\_GU – Extended Composite ID Number and Name for Persons

| Table 0‑39. XCN\_GU – Extended Composite ID Number and Name for Persons | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Comments |
| 14 |  | [HD](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#HD) | RE |  | Assigning Facility |  |  |
| 21 | 1..199# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE |  | Professional Suffix |  | Suggest using values from HL7 table 360. |

## XON\_GU – Extended Composite Name and Identification Number for Organizations

| Table 0‑40. XON\_GU – Extended Composite Name and Identification Number for Organizations | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Comments |
| 2 | 1..20= | [IS](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html" \l "IS) | RE | HL7[0204](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html" \l "Heading552) | Organization Name Type Code |  |  |

## XPN – Extended Person Name

| Table 0‑41. XPN – Extended Person Name | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Comments |
| 14 | 1..199# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE | HL70360 | Professional Suffix | . |

## Extended Telecommunication Number (XTN)

| Table 0‑42. XTN – Extended Telecommunication Number | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SEQ | LEN | DT | Usage | Value Set | Component Name | Condition Predicate | Comments |
| 1 |  |  | X |  | Telephone Number |  | Not supported. |
| 2 | 3..3 | ID | RE | HL70201 | Telecommunication Use Code |  | Should use ‘NET’ if component 4 (Email Address) is present. |
| 3 | 2..8 | [ID](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ST) | RE | HL70202 | Telecommunication Equipment Type |  | Should use ‘Internet’ if component 4 (Email Address) is present. |
| 4 | 1..199= | ST | C(R/X) |  | Email Address | IF XTN.7 (local number) is not valued. |  |
| 5 | 1..3= | NM | C(RE/X) |  | Country Code | IF XTN.7 (local number) is valued. | . |
| 6 | 1..3= | [NM](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#IS) | C(RE/X) |  | Area/City Code | IF XTN.7 (local number) is valued. |  |
| 7 | 1..9= | NM | C(R/X) |  | Local Number | IF XTN.4 (Email Address) is not valued. |  |
| 8 | 1..5= | [NM](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#ID) | C(RE/X) |  | Extension | IF XTN.7 (Local Number) is valued. | . |
| 9 | 1..199# | [ST](https://www.aphlweb.org/aphl_departments/Strategic_Initiatives_and_Research/Informatics_Program/Projects/Eric/Documents/kreislera/My%20Documents/HL7/Documents/hl725/std25/ch02A.html#CE) | RE |  | Any Text |  | For example: “Regular hours 8 am to 5 pm.” |
| 10 |  |  | X |  | Extension Prefix |  | Not supported. |
| 11 |  |  | X |  | Speed Dial Code |  | Not supported. |
| 12 |  |  | X |  | Unformatted Telephone number |  | Not supported. |

Implementation Note

Component 4 (Email Address) and component 7 (Local Number) are mutually exclusive. You must populate one or the other, but not both in a single repeat of this data type.

# Messages

Note numbering for conformance statements will be updated once the comment resolution is completed

The following sections detail the additional structure set forth by the LRI\_PH profile.. These constraints are in addition to the structure specified in the LRI guide. See section 1.4.2 (Message Element Attributes) for a description of the columns in the Abstract Message Syntax Tables

## ORU^R01^ORU\_R01

The ORU^R01 message is constrained for transmitting laboratory results from the testing source to to the Public Health Receiver as defined in theUse Case.

| Table 0‑1. ORU^R01^ORU\_R01 | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Segment | Name | Cardinality | Usage | Condition Predicate | Conformance Statement | Description |
| [{SFT}] | Software Segment | [1..\*] | R |  |  | Each HL7 aware application that touches the message on the way to the destination application must add a SFT segment for its application. For instance, PHIN MS is not HL7 aware and would not be expected to add an SFT. On the other hand, an integration engine is HL7 aware and would be expected to add an SFT.  The first repeat (i.e., the Laboratory Result Sender actor) is required. Any other application that transforms the message must add an SFT segment for that application. Other applications that route or act as a conduit may add an SFT but are not required to do so. |
| [{NTE}] | Notes and Comments for PID | [0..\*] | RE |  |  | This notes and comments (NTE) segment should contain notes or comments pertaining to the patient identified in the PID segment. It should not contain order or result related comments. |
| [{NK1}] | Next of Kin/Associated Parties | [0..\*] | RE |  |  | The next of kin (NK1) segment can be used to document the patient’s next of kin, employer, guardian, etc. Particular jurisdictions may require the NK1 segment to contain parent/guardian information when reporting lead testing results for children. When reporting results of animal testing (for example testing animals for rabies) the NK1 segment can be used to identify the owner of the animal. |
| [ | VISIT Begin | [0..1] | RE |  |  |  |
| - [{ | SPECIMEN Begin | [10..\*1] | RE |  | **ELR-064:** Specimen (Specimen Group) SHALL be present in at least one occurrence of one Order\_Observation Group. | The specimen group is required at least one time in the ORU and is used to carry specimen information that is no longer contained in the OBR segment. It also provides a place for the specimen number. Each specimen group documents a single sample |
| [{OBX}] | Observation related to Specimen | [0..\*] | RE |  |  | The Observation related to Specimen is generally used to report additional characteristics related to the specimen. It is not used to report the results of the requested testing identified in OBR-4 (Universal Service ID). The observations associated with the specimen are typically information that the ordering providing sends with the order. The laboratory forwards that information as part of the result message.  One recommended value to report in the OBX related to Specimen is the age of patient at time of specimen collection. The appropriate LOINC code for this is 35659-2 (Age at specimen collection).  Other possible types of observations include:  Was specimen sent out?  Was it a specimen or isolate?  Id of the specimen/isolate sent for testing  Where was the specimen sent?  Reason for send out?  Implementers will need to provide a list of expected observations associated with specimen. |

## ACK^R01^ACK

| Table 0‑2. ACK^R01^ACK | | | | | |
| --- | --- | --- | --- | --- | --- |
| Segment | Name | Cardinality | Usage | Condition Predicate | Description |
| [{SFT}] | Software Segment | [1..\*] | R |  | Each HL7 aware application that touches the message on the way to the destination application must add a SFT segment for its application. For instance, PHIN MS is not HL7 aware and would not be expected to add an SFT. On the other hand, an integration engine is HL7 aware and would be expected to add an SFT.  The first repeat (i.e., the originator) is required. Any other application that transforms the message must add an SFT segment for that application. Other applications that route or act as a conduit may add an SFT but are not required to do so. |

## HL7 Batch Protocol

. The frequencies of batch transmissions are left to specific implementations. Batches may be sent more often if the message size or resource requirements dictate. Acknowledgement methods for batch messaging are beyond the scope of this document. . The reader is directed to HL7 Version 2.7.1, Chapter 2 Section 2.10.3 *HL7 batch protocol* for further guidance

| Table 0‑3. HL7 Batch Protocol | | | | |
| --- | --- | --- | --- | --- |
| Segment | Name | Cardinality | Usage | Description |
| [FHS] | File Header Segment | [1..1] | R | File header required. |
| { | --- BATCH begin | [1..1] | R | One batch per file supported. |
| [BHS] | Batch Header Segment | [1..1] | R | One batch per file supported. |
| {[ | --- MESSAGE begin | [1..\*] | R | One or more messages per batch supported. |
| MSH | (start of one or more HL7 messages) | [1..1] | R |  |
| .... |  |  |  |  |
| ]} | --- MESSAGE end |  |  |  |
| [BTS] | Batch Trailer Segment | [1..1] | R |  |
| } | --- Batch end |  |  |  |
| [FTS] | File Trailer Segment | [1..1] | R |  |

# Segment and Field Descriptions

Note numbering for conformance statements will be updated once the comment resolution is completed

This messaging guide provides notes for additional required (non-optional) fields for each of the non-optional segments set forth by the LRI\_PH profile.. These constraints are in addition to the LRI\_GU\_NU profile specified in the LRI guide. The following format is used in this document for listing and defining message segments and fields. First, the message segment use is defined and then a segment attribute table listing all fields defined in the segment is shown. See section 1.4.2 (Message Element Attributes) for a description of the columns in the Segment Attribute Tables. The reader is referred to< Section in LRI Guide > regarding Component Profiles.

## MSH – Message Header Segment

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| Table 0‑1. MSH – Message Header Segment | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Condition Predicate | Conformance Statement | Description/  Comments |
| 3 |  | HD | [1..1] | R |  | Sending Application |  |  | Field used to identify the sending application uniquely for messaging purposes.  For this field only, if all three components of the HD are valued, the first component defines a member in the set defined by the second and third components. |
| 4 |  | HD | [1..1] | R |  | Sending Facility |  |  | Field that uniquely identifies the facility associated with the application that plays the Laboratory Result Sender Actor (see section 3.1 Use Case Model) that sends the message. If acknowledgments are in use, this facility will receive any related acknowledgment message.  For laboratories originating messages, the CLIA identifier is allowed for the Universal ID component of the HD data type. Non-laboratory facilities taking on the Laboratory Result Sender actor role will use an OID for this field. |
| 5 |  | HD | [1..1] | R |  | Receiving Application |  |  | Field used to identify the receiving application uniquely for messaging purposes. For this field only, if all three components of the HD are valued, the first component defines a member in the set defined by the second and third components. |
| 6 |  | HD | [1..1] | R |  | Receiving Facility |  |  | Field that uniquely identifies the facility for the application that plays the Laboratory Result Receiver Actor (see section 3.1 Use Case Model) and receives the message. If acknowledgments are in use, this facility originates any related acknowledgment message. |
| 7 |  | TS\_1 | [1..1] | R |  | Date/Time Of Message |  |  | Field containing the date/time the message was created by the sending system.  Note that the time zone offset is required and applies to all other date/time fields in the same message instance where a time zone offset is not valued |
| 15 | 2..2 | ID | [1..1] | R | HL70155 (Constrained) | Accept Acknowledgment Type |  | **ELR-nnn:** MSH-15 (Accept Acknowledgment Type) SHALL contain the constant value ‘NE’ IF an occurrence of MSH-21.3 (Entity Identifier) is valued 2.16.840.1.113883.9.NNN (PHLabReport-NoAck), ELSE SHALL contain the constant value 'AL'.  PHReturnAck Component:  **ELR- nnn**: MSH-15 (Accept Acknowledgement Type) SHALL contain the constant value ‘NE’. | Value is “NE” if PHLabReport-NoAck,profile is used, otherwise the value is “AL”. |
| 16 | 2..2 | ID | [1..1] | R | HL70155 (Constrained) | Application Acknowledgment Type |  | **ELR-nnn:** MSH-16 (Application Acknowledgement Type) SHALL contain the constant value ‘NE’ IF an occurrence of MSH-21.3 (Entity Identifier) is valued 2.16.840.1.113883.9.NNN (PHLabReport-NoAck), ELSE, if valued, SHALL contain the value '‘AL’, 'NE', 'ER', or 'SU'.  PHReturnAck Component:  **ELR-nnn:** **ELR- nnn**: MSH-15 (Accept Acknowledgement Type) SHALL contain the constant value ‘NE’.. | Value is “NE” if PHLabReport-NoAck,profile is used, otherwise the value is '‘AL’, 'NE', 'ER', or 'SU'. |

Implementation Note:

The table below indicates valid MSH-21 combinations for declaring conformance to a particular ELR Result profile or components.

| Table 0‑2. MSH 21 Result Profile Combinations | | |
| --- | --- | --- |
| Component Name | Component OIDs | Description/Comments |
| LRI\_GU\_RU\_Profile + LRI\_PH\_Component | 2.16.840.1.113883.9.17  2.16.840.1.113883.9.NNN | Message is conformant to the **pre-coordinated** LRI\_GU\_RU profile and Public Health component, which support the (ELR) Laboratory Result with Acknowledgement use case. This conformance profile is identical to PHLabReport above except for OBR.29 attributes**.** |
| LRI\_Common\_Component +  LRI\_GU\_Component +  LRI\_RU\_Component +  LRI\_PH\_Component | 2.16.840.1.113883.9.16  2.16.840.1.113883.9.12  2.16.840.1.113883.9.14  2.16.840.1.113883.9.NNN | Message is conformant to the **post-coordinated** LRI\_GU\_RU profile and Public Health component, which support the (ELR) Laboratory Result with Acknowledgement use case. This conformance profile is identical to PHLabReport above except for OBR.29 attributes**.** |

For each of the combinations illustrated, the following additional profile component identifiers can be specified:

LRI\_TO\_Component – 2.16.840.1.113883.9.22

LRI\_PH\_NoAcK Component - 2.16.840.1.113883.9.NNN

**Example: LRI\_GU\_RU\_Profile + LRI\_PH\_Component Using Component OIDs**

MSH…|||||LRI\_GU\_RU\_Profile^^2.16.840.1.113883.9.17^ISO~LRI\_PH\_Component^^2.16.840.1.113883.9.NNN^ISO

**Example: LRI\_Common\_Component + LRI\_GU\_Component + LRI\_RU\_Component + LRI\_PH\_Component Using Component OIDs**

MSH…|||||LRI\_Common\_Component^^2.16.840.1.113883.9.16^ISO~ LRI\_GU\_Component^^2.16.840.1.113883.9.12^ISO~ LRI\_RU\_Component^^2.16.840.1.113883.9.14^ISO~LRI\_PH\_Component^^2.16.840.1.113883.9.NNN^ISO

## SFT – Software segment

The software segment provides information about the sending application or other applications that manipulate the message before the receiving application processes the message. In this guide, the Laboratory Result Sender actor is required to populate the first SFT segment. Any other application that transforms the message must add an SFT segment for that application. Other applications that route or act as a conduit may add an SFT but are not required to do so. See **Error! Reference source not found.**, Actor, Laboratory Result Sender for further discussion the types of roles applications may play in these data exchanges. Based on that discussion, and HL7 Application (including gateways) is required to populate an SFT segment, while bridges and intermediaries may add an SFT but are not required to do so.

| Table 0‑3. SFT – Software Segment | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Conformance Statement | Description/Comments |
| 1 |  | XON | [1..1] | R |  | Software Vendor Organization |  |  |
| 2 | 1..15# | ST | [1..1] | R |  | Software Certified Version or Release Number |  |  |
| 3 | 1..20# | ST | [1..1] | R |  | Software Product Name |  |  |
| 4 | 1..20# | ST | [1..1] | R |  | Software Binary ID |  |  |
| 5 |  |  |  | O |  | Software Product Information |  |  |
| 6 |  | TS\_0 | [0..1] | RE |  | Software Install Date |  |  |

## MSA – Acknowledgement Segment



## ERR – Error Segment

| Table 0‑5. ERR – Error Segment | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Description/Comments |
| 3 |  | CWE\_CRE | [1..1] | R | HL70357 | HL7 Error Code | Identifies the HL7 (communications) error code. |
| 8 | 1..250# | TX | [0..1] | RE |  | User Message |  |
| 9 |  |  |  | X |  | Inform Person Indicator | Not supported. |
| 10 |  |  |  | X |  | Override Type | Not supported. |
| 11 |  |  |  | X |  | Override Reason Code | Not supported. |
| 12 |  | XTN | [0..\*] | RE |  | Help Desk Contact Point |  |

## PID – Patient Identification Segment

The Patient Identification Segment (PID) is used to provide basic demographics regarding the subject of the testing. The subject may be a person or animal.

| Table 0‑6. PID – Patient Identification Segment | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Condition Predicate | Conformance Statement | Description/Comments |
| 6 |  | XPN | [0..1] | RE |  | Mother’s Maiden Name |  | **ELR-025:** If valued, PID- 6.7 (Name Type Code) SHALL contain the constant value ‘M'. | May be included for identification purposes. Name type code is constrained to the value "M." |
| 7 |  | TS\_3 | [0..1] | RE |  | Date/Time of Birth |  | **ELR-027:** If PID-7 (Date/Time of Birth) is not valued, then an OBX segment associated with the SPM segment SHALL be present to report patient age at specimen collection (LOINC in OBX-3.1 = 35659-2 . | Patient’s date of birth. Note that the granularity of the birth date may be important. For a newborn, birth date may be known down to the minute, while for adults it may be known only to the date.  Note: If a birth date is not provided in the PID, then the patient age must be reported as an observation associated with the specimen. |
| 10 |  | CWE\_CRE | [0..\*] | RE | HL70005 | Race |  |  | Note that state regulations may dictate other behaviors. |
| 11 |  | XAD | [0..\*] | RE |  | Patient Address |  |  |  |
| 13 |  | XTN | [0..\*] | RE |  | Phone Number – Home |  |  |  |
| 14 |  | XTN | [0..\*] | RE |  | Phone Number – Business |  |  |  |
| 22 |  | CWE\_CRE | [0..\*] | RE | HL70189 | Ethnic Group |  |  | . |
| 29 |  | TS\_3 | [0..1] | RE |  | Patient Death Date and Time |  |  |  |
| 30 | 1..1 | ID | [0..1] | RE | HL70136 | Patient Death Indicator |  |  | If PID-29 is valued, then this field should be populated with “Y” since the patient is known to be dead. |
| 31 |  |  |  | O |  | Identity Unknown Indicator |  |  |  |
| 33 |  | TS\_5 | [0..1] | RE |  | Last Update Date/Time |  |  |  |
| 34 |  | HD | [0..1] | C(R/RE) |  | Last Update Facility | IF PID-33 (Last Update Date/Time) is valued. |  | This is the facility that originated the demographic update. |
| 35 |  | CWE\_CRE | [0..1] | RE | PHVS\_Animal\_CDC | Species Code |  |  | Population of this field supports animal rabies testing as it relates to human rabies testing. This is a variant to HITSP where the field is not supported. If a constrained version of this guide includes support for Breed (PID-36) or Strain (PID-37), then this field would be required if Breed and or Strain is present. |
| 36 |  |  |  | O |  | Breed Code |  |  |  |
| 37 |  |  |  | O |  | Strain |  |  |  |
| 38 |  |  |  | O |  | Production Class Code |  |  |  |
| 39 |  |  |  | O |  | Tribal Citizenship |  |  |  |

## NK1 – Next of Kin Segment

If the subject of the testing is something other than a person i.e. an animal, the NK1 will document the person or organization responsible for or owning the subject. For patients who are persons, the NK1 documents the next of kin of the patient. This is particularly important for lead testing of minors, since the NK1 is used to document information about the parent or guardian. This is where the employment information for the patient is documented.

| Table 0‑7. NK1 – Next Of Kin Segment | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Condition Predicate | Conformance Statement | Description/Comments |
| 1 | 1..4 | SI | [1..1] | R |  | Set ID – NK1 |  | **ELR-033:** NK1-1 (Set ID – NK1) SHALL be valued sequentially starting with the value ‘1’ |  |
| 2 |  | XPN | [0..\*] | C(R/X) |  | Name | IF NK1-13 (Organization Name – NK1) is not valued. |  | Name of the next of kin or associated party. Multiple names for the same entity are allowed, but the legal name must be sent in the first sequence. If the legal name is not sent, the repeat delimiter must be sent in the first sequence.  If next of kin or associated party is a person use this field, otherwise, use field NK1-13 |
| 3 |  | CWE\_CRE | [0..1] | RE | HL70063 | Relationship |  |  | Description of the relationship between the next of kin/related party and the patient. It is of particular importance when documenting the parent or guardian of a child patient or the owner of an animal patient. |
| 4 |  | XAD | [0..\*] | RE |  | Address |  |  | Component that may contain the address of the next of kin/associated party. |
| 5 |  | XTN | [0..\*] | RE |  | Phone Number |  |  | Field that may contain the telephone number of the next of kin/associated party. Multiple phone numbers are allowed |
| 6 |  | XTN | [0..0] | X |  | Business Phone Number |  |  | Not supported. |
| 7 |  | CWE | [0..0] | X |  | Contact Role |  |  | Not supported. |
| 8 |  | DT | [0..0] | X |  | Start Date |  |  | Not supported. |
| 9 |  | DT | [0..0] | X |  | End Date |  |  | Not supported. |
| 10 | 1..60# | ST | [0..0] | X |  | Next of Kin / Associated Parties Job Title |  |  | Not supported. |
| 11 |  | JCC | [0..0] | X |  | Next of Kin / Associated Parties Job Code/Class |  |  | Not supported. |
| 12 |  | CX | [0..0] | X |  | Next of Kin / Associated Parties Employee Number |  |  | Not supported. |
| 13 |  | XON | [0..1] | C(R/X) |  | Organization Name – NK1 | IF NK1-2 (Name) is NOT valued. |  | If next of kin or associated party is an organization use this field, otherwise, use field NK1-2. |
| 14 |  | CWE | [0..0] | X |  | Marital Status |  |  | Not supported. |
| 15 | 1..20= | IS | [0..0] | X |  | Administrative Sex |  |  | Not supported. |
| 16 |  | TS | [0..0] | X |  | Date/Time of Birth |  |  | Not supported. |
| 17 | 1..20= | IS | [0..0] | X |  | Living Dependency |  |  | Not supported. |
| 18 | 1..20= | IS | [0..0] | X |  | Ambulatory Status |  |  | Not supported. |
| 19 |  | CWE | [0..0] | X |  | Citizenship |  |  | Not supported. |
| 20 |  |  |  | O |  | Primary Language |  |  |  |
| 21 |  |  |  | X |  | Living Arrangement |  |  | Not supported. |
| 22 |  |  |  | X |  | Publicity Code |  |  | Not supported. |
| 23 |  |  |  | X |  | Protection Indicator |  |  | Not supported. |
| 24 |  |  |  | X |  | Student Indicator |  |  | Not supported. |
| 25 |  |  |  | X |  | Religion |  |  | Not supported. |
| 26 |  |  |  | X |  | Mother’s Maiden Name |  |  | Not supported. |
| 27 |  |  |  | X |  | Nationality |  |  | Not supported. |
| 28 |  |  |  | X |  | Ethnic Group |  |  | Not supported. |
| 29 |  |  |  | X |  | Contact Reason |  |  | Not supported. |
| 30 |  | XPN | [0..\*] | C(R/X) |  | Contact Person’s Name | IF NK1-13 (Organization Name) is valued. |  |  |
| 31 |  | XTN | [0..\*] | C(RE/X) |  | Contact Person’s Telephone Number | IF NK1-13 (Organization Name) is valued |  |  |
| 32 |  | XAD | [0..\*] | C(RE/X) |  | Contact Person’s Address | IF NK1-13 (Organization Name) is valued |  |  |
| 33 |  | CX | [0..0] | X |  | Next of Kin/Associated Party’s Identifiers |  |  | Not supported. |
| 34 | 1..20= | IS | [0..0] | X |  | Job Status |  |  | Not supported. |
| 35 |  | CWE | [0..0] | X |  | Race |  |  | Not supported. |
| 36 | 1..20= | IS | [0..0] | X |  | Handicap |  |  | Not supported. |
| 37 | 1..16# | ST | [0..0] | X |  | Contact Person Social Security Number |  |  | Not supported. |
| 38 | 1..250# | ST | [0..0] | X |  | Next of Kin Birth Place |  |  | Not supported. |
| 39 | 1..20= | IS | [0..0] | X |  | VIP Indicator |  |  | Not supported. |

1

## PV1 – Patient Visit Information

This segment contains basic inpatient or outpatient encounter information.

| Table 0‑8. PV1 – Patient Visit Information | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Conformance Statement | Description/Comments |
| 1 | 1..4 | SI | [1..1] | R |  | Set ID - PV1 | **ELR-030:** PV1-1 (Set ID - PV1) SHALL contain the constant value ‘1’. |  |
| 2 | 1..20= | IS | [1..1] | R | HL70004 | Patient Class |  | A gross identification of the classification of patient’s visit |
| 3 |  |  |  | O |  | Assigned Patient Location |  |  |
| 4 | 1..20= | IS | [0..1] | RE | Admission Type Value Set | Admission Type |  |  |
| 5 |  |  |  | O |  | Preadmit Number |  |  |
| 6 |  |  |  | O |  | Prior Patient Location |  |  |
| 7 |  |  |  | O |  | Attending Doctor |  |  |
| 8 |  |  |  | O |  | Referring Doctor |  |  |
| 9 |  |  |  | O |  | Consulting Doctor |  |  |
| 10 |  |  |  | O |  | Hospital Service |  |  |
| 11 |  |  |  | O |  | Temporary Location |  |  |
| 12 |  |  |  | O |  | Preadmit Test Indicator |  |  |
| 13 |  |  |  | X |  | Re-admission Indicator |  | Not supported. |
| 14 |  |  |  | O |  | Admit Source |  |  |
| 15 |  |  |  | X |  | Ambulatory Status |  | Not supported. |
| 16 |  |  |  | X |  | VIP Indicator |  | Not supported. |
| 17 |  |  |  | O |  | Admitting Doctor |  |  |
| 18 |  |  |  | O |  | Patient Type |  |  |
| 19 |  |  |  | O |  | Visit Number |  |  |
| 20 |  |  |  | O |  | Financial Class |  |  |
| 21 |  |  |  | X |  | Charge Price Indicator |  | Not supported. |
| 22 |  |  |  | X |  | Courtesy Code |  | Not supported. |
| 23 |  |  |  | X |  | Credit Rating |  | Not supported. |
| 24 |  |  |  | X |  | Contract Code |  | Not supported. |
| 25 |  |  |  | X |  | Contract Effective Date |  | Not supported. |
| 26 |  |  |  | X |  | Contract Amount |  | Not supported. |
| 27 |  |  |  | X |  | Contract Period |  | Not supported. |
| 28 |  |  |  | X |  | Interest Code |  | Not supported. |
| 29 |  |  |  | X |  | Transfer to Bad Debt Code |  | Not supported. |
| 30 |  |  |  | O |  | Transfer to Bad Debt Date |  |  |
| 31 |  |  |  | O | HL70021 | Bad Debt Agency Code |  |  |
| 32 |  |  |  | O |  | Bad Debt Transfer Amount |  |  |
| 33 |  |  |  | O |  | Bad Debt Recovery Amount |  |  |
| 34 |  |  |  | O | HL70111 | Delete Account Indicator |  |  |
| 35 |  |  |  | O |  | Delete Account Date |  |  |
| 36 |  |  |  | O | HL70112 | Discharge Disposition |  |  |
| 37 |  |  |  | O |  | Discharged to Location |  |  |
| 38 |  |  |  | O | HL70114 | Diet Type |  |  |
| 39 |  |  |  | O | HL70115 | Servicing Facility |  |  |
| 40 |  |  |  | X |  | Bed Status |  | Not supported |
| 41 |  |  |  | O | HL70117 | Account Status |  |  |
| 42 |  |  |  | O |  | Pending Location |  |  |
| 43 |  |  |  | O |  | Prior Temporary Location |  |  |
| 44 |  | TS\_5 | [0..1] | RE |  | Admit Date/Time |  | Date and time patient arrived for services |
| 45 |  | TS-5 | [0..1] | RE |  | Discharge Date/Time |  | Date and time patient services ended |
| 46 |  |  |  | O |  | Current Patient Balance |  |  |
| 47 |  |  |  | O |  | Total Charges |  |  |
| 48 |  |  |  | O |  | Total Adjustments |  |  |
| 49 |  |  |  | O |  | Total Payments |  |  |
| 50 |  |  |  | O |  | Alternate Visit ID |  |  |
| 51 |  |  |  | O | HL70326 | Visit Indicator |  |  |
| 52 |  |  |  | X |  | Other Healthcare Provider |  | Not supported. |

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## ORC – Common Order Segment

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|  | | |  | |  | |  | | Table 0‑9. ORC – Common Order Segment | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | | Cardinality | |  | |  | |  |  | Usage | Value Set | HL7 Element Name | Condition Predicate | Conformance Statement | Description/Comments |
| 1 | 2..2 | ID | | [1..1] | |  | |  | |  |  | R | HL70119 | Order Control |  | **ELR-034:** ORC-1 (Order Control) SHALL contain the constant value ‘RE'. |  |
| 14 |  | XTN | | [0..2] | |  | |  | |  |  | RE |  | Call Back Phone Number |  | **ELR-038:** ORC-14 (Call Back Phone Number) SHALL be the same value as OBR-17 within same Order\_Observation Group. | This should be a phone number associated with the original ordering provider. |
| 21 |  | XON | | [1..1] | |  | |  | |  |  | R |  | Ordering Facility Name |  |  | The name of the facility where the order was placed |
| 22 |  | XAD | | [1. 1] | |  | |  | |  |  | R |  | Ordering Facility Address |  |  | The address of the facility where the order was placed. |
| 23 |  | XTN | | [1..\*] | |  | |  | |  |  | R |  | Ordering Facility Phone Number |  |  | The telephone number of the facility where the order was placed |
| 24 |  | XAD | | [0..\*] | |  | |  | |  |  | RE |  | Ordering Provider Address |  |  | This should be the address associated with the original ordering provider |

## OBR – Observation Request Segment

| Table 0‑10. OBR – Observation Request Segment | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Condition Predicate | Conformance Statement | Description/Comments |
| 4 |  | CWE\_CR | [1..1] | R | LOINC  (See Description and Comments for further guidance.) | Universal Service Identifier |  |  | OBR.4 (Universal Service Identifier is oftentimes a panel, order or group code, it can be the same as an OBX.3 (Universal Serivice Identiefier) that follows it within the Order\_Observation Group.  .LOINC SHOULD be used as the standard coding system for this field . A local code and local test name SHOULD also be sent to help with identification of coding issues.  If an appropriate LOINC code does not exist, then value “NAV” ( Not available) from HL7 table0353 MAY be used AND the local code and local test name SHALL be sent.  For reportable lab tests use ELR Reportable Laboratory Observation Identifier Value Set. |
| 8 |  | TS\_4 | [0..1] | C(R/X) |  | Observation End Date/Time | IF SPM-17.2 is valued. | ELR-0NN: If present, OBR-8 (Observation End Date/Time) SHALL be equal or later than OBR-7 (Observation Date/Time). | For specimen-based observations where the specimen was collected over a period of time, this represents the end point in time when the specimen was collected.  This field is related to the second component of SPM-17 Specimen Collection Date/Time. |
| 9 |  |  |  | X |  | Collection Volume |  |  | Not supported.. |
| 17 |  | XTN | [0..2] | RE |  | Order Callback Phone Number |  |  | This should be a phone number associated with the original ordering provider. |
| 30 |  |  |  | X |  | Transportation Mode |  |  | Not supported. |
| 31 |  | CWE\_CRE | [0..\*] | RE | Reason For Study Value Set | Reason for Study |  |  | We know ICD9 is used today, but we will allow ICD10 when the US starts using it. |
| 32 |  | NDL | [0..1] | RE |  | Principal Result Interpreter |  |  | Used for pathology results. |

## TQ1 – Timing/Quantity Segment



## OBX – Observation/Result Segment

| Table 0‑12. OBX – Observation/Result Segment | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Condition Predicate | Conformance Statement | Description/Comments |
| 2 | 2..3 | ID | [0..1] | C(R/X) | HL70125 ( constrained) | Value Type | IF OBX-5 (Observation Value) is valued. |  | This field identifies the data type used for OBX-5. |
| 3 |  | CWE\_CR | [1..1] | R | LOINC OR “NAV”  See Description and Comments for further guidance. | Observation Identifier |  | ELR-NNN: OBX.3 (Observation Identifier) OBX3.3 OR OBX3.6 SHALL be valued "LN" OR "HL70353" | LOINC SHALL be used as the standard coding system for this field . A local code and local test name SHOULD also be sent to help with identification of coding issues.  If an appropriate LOINC code does not exist, then value “NAV” ( Not available) from HL7 table0353 SHALL be used AND the local code and local test name SHALL be sent..[[5]](#footnote-5)  For reportable lab tests ELR Reportable Laboratory Observation Identifier Value Set. SHOULD be used.  For additional demographic information use Epidemiologically important information Value Set SHOULD be used. |
| 5 |  | Var | [0..1] | C(RE/X) | Varies | Observation Value | IF OBX-11 (Observation Result Status) is not valued 'X'. | **ELR-065:** OBX-5(Observation Value) Must be valued IF OBX-8 (Abnormal Flags) is empty AND OBX-11 (Observation Result Status) is not valued ‘X’.  ELR-NNN: OBX.5 (Observation Identifier) IF OBX.2 is valued "CWE", OBX5.3 OR OBX5.6 SHALL be valued "SCT" OR "HL70353"  If OBX-2 (Observation Type) is valued, then the data type format for OBX-5 SHALL conform to the corresponding constrained data type identified in the constrained HL7 Table 0125 found in this guide. | Field that documents each specific, allowed data type. See Section *, HL7 Table 0125* for the data types that will be supported for this field.  Either OBX-5 or OBX-8 (Abnormal flags) must be present in the message except if OBX-11 is ‘X”, result cannot be obtained.[[6]](#footnote-6)  For coded results: use SNOMED CT  For reportable coded nominal test results use: ELR Reportable Coded Observation Value Set  For coded ordinal test results use: ELR Ordinal Value Set for Qualitative Results |
| 8 |  | CWE\_CRE | [0..\*] | C(RE/X) | HL70078 (Constrained V2.7.1), | Interpetation Codes | IF OBX-11 (Observation Result Status) is not valued 'X'. | **ELR-066:** OBX-8 (Abnormal Flags) Must be valued IF OBX-5 (Observation Value) is empty AND OBX-11 (Observation Result Status) is not valued ‘X’. | Indicator of the normalcy of the result found in OBX-5. Cardinality indicates the possible need for multiple abnormal flags, as in the following example: *Example: Hemoglobin has a normal range of 12-16  Initial result (reported in a separate ORU message based on testing an earlier specimen): HGB = 15.9 (results normal)  Current result (in this OBX based on current specimen): HGB = 11.9 abnormality: (L) below low normal and a (D) significant change down (delta > 3).*  In this example, OBX-8 would be set to |*L^* Below low normal ^2.16.840.1.113883.12.78~D^Significant change down ^2.16.840.1.113883.12.78|.  Microbiology example:  Ceftazidime susceptibility (LOINC 133-9) value = |<=^1|, units = ug/ml, Abnormal flag = S  Either OBX-5 (Observation Value) or OBX-8 must be present in the message except if OBX-11 is ‘X”, result cannot be obtained. |
| 14 |  | TS\_4 | [0..1] | RE |  | Date/Time of the Observation |  | **ELR-051:** OBX-14 (Date/Time of the Observation) For observation related to testing of specimen (OBX's following the OBR), SHALL be identical to an occurrence of SPM-17.1 (Range Start Date/Time) value within the same Order\_Observation Group. | The date/time of observation is intended to carry the clinically relevant time of the observation. For specimen-based laboratory reporting, the specimen collection date and time. For observations carried out directly on a patient for instance, such as a blood pressure, the time the observation was performed also happens to be the clinically relevant time of the observation.  The date/time the testing was performed should be reported in OBX-19  For a specimen based test, its value it must be the same as one instance of SPM-17.1 If SPM-17.2 is present in than same instance, then OBX-14 must be within the DR range. |
| 17 |  | CWE\_CRE | [0..\*] | RE | HL7 V3 Observation Method and SNOMED procedure hierarchy codes | Observation Method |  |  | This can be useful to further specify information about the specific method to a more granular level than what is defined by the LOINC used in OBX-3. There are two vocabularies available for use at this time, SNOMED procedure hierarchy codes and V3 Observation Method codes, and work to make these more complete as well as to provide a cross-mapping between them is in development. |

Implementation Notes:

An OBX can reflect an actual result for the test requested, additional information such as ask at order entry responses, or other epidemiologically important information or observations related to the specimen.

| * Table 0‑13. Observation Identifiers | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Testing situation Discussion | OBX.2 Observation Type | OBX.3 Observation Identifier: LOINC part = scale | OBX.5 Observation value | OBX.6 Units | OBX.8 Abnormal Flags | OBX.7 Reference Range | NTE Segment |
| Numeric result | NM | QN | number | UCUM Units required | May be populated with coded interpretation from HL7 table 0078 | May be populated | May be populated with comments, not clinical findings. |
| Numerical intervals, ratios, inequalities | SN | QN | structured numeric | UCUM Units required | May be populated with coded interpretation from HL7 table 0078 | May be populated | May be populated with comments, not clinical findings. |
| Ordinal result | CWE | ORD | For coded Ordinal test results use: ELR Ordinal Value Set for Qualitative Results. | [empty] | May be populated with coded interpretation from HL7 table 0078 | May be populated | May be populated with comments, not clinical findings. |
| Ordinal result | SN | ORD | Ordinal as structured numeric | UCUM Units required | May be populated with coded interpretation from HL7 table 0078 | Required | May be populated with comments, not clinical findings. |
| Conveys numeric or ordinal value | NM | ORDQN | Number | Required unless OBX-11 = ‘X’ \*\* | May be populated with coded interpretation from HL7 table 0078 | May be populated | May be populated with comments, not clinical findings. |
| Conveys numeric or ordinal value | CWE | ORDQN | For coded Ordinal test results use: ELR Ordinal Value Set for Qualitative Results. | [empty] | May be populated with coded interpretation from HL7 table 0078 | May be populated | May be populated with comments, not clinical findings |
| Conveys observation | CWE | NOM | For coded results, SNOMED CT. For reportable coded nominal test results use: ELR Reportable Coded Observation Value Set. If a suitable SNOMED CT does not exist, then use a local code. | [empty] | May be populated with coded interpretation from HL7 table 0078 | May be populated | May be populated with comments, not clinical findings. |



## SPM – Specimen Segment

| Table 0‑15. SPM – Specimen Segment | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Conformance Statement | Description/Comments |
| 2 |  | EIP | [1..1] | R |  | Specimen ID |  | Unique identifier for the specimen as referenced by the Placer application, the Filler application, or both.  Note that the specimen id is not the same thing as the placer/filler order number. Order numbers identify the specific test to be performed on a specimen. A particular specimen may be associated with multiple orders (and multiple placer/filler order numbers). The specimen id may be the same as an accession number, depending on how the particular lab assigns accession numbers. |
| 4 |  | CWE\_CRE | [1..1] | R | SNOMED CT specimen sub-tree | Specimen Type |  | SNOMED CT Specimen hierarchy codes SHALL be used, |
| 5 |  | CWE\_CRE | [0..\*] | RE | PHVS\_ModifierOrQualifier\_CDC | Specimen Type Modifier |  | Allows sending qualifiers for a SNOMED CT term from a single axis. Only used if SPM-4 is a SNOMED CT code. |
| 6 |  | CWE\_CRE | [0..\*] | RE | HL70371 | Specimen Additives |  |  |
| 7 |  | CWE\_CRE | [0..1] | RE | Specimen Collection Method Value Set | Specimen Collection Method |  | Method used to collect the specimen. |
| 8 |  | CWE\_CRE | [0..1] | RE | Body Site Value Set | Specimen Source Site |  | Source from which the specimen was obtained. For biological samples, it may represent the anatomical site from which the specimen was collected. |
| 9 |  | CWE\_CRE | [0..\*] | RE | PHVS\_ModifierOrQualifier\_CDC | Specimen Source Site Modifier |  | Modifier or qualifier for the specimen source site (SPM-8). Allows sending qualifiers for a SNOMED CT term from a single axis. Only used if SPM-8 is a SNOMED code. This allows use of post-coordinated terminologies for specimen source. |
| 10 |  |  |  | O |  | Specimen Collection Site |  |  |
| 11 |  | CWE\_CRE | [0..\*] | **RE** | HL70369 | Specimen Role |  |  |
| 12 |  | CQ | [0..1] | **RE** | Unified Code for Units of Measure (UCUM) | Specimen Collection Amount |  | Amount of sample collected. This can be reported as a volume or a weight/mass. |
| 17 |  | DR | [1..1] | **R** |  | Specimen Collection Date/Time | **ELR-NNN: The earliest** SPM-17.1 (Range Start Date/Time) value SHALL be equal to or before OBR-7 (Observation Date/Time) value within the same Order\_Observation Group.  **ELR-NNN:** If present, the latest SPM-17.2 (Range End Date/Time) value SHALL be equal to or after OBR-7 (Observation Date/Time) value within the same Order\_Observation Group.  ELR-NNN: IF present, the latest SPM-17.2 (Range End Date/Time) value SHALL be equal to or after OBR-8 (Observation End Date/Time) value within the same Order\_Observation Group | SPM-17.1 must use TS\_4 for the data type definition.  SPM-17.2 must use TS\_5 for the data type definition.  For OBXs reporting observations based on this specimen, OBX-14 should contain the same value as component 1 of one of the SPM-17.1 values under the OBR. |
| 18 |  | TS\_5 | [1..1] | R |  | Specimen Received Date/Time |  | Time the specimen was received at the diagnostic service. The actual time that is recorded is based on how specimen receipt is managed, and may correspond to the time the sample is logged in. |
| 21 |  | CWE\_CRE | [0..\*] | **RE** | HL70490 | Specimen Reject Reason |  |  |
| 24 |  | CWE\_CRE | [0..\*] | **RE** | HL70493 | Specimen Condition |  |  |

## NTE – Notes and Comments Segment

| Table 0‑16. NTE –Notes And Comments Segment | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Conformance Statement | Description/Comments |
| **2** | 1..1 | ID | [0..1] | **RE** | HL70105 | Source of Comment |  |  |
| **4** |  | CWE\_CRE | [0..1] | **RE** | HL70364 | Comment Type |  |  |

## FHS – FILE HEADER SEGMENT

This segment is used as the lead-in to a file (group of batches).

| Table 0‑17. FHS – File Header Segment | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Description/Comments |
| **1** | 1..1 | ST | [1..1] | R |  | File Field Separator | Character to be used as the field separator for the rest of the message. The supported value is |, ASCII (124). |
| **2** | 4..5 | ST | [1..1] | R |  | File Encoding Characters | Four characters that always appear in the same order in this field: |^~\&|. |
| **3** |  |  |  | O |  | File Sending Application |  |
| **4** |  |  |  | O |  | File Sending Facility |  |
| **5** |  |  |  | O |  | File Receiving Application |  |
| **6** |  |  |  | O |  | File Receiving Facility |  |
| **7** |  |  |  | O |  | File Creation Date/Time |  |
| **8** |  |  |  | X |  | File Security | Not Supported. |
| **9** |  |  |  | O |  | File Name/ID |  |
| **10** |  |  |  | X |  | File Header Comment | Not Supported. |
| **11** |  |  |  | X |  | File Control ID | Not Supported. |
| **12** |  |  |  | X |  | Reference File Control D | Not Supported. |

## FTS – FILE TRAILER SEGMENT

The FTS segment defines the end of a file (group of batches).

| Table 0‑18. FTS – File Trailer Segment | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Description/Comments |
| **1** |  |  |  | O |  | File Batch Count |  |
| **2** | 1..80# | ST | [0..0] | X |  | File Trailer Comment | Not supported. |

## BHS – BATCH HEADER SEGMENT

This segment is used as the lead-in to a file (group of batches).

| Table 0‑19. BHS – Batch Header Segment | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Description/Comments |
| **1** | 1..1 | ST | [1..1] | R |  | Batch Field Separator | Character used as the field separator for the rest of the message. The supported value is |, ASCII (124). |
| **2** | 4..5 | ST | [1..1] | R |  | Batch Encoding Characters | Four characters that always appear in the same order in this field: |^~\&|. |
| **3** |  |  |  | O |  | Batch Sending Application |  |
| **4** |  |  |  | O |  | Batch Sending Facility |  |
| **5** |  |  |  | O |  | Batch Receiving Application |  |
| **6** |  |  |  | O |  | Batch Receiving Facility |  |
| **7** |  |  |  | O |  | Batch Creation Date/Time |  |
| **8** |  |  |  | X |  | Batch Security | Not supported. |
| **9** |  |  |  | O |  | Batch Name/ID/Type |  |
| **10** |  |  |  | X |  | Batch Comment | Not supported. |
| **11** |  |  |  | X |  | Batch Control ID | Not supported. |
| **12** |  |  |  | X |  | Reference Batch Control D | Not supported. |

## BTS – Batch TRAILER SEGMENT

The BTS segment defines the end of a batch of messages.

| Table 0‑20. BTS – Batch Trailer Segment | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Seq | Len | DT | Cardinality | Usage | Value Set | HL7 Element Name | Description/Comments |
| 1 | 10 | NM | [1..1] | R |  | Batch Message Count | This is the total number of messages contained in the batch. |
| **2** |  |  |  | X |  | Batch Comment | Not supported. |
| **3** |  |  |  | X |  | Batch Totals | Not supported. |

# Code Systems and Value Sets

Refer the the LRI guide for a general discussion of Code Systems and Value sets. Additional constraints and guidance for the LRI\_PH component profile are discussed below.

### LOINC

The LOINC long common name SHOULD be sent in addition to the LOINC in order to facilitate debugging and message validation between the sender and the public health agency. See Section – NN below for further guidance and examples when a valid LOINC does not exist.

### SNOMED CT

Where a SNOMED CT code is available, SNOMED CT SHALL be used for coded reportable laboratory results (CWE\_CRO) in OBX.5 (and identified as CWE in OBX-2). Each SNOMED CT Concept has a permanent unique **numeric Identifier** which is known as the ConceptId and only these shall be used for this IG[[7]](#footnote-7). In other words, SNOMED alphanumeric legacy codes shall not be used for this IG.

In general, coded results for reportable laboratory results fall into three categories: microorganism names (e.g. 88274000^Tryspanoma curzi^SCT), presence or absence findings ( e.g. 260373001^Detected^SCT), and less commonly substances (255835006^Shiga toxin^SCT). When SNOMED CT is used in OBX-5, CWE\_CRO.9 shall contain the laboratory’s original text which is used for printing and/or display to satisfy CLIA reporting requirements. The original text can be different than or the same as the text describing the standard or local code..

### Specimen Type

SNOMED CT drawn from the specimen hierarchy in SNOMED CT SHALL be used vocabulary for specimen source terms in SPM-4 (Specimen type). A cross-mapping between HL70487 and SNOMED CT is under development.<<llink>>

### UCUM

UCUM (Unified Code for Units of Measure) SHALLl be used for reporting units of measure

A table of example UCUM units for electronic messaging is available here: [http://loinc.org/downloads/usage/units](http://loinc.org/downloads/usage/units%20) .

Further information on UCUM can be found at <http://unitsofmeasure.org/>

### Vocabulary Constraints

Table N-N. Value Set/Code System shows the various value sets/code systems used in this IG. It also provides information about the source of the vocabulary and an identifier for the vocabulary. The name found in the Value Set/Code System Name column corresponds with the value set identified in the Value Set column of the data type and segment attribute tables found above.

### Vocabulary Distribution

The value sets below are cross referenced with the ELR251 Value Sets from the Public Health Information Network Vocabulary Access and Distribution System (PHIN VADS). the complete reference table is accessible here:

<https://phinvads.cdc.gov/vads/DownloadHotTopicDetailFile.action?filename=368D12BD-1514-E211-989D-001A4BE7FA90>

Additionally, PHIN VADS provides all ELR related value sets collected into a view that can be accessed here: <http://phinvads.cdc.gov/vads/ViewView.action?name=Electronic%20Laboratory%20Reporting%20(ELR)%20to%20Public%20Health%20-%20HL7%20Version%202.5.1>

PHIN VADS is based upon Whitehouse E-Gov Consolidated Health Informatics (CHI) domain recommendations and its main purpose is to distribute the vocabulary subsets that are needed for public health. PHIN VADS allow implementers to browse, search, and download the value sets associated with an implementation guide. PHIN VADS has the capability to host multiple versions of value sets and implementation guide vocabulary. PHIN VADS provides vocabulary metadata that are needed for HL7 messaging or CDA implementation

Vocabularies recommended in this guide are primarily standard vocabularies recommended by the HITSP for use in the particular domains. In many cases, these vocabularies are further constrained into value sets for use within this guide or were previously constrained into value sets by the CDC and maintained in PHIN VADs for use in the Public Health domain.

| Table 0‑1. Value Set/Code System Summary | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Value Set/Code System Name** | **Code System Source \_(HL7 table 0396 Code)** | **Constrained** | **HL7 Code System OID** | **HL7 Element** | **Data Element Name** | **HL7 Table Type** | **PHIN VADS Value Set Name** | **PHIN VADS Value Set OID** | **Comments** |
| Admission Type Value Set | HL70007 | No | 2.16.840.1.113883.12.7 | PV1-4 | Admission Type | HL7 | PHVS\_AdmissionType\_HL7\_2x | 2.16.840.1.114222.4.11.913 |  |
| Body Site Value Set | SCT | N/A | 2.16.840.1.113883.6.96 | SPM-8 | Specimen Source Site | External | PHVS\_BodySite\_HITSP | 2.16.840.1.113883.3.88.12.3221.8.9 | Specimen Source Site. Identify the body site for injury, specimen, injection and finding. Shall contain a value descending from the SNOMED CT® Anatomical Structure (91723000) hierarchy. |
| ELR Reportable Laboratory Observation Identifier Value Set | LN | N/A | 2.16.840.1.113883.6.1 | OBR-4, OBX-3 | Observation  Identifier | External | PHVS\_LabTestName\_ReportableConditions | 2.16.840.1.114222.4.11.6053 | This includes all the LOINC codes from Reportable Condition Mapping Table (RCMT). This set is a smaller subset that includes only the LOINC lab test codes related to reportable conditions. This value set can be further constrained or extended locally by the public health jurisdiciton |
| HL7 V3 Observation Method | OBSMETHOD | Yes | 2.16.840.1.113883.5.84 | OBX-17 | Observation Method | HL7 | PHVS\_LabTestMethods\_CDC | 2.16.840.1.114222.4.11.1003 | \*\*\*\*\*Can we add SNOMED CT Laboratory test sub tree (152200000)? |
| HL70063 | HL70063 | No | 2.16.840.1.113883.12.63 | NK1-3 | Relationship | HL7 | PHVS\_Relationship\_HL7\_2x | 2.16.840.1.114222.4.11.813 |  |
| HL70078 (2.7.1) | HL70078 (V2.7.1) | yes | 2.16.840.1.113883.12.78 (code system) \*\*NEED TO UPDATE\*\*\* | OBX-8 | Interpretation Codes | HL7 | PHVS\_AbnormalFlag\_HL7\_27\*\*NEED TO UPDATE\*\*\* | 2.16.840.1.114222.4.11.3343\*\*NEED TO UPDATE\*\*\* | Previously known as Abnormal Flag. See Table 6 ? Below for details. |
| HL70105 | HL70105 | No | 2.16.840.1.113883.12.105 | NTE-2 | Source of Comment | HL7 | PHVS\_SourceOfComment\_HL7\_2x | 2.16.840.1.114222.4.11.3014 |  |
| HL70119 | HL70119 | No | 2.16.840.1.113883.12.119 | ORC-1 | Order Control | HL7 | PHVS\_OrderControlCodes\_HL7\_2x | 2.16.840.1.114222.4.11.923 | **constrained to RE** |
| HL70125 | HL70125 | yes | 2.16.840.1.113883.12.125 | OBX-2 | Value Type | HL7 | PHVS\_ValueType\_ELR | 2.16.840.1.114222.4.11.6064 | **See Table 6-n HL7 Table 0125 – Value Type (V2.5.1).** |
| HL70136 | HL70136 | No | 2.16.840.1.113883.12.136 | various | varies | HL7 | PHVS\_YesNo\_HL7\_2x | 2.16.840.1.114222.4.11.819 | Yes/No |
| HL70189 | HL70189 | No | 2.16.840.1.113883.6.238 (code system) | PID-22 | Ethnic Group | HL7 | PHVS\_EthnicGroup\_HL7\_2x | 2.16.840.1.114222.4.11.6066 |  |
| HL70201 | HL70201 | No | 2.16.840.1.113883.12.201 | XTN-2 | Telecommunication Use Code | HL7 | PHVS\_TelecommunicationUseCode\_HL7\_2x | 2.16.840.1.114222.4.11.818 |  |
| HL70202 | HL70202 | No | 2.16.840.1.113883.12.202 | XTN-3 | Telecommunication Equipment Type | HL7 | PHVS\_TelecommunicationEquipmentType\_HL7\_2x | 2.16.840.1.114222.4.11.817 |  |
| HL70204 | HL70204 | No | 2.16.840.1.113883.12.204 | XON-2 | Organization Name Type Code | HL7 | PHVS\_TypeOfOrganizationalNameType\_HL7\_2x | 2.16.840.1.114222.4.11.3346 |  |
| HL70360 | HL70360 | No | 2.16.840.1.113883.12.360 | CNN-7 | Degree | HL7 | PHVS\_DegreeLicenseCertificate\_HL7\_2x | 2.16.840.1.114222.4.11.808 |  |
| HL70364 | HL70364 | Yes | 2.16.840.1.113883.12.364 | NTE-4 | Comment Type | HL7 | PHVS\_CommentType\_CDC | 2.16.840.1.114222.4.11.975 |  |
| HL70369 | HL70369 | Yes | 2.16.840.1.113883.12.369 | SPM-11 | Specimen Role | HL7 | PHVS\_SpecimenRole\_CDC | 2.16.840.1.114222.4.11.1046 |  |
| HL70371 | HL70371 | No | 2.16.840.1.113883.12.371 | SPM-6 | Specimen Additives | HL7 | PHVS\_AdditiveOrPreservative\_HL7\_2x | 2.16.840.1.114222.4.11.960 | consider adding the SNOMED CT substance subtree - Riki working on this? |
| HL70488 (Specimen Collection Method Value Set) | HL70488 | No | 2.16.840.1.113883.12.488 | SPM-7 | Specimen Collection Method | HL7 | PHVS\_SpecimenCollectionMethod\_HL7\_2x | 2.16.840.1.114222.4.11.1041 | Specimen Collection Method. Union of HL7 Table 0488 and SNOMED CT Specimen Collection (17636008) sub-tree. |
| HL70490 | HL70490 | No | 2.16.840.1.113883.12.490 | SPM-21 | Specimen Reject Reason | HL7 | PHVS\_SpecimenRejectReason\_HL7\_2x | 2.16.840.1.114222.4.11.1044 |  |
| HL70493 | HL70493 | No | 2.16.840.1.113883.12.493 | SPM-24 | Specimen Condition | HL7 | PHVS\_SpecimenCondition\_CDC | 2.16.840.1.114222.4.11.1042 |  |
| HL70834 (2.7.1) | MEDIATYPE | Yes | 2.16.840.1.113883.6.10 \*\* change for 2,7,1 | ED-2 | Type of Data | HL7 | PHVS\_MIME\_MediaType\_IANA \*\* change for 2,7,1 | 2.16.840.1.114222.4.11.1012 \*\* change for 2,7,1 | **See Table 6-n HL7 Table 0834 – MIME Type below.** |
| ELR Reportable Coded Observation Value Set | SCT | N/A | 2.16.840.1.113883.6.96 | OBX-5 | Observation Value | External | PHVS\_LabTestResult\_ReportableConditions | 2.16.840.1.114222.4.11.6054 | This includes all the SNOMED CT concept ID from the Reportable Condition Mapping Table (RCMT). This value set includes only SNOMED CT concept IDs for coded related to reportable conditions. This includes microorganism, substances and ordinal results. This value set can be further constrained or extended locally by the public health jurisdiciton |
| PHVS\_Animal\_CDC | SCT | n/a | 2.16.840.1.113883.6.96 | PID-35 | Species Code | External | PHVS\_Animal\_CDC | 2.16.840.1.114222.4.11.1074 | Animal |
| PHVS\_ModifierOrQualifier\_CDC | SCT | N/A | 2.16.840.1.113883.6.96 | SPM -5, SPM-9 | Specimen Type Modifier, Specimen Source Site Modifier | External | PHVS\_ModifierOrQualifier\_CDC | 2.16.840.1.114222.4.11.1014 | Used for Specimen Type Modifier and Specimen Source Site Modifier. Based on a subset of SNOMED CT. |
| SNOMED CT Specimen Collection (17636008) sub-tree | SCT | N/A | 2.16.840.1.113883.6.96 | SPM-7 | Specimen Collection Method | External | PHVS\_SpecimenCollectionMethod\_CDC | 2.16.840.1.114222.4.11.3282 | Specimen Collection Method. Union of HL7 Table 0488 and SNOMED CT Specimen Collection (17636008) sub-tree. |
| SNOMED CT Specimen sub-tree (12303009) | SCT | N/A | 2.16.840.1.113883.6.96 | SPM-4 | Specimen Type | External | PHVS\_Specimen\_CDC | 2.16.840.1.114222.4.11.946 | Specimen Type Union of HL70487 and SNOMED CT Specimen sub-tree (12303009) |
| Reason For Study Value Set | I9CDX | N/A | 2.16.840.1.113883.6.103 | OBR-31 | Reason For Study | External | PHVS\_AdministrativeDiagnosis\_CDC\_ICD-9CM | 2.16.840.1.114222.4.11.856 | Reason for Study. Union of concepts from PHVS\_AdministrativeDiagnosis\_CDC\_ICD-9CM and ICD-10. Note: HITSP apparently has stopped using ICD-9 for diagnosis and focused on using value sets from SNOMED CT. |
| Reason For Study Value Set | SCT | N/A | 2.16.840.1.113883.6.96 | OBR-31 | Reason For Study | External | PHVS\_ProblemList\_HITSP | 2.16.840.1.113883.3.88.12.3221.7.4 | HITSP Problem list includes a broader set of concepts such as diagnosis, diseases, finding, symptoms and signs. |

### Constrained HL7 Tables

This section provides values for only those HL7 tables that are constrained by this IG. HL7 tables in this guide are as specified in the HL7 Version 2.5.1 Standard, except as noted below.

* HL7 Table 0078- Interpretation Codes. ( Abnormal Flag) is pre-adopted from HL7 Version 2.7.1
* HL7 Table 0834-MIME Types is pre-adopted from HL7 Version 2.7.1







### HL7 Table 0078 – Interpretation Codes (V2.7.1)

| Table 0‑4. HL& Table 0078 Interpretation Codes (V2.7.1) | | |
| --- | --- | --- |
| Value | Description | Comment |
| L | Below low normal |  |
| H | Above high normal |  |
| LL | Below lower panic limits |  |
| HH | Above upper panic limits |  |
| < | Below absolute low-off instrument scale |  |
| > | Above absolute high-off instrument scale |  |
| N | Normal (applies to non-numeric results) |  |
| A | Abnormal (applies to non-numeric results) |  |
| AA | Very abnormal (applies to non-numeric units, analogous to panic limits for numeric units) |  |
| null | No range defined, or normal ranges don't apply |  |
| U | Significant change up |  |
| D | Significant change down |  |
| B | Better—use when direction not relevant |  |
| W | Worse—use when direction not relevant |  |
| S | Susceptible. Indicates for microbiology susceptibilities only. |  |
| R | Resistant. Indicates for microbiology susceptibilities only. |  |
| I | Intermediate. Indicates for microbiology susceptibilities only. |  |
| MS | Moderately susceptible. Indicates for microbiology susceptibilities only. |  |
| VS | Very susceptible. Indicates for microbiology susceptibilities only. |  |
| POS | Positive | Added in HL7 Version 2.7 |
| NEG | Negative | Added in HL7 Version 2.7 |
| IND | Indeterminate | Added in HL7 Version 2.7 |
| DET | Detected | Added in HL7 Version 2.7 |
| ND | Not Detected | Added in HL7 Version 2.7 |
| AC | Anti-complementary substances present | Added in HL7 Version 2.7 |
| TOX | Cytotoxic substance present | Added in HL7 Version 2.7 |
| QCF | Quality Control Failure | Added in HL7 Version 2.7 |
| RR | Reactive | Added in HL7 Version 2.7 |
| WR | Weakly reactive | Added in HL7 Version 2.7 |
| NR | Non-reactive | Added in HL7 Version 2.7 |



### HL7 TABLE 0125 – VALUE TYPE (V2.5.1)

| Table 0‑6Table 6-n HL7 Table 0125 – Value Type (V2.5.1) | | | |
| --- | --- | --- | --- |
| Value | Description | Usage | Comment |
| CE | Coded Entry | O |  |
| CWE (CWR\_CRO) | Coded with Exceptions | R | Data type to be used where it is important to communicate the coding system and coding system version with the coded result being reported. Pre-adopted from Version 2.6.  This Implementation Guide has specially constrained versions of the CWE data type in Section 2.2 through 2.4. The CWE\_CRO format shall be used for OBX-5. When sending text data in OBX-5, use either the ST, TX or FT data types. |
| CX | Extended Composite ID With Check Digit | O |  |
| DT | Date | R |  |
| ED | Encapsulated Data | R | Field using the ED data type to allow communication of images, sound clips, XML documents, html markup, etc. |
| FT | Formatted Text (Display) | R | Field using the FT data type to carry a text result value. This is intended for display. The text may contain formatting escape sequences as described in the data types section. Numeric results and numeric results with units of measure should not be reported as text. These should be reported as NM or SN numeric results, with the units of measure in OBX-6. |
| NM | Numeric | R | Field using the NM data type to carry a numeric result value. The only non-numeric characters allowed in this field are a leading plus (+) or minus (-) sign. The structured numeric (SN) data type should be used for conveying inequalities, ranges, ratios, etc. The units for the numeric value SHALL be reported in OBX-6. |
| RP | Reference Pointer | R | Field using the RP data type to allow communication of pointers to images, sound clips, XML documents, html markup, etc. The RP data type is used when the object being pointed to is too large to transmit directly.  This specification defines the mechanism for exchanging pointers to objects, but it does not address the details of applications actually accessing and retrieving the objects over a network.  The most common scheme for passing a pointer is to use a Universal Resource Identifier (URI). See <http://ietf.org/rfc/rfc2396.txt> for detailed definition. The general format of a URI is in the form: <scheme>://<authority><path>?<query>. The scheme and authority portions appear in the Application ID component, Universal ID subcomponent. The path and query portion of the URI appear in the Pointer component of the RP data type. |
| SN | Structured Numeric | R | Field using the SN data type to carry a structured numeric result value. Structured numeric include numerals (^10), intervals (^0^-^1), ratios (^1^/^2 or ^1^:^2), inequalities (<^10), or categorical results (2^+). The units for the structured numeric value SHALL be reported in OBX-6. |
| ST | String Data | R | Field using the ST data type to carry a short text result value. Numeric results and numeric results with units of measure SHALL not be reported as text. These shall be reported as NM or SN numeric results, with the units of measure in OBX-6. |
| TM | Time | R |  |
| TS | Time Stamp (Date & Time) | R |  |
| TX | Text Data (Display) | R | Field using the TX data type to carry a text result value this is intended for display. Numeric results and numeric results with units of measure should not be reported as text. These should be reported as NM or SN numeric results, with the units of measure in OBX-6. |

### HL7 Table 0155 – Accept/Application Acknowledgment Conditions (V2.5.1)

| Table 0‑7. HL7 Table 0155 – Accept/Application Acknowledgment Conditions (V2.5.1) | | | |
| --- | --- | --- | --- |
| Value | Description | Usage | Comment |
| AL | Always | O |  |
| NE | Never | R |  |
| ER | Error/reject conditions only | O |  |
| SU | Successful completion only | O |  |



















### HL7 Table 0834 – MIME Type (V2.7.1)

| Table 0‑13. HL7 Table 0834 – MIME Type (V2.7.1) | | | |
| --- | --- | --- | --- |
| Value | Description | Usage | Comments |
| Application | Application data | O |  |
| Audio | Audio data | R |  |
| Image | Image data | R |  |
| Model | Model data | O |  |
| Text | Text data | R |  |
| Video | Video data | R |  |
| Multipart | MIME multipart package | O |  |

# Laboratory Result Message Development Resources

**Examples should not be used as the basis for implementing the messages in the implementation guide.** Examples are handcrafted and as such are subject to human error.

The National Institute of Standards and Technology (NIST) has established a website: <<website>t the HIT developer community. The site has a number of tools and related materials to assist implementers with the development and testing of software in preparation for ONC Certification.

To support the Laboratory Messaging community, a repository has been established to function as a dynamic library of V2.x.x example messages, technical corrections, and other materials with the intent of providing continuous growth of resources without being time bound to future publications of this guide.

The repository is available at [<<LINK>>](http://hl7v2labtesting.nist.gov:8081/) Example Laboratory Result Messages

# <<section on Additional implementation guidance in separate document>>

1. http://www.ietf.org/rfc/rfc2119.txt [↑](#footnote-ref-1)
2. There are multiple interpretations of “RE” when a value is known. One is “the capability must always be supported and a value is sent if known”, the other is “the capability must always be supported and a value may or may not be sent even when known based on a condition external to the profile specification. The condition may be noted in the profile but cannot be processed automatically”. This is what can be interpreted from the “relevant” part of the definition. Regardless of the interpretation the “RE” usage code, a set of test circumstances can be developed to sufficiently test the “RE” element. See the “Conformity Assessment of Conformance Constructs” section for more details. [↑](#footnote-ref-2)
3. Conditional on certain reportable conditions and also dependent upon individual state laws/regulations. [↑](#footnote-ref-3)
4. <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=210> [↑](#footnote-ref-4)
5. Appropriate status is defined in the LOINC Manual Section 11.2 Classification of LOINC Term Status. [**http://loinc.org/downloads/files/LOINCManual.pdf**](http://loinc.org/downloads/files/LOINCManual.pdf) [↑](#footnote-ref-5)
6. Valid structure:

   Case 1: OBX.5 populated, OBX.8 empty and OBX.11 <> X

   Case 2: OBX.5 empty, OBX.8 populated and OBX.11 <> X

   Case 3: OBX.5 populated, OBX.5 populated and OBX.11 <> X

   Case 4: OBX.5 empty, OBX.8 empty and OBX.11 = X

   Invalid structure:

   Case 5, 6 and 7:   OBX.5 and/or OBX.8 populated and OBX.11 = X

   Case 8: OBX.8 empty, OBX.5 empty and OBX.11 <> X [↑](#footnote-ref-6)
7. From Section 3.1.2. Concept Identifiers SNOMED CT User Guide- July 2012 International Release (US English), ([www.snomed.org/ug.pdf](http://www.snomed.org/ug.pdf)). [↑](#footnote-ref-7)