



**Connecticut Department of Public Health  
Electronic Laboratory Reporting  
Local Implementation Guide  
HL7 Version 2.5.1: ORU^R01  
(CT ELR Local Guide)**

July 18, 2019

Version 1.1

# Connecticut Electronic Laboratory Reporting

## Contents

|  |    |
|--|----|
| Electronic Laboratory Reporting in Connecticut .....                                   | 4  |
| Scope of This Document.....  | 4  |
| Resources.....   | 5  |
| Health Level Seven (HL7) Standard.....   | 5  |
| HL7 2.5.1 Implementation Guide for ELR .....   | 5  |
| Guidance for Object Identifiers (OIDs) .....   | 5  |
| Logical Observation Identifiers Names and Codes (LOINC).....                           | 6  |
| Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT).....                  | 6  |
| PHIN – Vocabulary Access and Distribution System (VADS).....                           | 7  |
| ‘Required’ by law versus ‘required’ in the ELR message .....                           | 7  |
| Use of the CT ELR Guide .....  | 8  |
| Structuring the ELR HL7 2.5.1 Message for CT ELR .....                                 | 9  |
| HL7 Terminology and Data Usage.....  | 9  |
| Table 1. HL7 Terminology .....   | 9  |
| The CT ELR HL7 2.5.1 Message .....   | 10 |
| Table 2. Segments required in the CT ELR HL7 2.5.1. Message.....                       | 10 |
| Usage.....   | 13 |
| Table 3. Usage for CT ELR .....  | 13 |
| Differences in Usage and Additional Constraints for the CT ELR HL7 2.5.1 message ..... | 15 |
| Table 4. Differences between the CT ELR Guide and the National ELR Guide. ....         | 16 |
| MSH – Message Header Segment.....  | 19 |
| SFT – Software Segment .....   | 21 |
| PID – Patient Identification Segment.....  | 22 |
| NK1 – Next of Kin Segment.....   | 25 |
| ORC – Common Order Segment .....   | 27 |
| OBR – Observation Request Segment .....  | 30 |
| OBX – Observation/Result Segment.....  | 34 |
| NTE – Notes and Comments Segment.....  | 39 |
| SPM – Specimen Segment .....   | 40 |

Sending and Receiving the HL7 2.5.1 Message for CT ELR..... 42

    Electronic Message Transport ..... 42

        PHINMS Overview .....42

        How PHINMS Works.....42

    Batch Messaging ..... 43

    FHS – File Header Segment..... 43

    BHS – Batch Header Segment ..... 44

    BTS – Batch Trailer Segment..... 45

    FTS – File Trailer Segment ..... 45

    Receipt Acknowledgment of the ORU Message..... 45

Appendix A – Value Sets ..... 46

*User-Defined* Table 0001 Administrative Sex ..... 46

*User-Defined* Table 0005 Race ..... 46

    HL7 Table 0008 Acknowledgment Code..... 46

*User-Defined* Table 0189 Ethnic Group ..... 46

*User-Defined* Table Connecticut Town Names ..... 47

*User Defined* Table 0078 (HL70078) ..... 48

*User Defined* Table 0363 (HL70363) Assigning Authority..... 48

| Revision History | Issue Date    | Summary of Changes                 |
|------------------|---------------|------------------------------------|
| 1.0              | Nov. 30, 2015 | Initial release by CT ELR team.    |
| 1.1              | July 18, 2019 | Revised links for updated webpages |
|                  |               |                                    |
|                  |               |                                    |

## Electronic Laboratory Reporting in Connecticut

Thank you for your interest in Health Level Seven (HL7) electronic data exchange with the Connecticut Electronic Laboratory Reporting (CT ELR) project. Receiving timely and accurate information is critical for Public Health disease surveillance and improving population health.

In Connecticut, licensed laboratories are required to report to the Department of Public Health (CTDPH) and local health jurisdictions, all test results indicative of and specific for the diseases, infections, microorganisms, and conditions as required by Connecticut General Statutes Chapter 368e Section 19a-215<sup>1</sup> and Sections 19a-2a and 19a-36-A2 of the Public Health Code<sup>2</sup>. Under Section 19a-215 “A clinical laboratory that reports an average of more than thirty findings per month shall make such reports electronically in a format approved by the commissioner.” In addition, certain laboratory significant findings can only be submitted electronically. Laboratory reporting requirements are published annually in the *Connecticut Epidemiologist* newsletter and posted on the CTDPH website<sup>3</sup>.

### Scope of This Document

This local implementation guide, the CT ELR Guide, is designed for use by analysts and developers who must understand and implement elements of the HL7 version 2.5.1 Unsolicited Observation Message for submission to CT ELR. Construction and submission of other HL7 message types are beyond the scope of this document. For example, this document does not cover querying of patient demographics or laboratory results.

Standardized HL7 messaging is the preferred format for ELR in Connecticut, and to meet current federal Meaningful Use requirements, HL7 version 2.5.1 is the only acceptable message format for ELR. This guide does not address Meaningful Use attestation. However, messages constructed using this guide and transmitted to CT ELR will be appropriate for meeting Meaningful Use. For more information on Meaningful Use attestation in Connecticut, please visit the Meaningful Use page of the CTDPH website<sup>4</sup>.

Within this guide, footnotes or underlines are used to indicate links to external URLs; links within this document are also underlined. Items of special importance are indicated in **bold type**.

CTDPH strongly encourages the submission of ELR messages in HL7 2.5.1 format, especially for hospital laboratories. If your laboratory needs to discuss using HL7 2.3.1 or other format for ELR, please contact the CTDPH ELR team at [DPH.ELR@CT.GOV](mailto:DPH.ELR@CT.GOV).

---

<sup>1</sup> <http://www.cga.ct.gov/2011/pub/chap368a.htm>

<sup>2</sup> <http://www.ct.gov/dph/cwp/view.asp?a=3118&q=397982>

<sup>3</sup> [http://www.ct.gov/dph/lib/dph/infectious\\_diseases/pdf\\_forms\\_/reportablediseases.pdf](http://www.ct.gov/dph/lib/dph/infectious_diseases/pdf_forms_/reportablediseases.pdf)

<sup>4</sup> [http://www.ct.gov/dph/cwp/view.asp?a=3936&q=462960&dphNav=|&dphNav\\_GID=1993](http://www.ct.gov/dph/cwp/view.asp?a=3936&q=462960&dphNav=|&dphNav_GID=1993)

## Resources

The following resources will be valuable as you create your ELR messages.

### Health Level Seven (HL7) Standard

The ANSI HL7 standards are widely used for data exchange in the health care industry. The full *HL7 Messaging Standard Version 2.5.1* is quite lengthy, covering a variety of situations in patient care and health care finance. No single application is likely to use all of its content.

This CT ELR Guide covers the subset of HL7 2.5.1 that will be used for generation of messages suitable for ELR of reportable conditions in Connecticut. It is expected that laboratories and their information system vendors educate themselves on the HL7 2.5.1 standards as needed for ELR. For information on HL7 and complete descriptions of message construction, please visit [www.hl7.org](http://www.hl7.org).

### HL7 2.5.1 Implementation Guide for ELR

The full *HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 (US Realm)* HL7 Informative Document published in February 2010 can be obtained from CTDPH. In this document, it will be referred to as the National ELR Guide. This document, the CT ELR Guide, is based on the National ELR Guide but includes only the information relevant to CT ELR requirements. In addition, several clarification and errata documents have been published<sup>5, 6, 7</sup>. To request copies of the National ELR Guide and clarification documents, or for answers to other questions, please email [DPH.ELR@CT.GOV](mailto:DPH.ELR@CT.GOV). This CT ELR Guide will be updated as appropriate when new releases of the National ELR Guide are made.

### Guidance for Object Identifiers (OIDs)

An OID is a globally unique International Organization for Standardization (ISO) identifier. OIDs represented in HL7 models consists only of numbers and dots (e.g., 2.16.840.1.113883.3.1) and are created by a Registration Authority. OIDs are the preferred scheme for unique identifiers in HL7 and should be used unless a different scheme is specified or allowed in this guide (e.g., use of a CLIA number instead of an OID in MSH-4).

CT DPH is a registration authority for public health reporting measures for HL7 version 2.5.1 messaging and has obtained from HL7 International a unique OID root that it is using to create the

---

<sup>5</sup> HL7 v2.5.1 IG: Electronic Laboratory Reporting to Public Health (US Realm) Release 1 Errata and Clarifications 9/29/2011.

<sup>6</sup> HL7 v2.5.1 IG: Electronic Laboratory Reporting To Public Health (US Realm) Release 1 ELR 2.5.1 Clarification Document for EHR Technology Certification V1.2, March 22, 2013.

<sup>7</sup> Additional Errata and Clarifications, 5/20/2013.

OID tree structure for public health electronic data exchange with external partners. If an organization wishes to receive an OID under the CTDPH root, CTDPH will assign all the appropriate OIDs required to support the public health reporting measure requested if appropriate. There is no cost.

Laboratories and facilities participating in ELR with CTDPH can request to be assigned an organizational OID for their laboratory, if they do not already have one. At this time, CT ELR will allow the use of CLIA IDs in the ELR HL7 2.5.1 message as allowed in the message specification. In addition, CTDPH has OIDs that **must** be used in particular message segments (e.g., MSH-5, MSH-6, etc.) and may be different for testing vs. production messaging.

CTDPH has established a strict control mechanism for OID assignment. For further information or to requesting an OID under the CTDPH root, please contact Diane Fraiter through the [DPH.ELR@ct.gov](mailto:DPH.ELR@ct.gov) email with "OID Request" in the subject line.

### **Logical Observation Identifiers Names and Codes (LOINC)**

LOINC is a universal standard for identifying medical laboratory observations. The Meaningful Use certification and standards criteria<sup>8</sup> refer to the National ELR Guide that strongly recommends the use of LOINC codes for OBR-4 (ordered test) and lists LOINC as the coding system for OBX-3 (observation identifier), unless no LOINC code is available. CT ELR is further constraining these fields to **require** the use of LOINC codes.

CT ELR prefers the use of LOINC codes that include at least the following LOINC elements: Component-Scale-System-Method-Property. Where LOINC is required in the message, the field should be constructed as follows: LOINC^LongName Text^LN (i.e., 45335-7^Bacteria Identification [Presence] in Isolate by Culture^LN). If a methodless LOINC is used, the method **must** be included in OBX.17.

CTDPH will review all LOINC codes used for messaging with the sending laboratory during the testing and on-boarding process. We suggest that laboratories start transitioning away from local lab codes to LOINC codes before working with CTDPH. The Regenstrief Institute has developed several on-line utilities to facilitate mapping laboratory tests and results to the appropriate LOINC code; the easiest to use is <http://search.loinc.org>. Registration for use is free. The complete LOINC database can be downloaded at <http://loinc.org>.

### **Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT)**

SNOMED CT is a structured collection of coded medical terms, including diseases and organisms that are isolated from laboratory specimens. The Meaningful Use certification and standards

---

<sup>8</sup> [http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2\\_HospitalCore\\_14\\_SubLabResults.pdf](http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/Stage2_HospitalCore_14_SubLabResults.pdf)

criteria (see footnote 8) refer to the National ELR Guide that states “SNOMED CT shall be used when code exists; otherwise it’s a local code” (Table 5-13)<sup>9</sup>.

CT ELR strongly prefers the use of SNOMED CT codes where indicated, however, ELR messages will be accepted without SNOMED CT codes. However, eligible hospitals who wish to attest for Meaningful Use Stage 2 for ELR when CTDPH declares readiness, **must** follow the National ELR Guide as described above. For the purposes of this CT ELR guide, when use of a SNOMED CT code is specified, the field should be constructed as follows: SNOMED^Text^SCT (78181009^Giardia lamblia (organism)^SCT).

There are several SNOMED CT browsers available. You can request a free license to access the SNOMED CT browser available through the U.S. National Library of Medicine UMLS Terminology Services at <https://uts.nlm.nih.gov/home.html>. HL7 vocabulary, SNOMED CT, and National Drug file domains can also be found on the National Cancer Institute Enterprise Vocabulary Services: <https://evs.nci.nih.gov/>.

### **PHIN - Vocabulary Access and Distribution System (VADS)**

The main purpose of the Centers for Disease Control and Prevention (CDC) PHIN VADS is to distribute the value sets associated with HL7 message implementation guides. PHIN VADS is a web-based enterprise vocabulary system for accessing, searching, and distributing vocabularies used in public health and clinical care practice. Users can access and view vocabularies in the context of public health with file download options for Value Sets, Value Set Concepts, Views and Groups available in a tab-delimited text format and also in Microsoft Excel format. All value sets associated with HL7 2.5.1 ELR messaging can be downloaded from the PHIN VADS site <https://phinvads.cdc.gov/vads/SearchVocab.action>. Relevant value sets are included (and hyperlinked) in the segment attribute tables that follow (e.g., *Value set: [HL70005](#)*).

When using PHIN VADS, it is recommended that laboratories review the National ELR Guide clarification and errata documents as referenced in footnotes 5-7 above.

### **‘Required’ by law versus ‘required’ in the ELR message**

‘Required’ is a term used in both the public health and information technology domains. In the public health domain, ‘required’ refers to the legal obligation of providing certain information such as a legally reportable laboratory result. It may also further refer to the actual data elements that must be included with a reportable laboratory result. The Connecticut Public Health Code Section 19a-36-A4<sup>10</sup> outlines what information shall be included in a laboratory report of significant findings, specifically: the name, address, age sex, and, if known, race/ethnicity of the

---

<sup>9</sup> HL7 v2.5.1 IG: Electronic Laboratory Reporting to Public Health (US Realm) Release 1; p. 158.

<sup>10</sup> The Connecticut Public Health Code can be browsed at: <http://www.ct.gov/dph/cwp/view.asp?a=3118&q=397982>

person affected, the name and address of the attending physician, the identity of the infectious agent or other reportable laboratory findings, and the method of identification.

In the information technology domain, 'required' typically means that a component must be present or the next step in the process cannot be performed. Absence of a required element stops the entire process. For example, an information system may require that a patient's name be present before the record can be saved in the system. Without the name, this necessary step cannot be made and all subsequent processing is halted until the name is provided.

Differences in data element usage and other constraints for the CT ELR HL7 2.5.1 message are described in the section "[Differences in Usage and Additional Constraints for the CT ELR HL7 2.5.1 message](#)" below.

## Use of the CT ELR Guide

As mentioned above, this document was developed as the Connecticut specific companion to the *HL7 International Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release1 (US Realm)* Informative Document. This local guide represents the minimum expectation for message construction and submission to CT ELR.

The following sections will cover the ORU^R01 public health laboratory reporting message including details for message segments and examples, and, sending and receipt of the ORU^R01 ELR message. There is one appendix, A, Value Sets, that lists a subset of some of the value set tables used in the HL7 2.5.1 ELR message.

The CT ELR Guide will be updated as appropriate and as changes are adopted for the ELR national guide. For more information on CT ELR, please contact [DPH.ELR@CT.GOV](mailto:DPH.ELR@CT.GOV) or visit the CTDPH website at <https://portal.ct.gov/DPH/Epidemiology-and-Emerging-Infections/Electronic-Laboratory-Reporting>.



## Structuring the ELR HL7 2.5.1 Message for CT ELR

### HL7 Terminology and Data Usage

This guide will use the HL7 Terminology as described in Table 1. Please note that there has been a recent change in delimiters with the addition of the # (truncation character). Submitting laboratories are advised to add this 5<sup>th</sup> delimiter.

**Table 1. HL7 Terminology**

| Term       | Definition   |
|------------|--|
| Message    | The basic unit of information transferred between systems. For CT ELR, multiple messages are typically batched and sent in a single transmission. A message is comprised of a series of segments in a defined sequence.  |
| Segment    | A segment is a logical grouping of data fields. Segments within a defined message may be required or optional, and may occur only once or may be allowed to repeat. Each segment is named and identified by a segment ID; a unique 3-character code (e.g., OBX). This guide only includes segments needed to construct an ORU-R01 message type.  |
| Field      | A field is a string of characters delimited by field separators ( ). Each field has an element name and is identified by the segment it is in and its sequence within the segment. Usage and cardinality requirements are defined in the Segment Definitions. A field is referenced by the 3-character segment code, followed by the field position (e.g., OBX-5).   |
| Component  | A component is an element within a composite field and is delimited within the field by component separators (^). Within a field having several components, not all components may be required. Leading empty components must be represented by a delimiter (^); trailing empty components may be eliminated from the field. A component is referenced by the 3-character segment code, followed by the field position, and the component position within that field (e.g., OBX-5.2 denotes the second component of the fifth field of the OBX segment). |
| Data Type  | A data type restricts the contents and format of the data field. Data types are given a 2- or 3- letter code specified by HL7. Some data types are composite types and include several components. The applicable HL7 data type is listed in each field definition. For additional information on data types, please see the National ELR Guide or the HL7 Messaging Standard version 2.5.1.   |
| Delimiters | Delimiter values in MSH-1 ( ) and MSH-2 (^&~\#) are used throughout the message. <ul style="list-style-type: none"> <li>  Field Separator (ASCII 124)</li> <li>^ Component Separator (ASCII 094)</li> <li>&amp; Sub-Component Separator (ASCII 038)</li> <li>~ Repetition Separator (ASCII 126)</li> <li>\ Escape Character (ASCII 091)</li> <li># Truncation Character (ASCII 035)</li> </ul>   |

## The CT ELR HL7 2.5.1 Message

The CT ELR HL7 2.5.1 message is based on the National ELR HL7 2.5.1 ORU^R01 message, i.e., the unsolicited observation result message. Table 1 shows the general construction of the ORU^R01 message for CT ELR. Note that not all segments from the National ELR message need to be included for ELR messaging purposes in CT. Laboratories may include or populate other segments if they wish, but these will not be processed or included in the CT ELR message testing system. Please note that laboratories are responsible for demonstrating they can include and populate segments required under Meaningful Use specifications, even if those segments are not currently used by CTDPH.

For CT ELR, segments displayed without braces are required (e.g., MSH). Segments enclosed in curly braces are required and may repeat (e.g., {SFT}). Segments enclosed in both square and curly braces are optional, but if included these segments may repeat (e.g., [{NTE}]).

All CT ELR messages must have at least a one instance of the MSH, SFT, and PID segments; zero or more NK1 segments; one ORC segment; one OBR segment with at least one OBX (that may or may not include a NTE segment) and one SPM segment per grouping.

**Table 2. Segments required in the CT ELR HL7 2.5.1. Message**

| Segment    | Name                          | Description   |
|------------|-------------------------------|---|
| MSH        | Message Header                | Includes information on message delimiters, sender, receiver, message type, and time stamp of the message.  |
| {SFT}      | Software Segment              | A minimum of one SFT segment is required by the original sending facility. CT ELR ignores multiple SFT segments.                                      |
| {          | Patient Result Begin          | Only 1 (one) patient result group can be received per message.  |
| <b>PID</b> | <b>Patient Identification</b> | <b>Demographic data on the subject of the test (i.e., the patient).</b>   |
| [[NK1]]    | Next of Kin/Associated Party  | Used to document next of kin or associated party (employer, guardian, etc.). <b>Required when reporting blood lead results for children.</b>          |
| {          | Order Observation Begin       | The order group is required and can repeat. Multiple ordered tests may be performed on a single specimen.   |
| [ORC]      | Order Common                  | Information about the order including who placed it and when it was placed, etc. This segment is only required for the first order observation group. |
| OBR        | Observation Request           | Information about the test being performed; linked to subsequent results.   |

| Segment      | Name  | Description  |
|--------------|---|--|
| {<br>OBX     | Observation related to<br>OBR                 | Information regarding a single result.   |
| [[NTE]]<br>} | Notes regarding the OBX                       | <b>CT ELR only expects NTEs associated with OBX segments. The contents of the NTE segment are primarily intended for human use and <u>should not be used to relay relevant clinical or laboratory information.</u></b> |
| SPM<br>}     | Specimen<br>information<br>related to the OBR | Characteristics of a single sample such as specimen number, specimen type, collection date, collection site, collection location, and who collected the specimen.  |

The pages that follow describe how to construct each segment for the CT ELR message starting with a description of the purpose of the segment, followed by an example of that segment, and concluding with an attribute table that defines how each data element should be composed.

Segment attribute tables are derived from the National ELR Guide attribute tables and contain the following columns:

- **Sequence** (Seq), the number of the sequence for that message segment.
- **Type** is the overall data type for that data element. Details on data types used in this guide can be found in Chapter 2 of the National ELR Guide, or in the HL7 messaging standard version 2.5.1 document. CTDPH has one change in data type conformance for the EI data type in that CTDPH will allow use of either an OID or CLIA for Universal ID and Universal ID Type.
- **Usage** is the CT ELR usage for that sequence. Differences in use from the National ELR Guide are indicated in **bold** and also noted in the **Guidance** column. Table 3 includes a summary on usage in this guide. Note that CT ELR is pre-adopting the HL7 version 2.7 usage for conditional elements. This is defined in Table 3. In addition, CTDPH, working with NIST, has added a usage element of “I” for “Indifferent”. This indicates data elements that CT ELR currently does not support or process. Laboratories are reminded that even though CTDPH does not process a particular data element, labs may have to be able to demonstrate support for certain elements.
- **Name** is the HL7 standard name for that sequence.
- **Guidance** contains required literal values or values required by CTDPH (**bold**), vocabulary standards (*italics*), value sets (*hyperlinked italics*), and is where examples are defined. Certain value sets specific for CT ELR are listed in Appendix A. Data sequences that are currently not supported by CT ELR are indicated by **N/A** in shaded cells under Guidance.

- **Cardinality.** This guide does not include cardinality for all sequences and data elements except where a change in data type or usage specific for CTDPH requirements causes a change in cardinality. Otherwise, cardinality follows the National ELR Guide.

Examples for each segment are provided only to show a sample construction for each segment (delimited by pipes | |), sequence components, and when needed, sequence subcomponents (both delimited by carets ^), including blank pipes or carets for sequences or components that are not currently supported or required by CT ELR but that need to be accommodated in the message construction. Please refer to the National ELR Guide for complete information for each segment. Standard data element information for a segment may also be found in the *HL7 Messaging Standard Version 2.5.1 An Application Protocol for Electronic Data Exchange in Healthcare Environments*.<sup>11</sup>

Information on submission of the HL7 2.5.1 message to CT ELR, including transport options, batch message requirements, headers, trailers, and errors, are described in the section [“Sending and Receiving the HL7 2.5.1 Message for CT ELR”](#).

---

<sup>11</sup> www.hl7.org

## Usage

To better assist laboratories and their vendors in preparing HL7 2.5.1 ELR messages, we are providing the following table (Table 3) that defines usage. For easier reading, we are using “Submitting Laboratory” to mean the conforming sending application and “CTDPH” to mean the conforming receiving application.

**Table 3. Usage for CT ELR**

| Usage Code | Interpretation            | Comment for Submitting Laboratory  | CTDPH Comment  |
|------------|---------------------------|--|--|
| R          | Required                  | The Submitting Laboratory <b>SHALL</b> populate all “R” elements with a non-empty value.<br><b>CTDPH expects these to be populated.</b>  | CTDPH <b>SHALL</b> process or ignore the information conveyed by required elements.<br>CTDPH <b>must NOT</b> raise an error due to the presence of a required element, but <b>MAY</b> raise an error due to the absence of a required element.<br><b>CTDPH will contact submitting laboratories by email or other methods to let them know if required elements are missing.</b> |
| RE         | Required but may be empty | The element may be missing from the message, but it <b>MUST</b> be sent by the Submitting Laboratory <b>IF</b> there is relevant data.<br>A Submitting Laboratory should be capable of providing all "RE" elements. If the Submitting Laboratory knows the required values for the element, then it <b>MUST</b> send that element. If the Submitting Laboratory does not know the required values, then that element will be omitted.  | CTDPH will be expected to process data contained in the element, but <b>MUST</b> be able to successfully process the message if the element is omitted (no error message should be generated because the element is missing).  |
| X          | Not Supported             | Data elements that are unsupported are indicated with an “X”. In a pipe-delimited (ER7) message type, unsupported elements retain their field delimiters ( ), but do not retain the sub-component or repeat delimiters (~, ^, &), and are not populated. The exception is if the “X” elements are at the end of a segment with no intervening elements designated as usage R, C, RE, CE, in which case the “X” elements may be deleted from the message.<br><b>CTDPH may raise errors if an X element is received.</b> |  |

| Usage Code                                       | Interpretation | Comment for Submitting Laboratory  | CTDPH Comment   |
|--|----------------|--|---|
| C(a/b)<br>C(R/X)<br>C(RE/X)<br>C(R/RE)<br>C(R/O) | Conditional    | <p>CTDPH is pre-adopting the notation for conditional statements from v2.7.1, Section 2.B.7.9, to ensure greater clarity about the usage when the condition is met and when the condition is not met:</p> <p>“An element with a conditional usage code has an associated condition predicate that determines the operational requirements (usage code) of the element.</p> <p>If the condition predicate associated with the element is <b>true</b>, follow the rules for which (the first sub-element) <b>a</b> shall be one of “R”, “RE”, “O” or “X”. If the condition predicate associated with the element is <b>false</b>, follow the rules for (the second sub-element) <b>b</b> which shall be one of “R”, “RE”, “O” or “X”. <b>a</b> and <b>b</b> shall be different and defined by the message profile.”</p> <p>CTDPH is replacing “C” and “CE” with C(R/X), C(RE/X), C(R/RE) or C(R/O) with the following interpretations:</p> <p>1) C(R/X) is interpreted as follows. If the condition predicate associated with the element is <b>true</b> then the usage for the element is <b>R - Required</b>. If the condition predicate associated with the element is <b>false</b> then the usage for the element is <b>X – Not Supported</b>.</p> <p>2) C(RE/X) is interpreted as follows. If the condition predicate associated with the element is <b>true</b> then the usage for the element is <b>RE – Required but may be empty</b>. If the condition predicate associated with the element is <b>false</b> then the usage for the element is <b>X – Not Supported</b>.</p> <p>3) C(R/RE) is interpreted as follows. If the condition predicate associated with the element is <b>true</b> then the usage for the element is <b>R - Required</b>. If the condition predicate associated with the element is <b>false</b> then the usage for the element is <b>RE – Required but may be empty</b>.</p> <p>4) C(R/O) is interpreted as follows. If the condition predicate associated with the element is <b>true</b> then the usage for the element is <b>R - Required</b>. If the condition predicate associated with the element is <b>false</b> then the usage for the element is <b>O – Optional</b>.</p> |   |
| O  | Optional       | <p>This element may be present if specified in the local profile. Local partners may develop profiles that support or forbid use of this element. In the absence of a local profile, Submitting Laboratories will not send the element (i.e., it is assumed to be not-supported).</p>  | <p>CTDPH will ignore the element if it is sent, unless the local profile specifies otherwise. CTDPH may not raise an error if it receives an unexpected optional element.</p> |
| I  | Indifferent    | <p>CTDPH is using “I” (indifferent) to indicate those elements that CTDPH currently does not support, i.e., does not currently process. It is important to note that even if CTDPH does not process these data elements, some of these are required by the National ELR guide. Sending systems should make every effort to support these</p>   | <p>CTDPH will not process the element, but will not raise an error if the element is present.</p>   |

| Usage Code | Interpretation | Comment for Submitting Laboratory  | CTDPH Comment |
|------------|----------------|--|---------------|
|            |                | nationally required elements, as they also form the standard for meaningful use ELR reporting. The CTDPH modified NIST tool will issue an alert (not an error) when these “I” elements are not present in a message. CTDPH will ignore the data for these elements if present. |               |

**Differences in Usage and Additional Constraints for the CT ELR HL7 2.5.1 message**

There are several differences in usage, data type, constraints and requirements between the National ELR HL7 2.5.1 message and the CT ELR HL7 2.5.1 message that are described in Table 4. Again, laboratories should be able to support required data elements based on the National ELR Guide even if CT ELR does not currently process these data elements.

CTDPH has some additional conformance changes that differ from the National ELR Guide. These changes will impact laboratories when they try testing their HL7 2.5.1 messages using the National Institute of Standards and Testing (NIST) ELR message validation testing tool. CTDPH is working with NIST to provide a version of the context free validation tool that is specific for CT available on the NIST website<sup>12</sup>. There is only one data type that has been changed to meet a CT conformance – the EI datatype. This change reflects that CTDPH will accept either an OID **OR** a CLIA ID for the following data elements: PID-3.4, ORC-2.3, ORC-3.3, ORC-4.3, OBR-2.3, OBR-3.3, and, SPM-2.3. For ORC-2.4, ORC-3.4, ORC.4.4, OBR-2.4, OBR-3.4, SPM-2.4, Universal ID Type should be valued “ISO” or “CLIA” depending on which Universal ID (OID or CLIA) was used.

---

<sup>12</sup> <http://hl7v2-cf-validator.nist.gov/cf-validator/#/home>

| <b>Table 4. Differences between the CT ELR Guide and the National ELR Guide.</b> |                           |                     |   |
|--|---------------------------|---------------------|---|
| <b>Segment-Sequence</b>  | <b>National ELR Usage</b> | <b>CT ELR Usage</b> | <b>Comments/Constraints</b>   |
| <b>Message Header (MSH) Segment</b>  |                           |                     |   |
| MSH-5<br>Receiving Application   | R                         | R                   | CTDPH requires using the following literal values.<br><u>Testing/Staging:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO</b><br><u>Production:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO</b><br>These OIDs are specific for ELR HL7 2.5.1 Release 1. |
| MSH-6<br>Receiving Facility  | R                         | R                   | CTDPH requires using the following literal value which is the same for testing and production:<br><b>CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO</b><br>This OID is specific for ELR HL7 2.5.1 Release 1.  |
| MSH-15 Accept Acknowledgment Type  | C(R/RE)                   | I                   | CTDPH is <u>not processing this data element</u> at this time. CTDPH will inform the sending facility by email of any errors found in the message.  |
| MSH-16 Accept Application Type   | C(R/RE)                   | I                   | CTDPH is <u>not processing this data element</u> at this time. CTDPH will inform the sending facility by email of any errors found in the message.  |
| MSH-21 Message Profile Identifier  | R                         | R                   | MSH-21 (Message Profile Identifier) is specific for the version of HL7 2.5.1 implementation. CT is using ELR HL7 2.5.1 Release 1 and CTDPH recommends populating this data element with:<br><b>PHLabReport-NoAck^^2.16.840.1.113883.3.5609.9.2.1^ISO</b>                |
| <b>Patient Identification (PID) Segment</b>                                      |                           |                     |   |
| PID-3 Patient Identifier List  | R                         | R                   | CTDPH will allow either an OID or a CLIA ID for the Universal ID and the appropriate designation for Universal ID Type (CLIA or ISO). These are CT specific ELR conformance CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type).                               |
| PID-11 Patient Address   | RE                        | R                   | CTDPH <b>requires</b> the following address information <u>as a minimum</u> : street or mailing address, city, state, zip code (at least first five digits). Note: use of the 169 CT town names is preferred, but not required.   |
| PID-35 Species Code  | RE                        | I                   | CTDPH is <u>not processing this data element</u> at this time.  |



| <b>Table 4. Differences between the CT ELR Guide and the National ELR Guide.</b> |                           |                     |   |
|--|---------------------------|---------------------|---|
| <b>Segment-Sequence</b>  | <b>National ELR Usage</b> | <b>CT ELR Usage</b> | <b>Comments/Constraints</b>   |
| <b>Next of Kin (NK 1) Segment</b>  |                           |                     |   |
| NK1-4 Address  | RE                        | RE                  | If information available, please follow requirements for PID-11 above. Next of kin may be required for certain diseases reports, e.g., blood lead findings in children.   |
| <b>Common Order (ORC) Segment</b>  |                           |                     |   |
| ORC-2 Placer Order Number  | C(R/RE)                   | R                   | CTDPH will allow either an OID or a CLIA ID for the Universal ID and the appropriate designation for Universal ID Type (CLIA or ISO). These are CT specific ELR conformance CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type). |
| ORC-3 Filler Order Number  | R                         | R                   | CTDPH will allow either an OID or a CLIA ID for the Universal ID and the appropriate designation for Universal ID Type (CLIA or ISO). These are CT specific ELR conformance CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type). |
| ORC-4 Placer Group Number  | RE                        | I                   | CTDPH is <u>not processing this data element</u> at this time, but laboratories should be able to populate this. If element is populated, please follow the CT-ELR-003 and 004 constraints as described above.                            |
| ORC-12 Ordering Provider   | C(R/X)                    | R                   | Populated with the same values as OBR-16. CTDPH <b>requires</b> at least the first and last names of the ordering provider in OBR-16.   |
| ORC-14 Order Callback Phone Number   | C(R/X)                    | R                   | Populated with the same values as OBR-17. CTDPH <b>requires</b> a contact number for the ordering provider in OBR-17.   |
| ORC-24 Ordering Provider Address   | RE                        | R                   | CTDPH <b>requires</b> that an address for the ordering provider be sent. The address must follow the minimum elements as for PID-11.  |
| <b>Observation Request (OBR) Segment</b>   |                           |                     |   |
| OBR-2 Placer Order Number  | R                         | R                   | CTDPH will allow either an OID or a CLIA ID for the Universal ID and the appropriate designation for Universal ID Type (CLIA or ISO). These are CT specific ELR conformance CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type). |

| <b>Table 4. Differences between the CT ELR Guide and the National ELR Guide.</b> |                           |                     |   |
|--|---------------------------|---------------------|---|
| <b>Segment-Sequence</b>  | <b>National ELR Usage</b> | <b>CT ELR Usage</b> | <b>Comments/Constraints</b>   |
| OBR-3 Filler Order Number  | R                         | R                   | CTDPH will allow either an OID or a CLIA ID for the Universal ID and the appropriate designation for Universal ID Type (CLIA or ISO). These are CT specific ELR conformance CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type). |
| OBR-16 Ordering Provider   | RE                        | <b>R</b>            | CTDPH <b>requires</b> at least the <b>first and last names</b> of the ordering provider be provided. ORC-12 is populated with the same values.  |
| OBR-17 Order Callback Phone Number   | RE                        | <b>R</b>            | CTDPH <b>requires</b> that a contact number for the ordering provider be sent in OBR-17. ORC-14 is populated with the same values.  |
| OBR-32 Principal Result Interpreter  | RE                        | <b>I</b>            | CTDPH is <u>not processing this data element</u> at this time.  |
| <b>Observation/Result (OBX) Segment</b>  |                           |                     |   |
| OBX-2 Value Type   | C(R/X)                    | <b>R</b>            | CTDPH <b>requires</b> that OBX-2 Value Type be populated. The OBX-5 (Observation Value), -6 (Units) and -7 (References Ranges) <b>must</b> be consistent with the OBX-2 Value Type.   |
| <b>Specimen (SPM) Segment</b>  |                           |                     |   |
| SPM-2 Specimen ID  | R                         | R                   | CTDPH will allow either an OID or a CLIA ID for the Universal ID and the appropriate designation for Universal ID Type (CLIA or ISO). These are CT specific ELR conformance CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type). |
| SPM-6 Specimen Additives   | RE                        | <b>I</b>            | CTDPH is <u>not processing this data element</u> at this time. Laboratories should be able to demonstrate they can populate this data element.  |
| SPM-12 Specimen Collection Amount  | RE                        | <b>I</b>            | CTDPH is <u>not processing this data element</u> at this time. Laboratories should be able to demonstrate they can populate this data element.  |
| SPM-21 Specimen Reject Reason  | RE                        | <b>I</b>            | CTDPH is <u>not processing this data element</u> at this time. Laboratories should be able to demonstrate they can populate this data element.  |

## MSH – Message Header Segment

The MSH segment contains information about how to parse and process the message.

*Example:*

```
MSH|^~\&#|HealthSentry^2.16.840.1.113883.3.13.2.2.1^ISO|The Hospital of Central Connecticut at New Britain^07D0092913^CLIA|CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO|CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO|20151004154300-0400||ORU^R01^ORU_R01|2015100415431901507|P|2.5.1||||USA||||PHLabReport-NoAck^^2.16.840.1.113883.3.5609.9.2.1^ISO
```

| MSH – Message Header Segment |      |       |                       |  |
|------------------------------|------|-------|-----------------------|--|
| Seq                          | Type | Usage | Name                  | Guidance   |
| 1                            | ST   | R     | Field Separator       | Literal value:   |
| 2                            | ST   | R     | Encoding Characters   | Literal value: ^~\&#   |
| 3                            | HD   | R     | Sending Application   | Name and OID for the sending application.<br><i>Example:</i> HealthSentry^2.16.840.1.113883.3.13.2.2.1^ISO   |
| 4                            | HD   | R     | Sending Facility      | Name and <b>CLIA ID</b> for the sending facility.<br><i>Example:</i> The Hospital of Central Connecticut at New Britain^07D0092913^CLIA<br>Note: Either an OID or CLIA ID is acceptable. |
| 5                            | HD   | R     | Receiving Application | <u>Testing/Staging:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO</b><br><u>Production:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO</b>                                |
| 6                            | HD   | R     | Receiving Facility    | CTDPH requires using the following literal value which is the same for testing and production:<br><b>CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO</b>  |
| 7                            | TS   | R     | Date/Time of Message  | <i>Example:</i> 20151004154300-0400<br>Note: GMT offset required.  |
| 8                            |      | O     | Security              | CTDPH is not processing this data element at this time.  |
| 9                            | MSG  | R     | Message Type          | Literal value: <b>ORU^R01^ORU_R01</b>  |
| 10                           | ST   | R     | Message Control ID    | Unique message identifier generated by the sending application; MSH-3 plus MSH-10 must be globally unique.<br><i>Example:</i> 2015100415431901507  |
| 11                           | PT   | R     | Processing ID         | Denotes whether the message is for testing ( <b>T</b> ), debugging ( <b>D</b> ), or production ( <b>P</b> ); <b>data element currently ignored by CT ELR.</b> <i>Example:</i> P          |
| 12                           | VID  | R     | Version ID            | Literal value: <b>2.5.1</b>  |

| MSH – Message Header Segment |      |       |   |   |
|------------------------------|------|-------|---|---|
| Seq                          | Type | Usage | Name                                    | Guidance  |
| 13-14                        | vary | O     | Sequence Number/Continuation Pointer    | CTDPH is not processing this data element at this time.   |
| 15                           | ID   | I     | Accept Acknowledgment Type              | CTDPH is not processing this data element at this time. CTDPH will inform the sending facility by email of any errors found in the message. |
| 16                           | ID   | I     | Application Acknowledgment              | CTDPH is not processing this data element at this time. CTDPH will inform the sending facility by email of any errors found in the message. |
| 17                           | ID   | O     | Country Code                            | Value Set: <a href="#">PHVS Country ISO 3166-1</a><br><i>Example: USA</i>   |
| 18                           | ID   | O     | Character Set                           | CTDPH is not processing this data element at this time.   |
| 19                           | CWE  | O     | Principal Language of Message           | CTDPH is not processing this data element at this time.   |
| 20                           | ID   | O     | Alternate Character Set Handling Scheme | CTDPH is not processing this data element at this time.   |
| 21                           | EI   | R     | Message Profile Identifier              | <b>DPHlabReport-NoAck^^2.16.840.1.113883.3.5609.9.2.1^ISO</b>   |

### SFT – Software Segment

The SFT segment provides information about the sending application or other applications that manipulate the message. The Laboratory Result Sender is required to populate the first SFT segment. Any other application that transforms the message must add an SFT segment for that application. CT ELR does not evaluate multiple SFT segments.

*Example:*

SFT|Cerner

Corporation^D^^^^HealthSentry&2.16.840.1.113883.3.13.2.2.1&ISO^XX^^^^2168401113883313221  
|20101001|HealthSentry|0100100001010011|HealthSentry|201010010800

| SFT – Software Segment |      |       |                                    |   |
|------------------------|------|-------|------------------------------------|---|
| Seq                    | Type | Usage | Name                               | Guidance  |
| 1                      | XON  | R     | Software Vendor Organization       | <i>Example:</i> Cerner Corporation^D^^^^HealthSentry&2.16.840.1.113883.3.13.2.2.1&ISO^XX^^^^2168401113883313221 |
| 2                      | ST   | R     | Software Version or Release Number | <i>Example:</i> 20101001  |
| 3                      | ST   | R     | Software Product Name              | <i>Example:</i> HealthSentry  |
| 4                      | ST   | R     | Software Binary ID                 | <i>Example:</i> 0100100001010011  |
| 5                      | TX   | O     | Software Product Information       | <i>Example:</i> HealthSentry  |
| 6                      | TS   | RE    | Software Install Date              | <i>Example:</i> 201010010800  |

### PID – Patient Identification Segment

The PID segment is used to provide basic demographics regarding the subject of the testing. This segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change frequently.

*Example:*

```
PID|1||999QQQ1234z^^^The Hospital of Central Connecticut at New
Britain&07D0092913&CLIA^MR^The Hospital of Central Connecticut at New
Britain&2.16.840.1.113883.3.13.2.2.1&ISO~15493225^^^The Hospital of Central Connecticut at New
Britain&07D0092913&CLIA^PI^The Hospital of Central Connecticut at New
Britain&2.16.840.1.113883.3.13.2.2.1&ISO||Patient^Test^A^Jr^^^L|
MaidenLast^MomFirst^MomMI^^^^M |19380510040000|M||2028-9^Asian^CDCREC^^^^^2.5.1|
426 Somewhere St^^NEW BRITAIN^CT^06052^USA^C||^PRN^PH^^^860^9999999|
^WPN^PH^^1^860^4444444^^B |||||||U^Unknown^HL70189^^^^^2.5.1
```

| PID – Patient Identification Segment |      |       |                         |   |
|--------------------------------------|------|-------|-------------------------|---|
| Seq                                  | Type | Usage | Name                    | Guidance  |
| 1                                    | SI   | R     | Set ID – PID            | Literal value: <b>1</b>   |
| 2                                    | CX   | X     | Patient ID              | Deprecated. See PID-3.  |
| 3                                    | CX   | R     | Patient Identifier List | <p>This field contains the list of identifiers (one or more) used by the healthcare facility to <u>uniquely</u> identify a patient. Patient identifiers may include: medical record number, billing number, etc. Up to 4 identifiers separated with ~ may be sent. The example shows 2 patient identifiers.</p> <p><b>Please note: in Connecticut use of a social security number in the PID as the only identifier is <u>not allowed</u>.</b></p> <p><i>Example:</i><br/>                     999QQQ1234z^^^The Hospital of Central Connecticut at New Britain&amp;07D0092913&amp;CLIA^MR^The Hospital of Central Connecticut at New Britain&amp;2.16.840.1.113883.3.13.2.2.1&amp;ISO~15493225^^^The Hospital of Central Connecticut at New Britain&amp;07D0092913&amp;CLIA^PI^The Hospital of Central Connecticut at New Britain&amp;2.16.840.1.113883.3.13.2.2.1&amp;ISO</p> |
| 4                                    | CX   | X     | Alternate Patient ID    | Deprecated. See PID-3.  |
| 5                                    | XPN  | R     | Patient Name            | <p>This field contains the names of the patient, the primary or legal name of the patient is reported first. The name type code should reflect name type, e.g., “L - Legal”. Value sets: <a href="#">HL70200 Name Type</a>, <a href="#">HL70360 Degree, License, Certificate</a></p> <p><i>Example:</i> for patient Test A. Patient, Jr.<br/>                     Patient^Test^A^Jr^^^L</p>   |

| PID – Patient Identification Segment   |      |       |                      |   |
|--|------|-------|----------------------|---|
| Seq  | Type | Usage | Name                 | Guidance  |
| 6  | XPN  | RE    | Mother’s Maiden Name | Value sets: <a href="#">HL70200</a> , <a href="#">HL70360</a><br><i>Example:</i> MaidenLast^MomFirst^MomMI^^^^M   |
| 7  | TS   | R     | Date/Time of Birth   | <b>This field is required by CTDPH with minimum format YYYYMMDD. If birth time unknown, use 0000 (HHSS)</b><br><i>Example:</i> 19380510040000   |
| <b>Note: PID-7 is a required field in CT ELR so minimum cardinality is 1.</b>  |      |       |                      |   |
| 8  | IS   | RE    | Administrative Sex   | <a href="#">User-Defined Table 0001</a> (see Appendix A)<br>Female (F), Male (M), Other (O), or Unknown (U)<br><i>Example:</i> M  |
| 9  | XPN  | X     | Patient Alias.       | Deprecated. See PID-5.  |
| 10   | CWE  | RE    | Race                 | One or more race codes;<br>multiple entries delimited with ~<br>Value set: <a href="#">User-Defined Table 0005</a> (see Appendix A)<br><a href="#">HL70396 Coding System</a><br><i>Example:</i> 2028-9^Asian^CDCREC^^^^2.5.1  |
| 11   | XAD  | R     | Patient Address      | <b>CTDPH requires address information for the following components: street address or mailing address, city, state, zip code (at least first 5 digits).</b><br>Value sets: <a href="#">HL70190 Address Type</a> ,<br><a href="#">PHVS State FIPS 5-2</a><br>For the City component for Connecticut cities and towns, <b>CTDPH strongly prefers the use of the 169 town names.</b> See the User Defined Table Connecticut Town Names in Appendix A.<br><i>Example:</i> 426 Somewhere St^^NEW<br>BRITAIN^CT^06052^USA^C |
| <b>Note: PID-11 is a required field in CT ELR so minimum cardinality is 1.</b> |      |       |                      |   |
| 12   | IS   | X     | County Code          | Deprecated. See PID-11, component 9.  |
| 13   | XTN  | RE    | Phone Number – Home  | CTDPH requests at least one phone number for the patient is provided if available.<br>Value sets: <a href="#">HL70201 Telecommunication Use Code</a> ,<br><a href="#">HL70202 Telecommunication Equipment Type</a><br><i>Example:</i> ^PRN^PH^^^860^9999999^^H  |

| PID – Patient Identification Segment |      |        |                                   |   |
|--------------------------------------|------|--------|-----------------------------------|---|
| Seq                                  | Type | Usage  | Name                              | Guidance  |
| 14                                   | XTN  | RE     | Phone Number – Business           | Value sets: <a href="#">HL70201</a> , <a href="#">HL70202</a><br><i>Example:</i> ^WPN^PH^^1^860^4444444^^B  |
| 15-18                                | CWE  | O      | Optional                          | CTDPH is not processing these data elements at this time (Primary Language, Marital Status, Religion).  |
| 19                                   | ST   | X      | SSN Number- Patient               | Deprecated.   |
| 20                                   | DLN  | X      | Driver's License Number - Patient | Deprecated. See PID-3.  |
| 21                                   | CX   | O      | Mother's Identifier               | CTDPH is not processing this data element at this time.   |
| 22                                   | CWE  | RE     | Ethnic Group                      | Hispanic ( <b>H</b> ), Not Hispanic ( <b>N</b> ), or Unknown ( <b>U</b> ) Value sets: <a href="#">User Defined Table 0189</a> , (see Appendix A) <a href="#">HL70396 Coding System</a><br><i>Example:</i> U^Unknown^HL70189^^^2.5.1 |
| 23-27                                |      | O      | Optional                          | CTDPH is not processing these data elements at this time (Birth Place, Multiple Birth Indicator, Birth Order, Citizenship).   |
| 28                                   | CWE  | X      | Nationality                       | Deprecated.   |
| 29                                   | TS   | RE     | Patient Death Date and Time       | <i>Example:</i> 201302060827-0400 (not shown above)   |
| 30                                   | ID   | RE     | Patient Death Indicator           | If PID-29 is populated then PID-30 must be <b>Y</b> .   |
| 31                                   | ID   | RE     | Identity Unknown Indicator        | CTDPH is not processing this data element at this time, although Lab Result Senders should be able to populate this element, if information available.  |
| 32                                   | IS   | O      | Identity Reliability Code         | CTDPH is not processing this data element at this time.   |
| 33                                   | TS   | RE     | Last Update Date/Time             | <i>Example:</i> 201302061133-0500 (not shown above)   |
| 34                                   | HD   | C(R/O) | Last Update Date Facility         | This field is required <b>if</b> PID-33 is populated.<br><i>Example:</i> New Britain General Campus^2.16.840.1.113883.4.6^ISO   |
| 35                                   | CWE  | I      | Species Code                      | CTDPH is not processing this data element at this time  |
| 36-39                                | vary | O      | Optional                          | CTDPH is not processing these data elements at this time.   |



### NK1 – Next of Kin Segment

The NK1 segment used to document information about a party associated with the patient. This is particularly important for blood lead testing of minors, since the NK1 is used to document information about the parent or guardian. CTDPH recommends providing next of kin information, if available, only for blood lead testing at this time.

*Example:*

NK1|1|Patient^Mother^M^^^^L|MTH^Mother^HL70063|410 Capitol Avenue^^Hartford^CT^06106^USA^H|^PRN^PH^^1^860^8888888^^C

| NK1 – Next of Kin Segment |      |        |                         |   |
|---------------------------|------|--------|-------------------------|---|
| Seq                       | Type | Usage  | Name                    | Guidance  |
| 1                         | SI   | R      | Set ID – NK1            | Sequential number for each repeat of the NK1 segment, must start with 1 for the first sequence, 2 for the second, etc.  |
| 2                         | XPN  | C(R/X) | Name                    | Name of the patient’s next of kin (use NK1-13 if the associated party is an organization)<br>Value sets: <a href="#">HL70200</a> , <a href="#">HL70360</a><br><i>Example:</i> Patient^Mother^M^^^^L   |
| 3                         | CWE  | RE     | Relationship            | The associated party’s relationship to the patient<br>Value sets: <a href="#">HL70063</a> , <a href="#">HL70396</a><br><i>Example:</i> MTH^Mother^HL70063   |
| 4                         | XAD  | RE     | Address                 | Address of the associated party.<br><b>CTDPH strongly prefers the use of the 169 town names.</b> See <a href="#">User Defined Table Connecticut Town Names</a> in Appendix A.<br>Value sets: <a href="#">HL70190</a> , <a href="#">PHVS State FIPS 5-2</a><br><i>Example:</i> 410 Capitol Avenue^^Hartford^CT^06106^USA^H |
| 5                         | XTN  | RE     | Phone Number            | Telephone number(s) of associated party<br>Value sets: <a href="#">HL70201</a> , <a href="#">HL70202</a><br><i>Example:</i> ^PRN^PH^^1^860^8888888^^C   |
| 6-12                      |      | X      | Not Supported           | N/A   |
| 13                        | XON  | C(R/X) | Organization Name – NK1 | Use when the associated party is an organization<br>Value sets: <a href="#">HL70204</a> , <a href="#">HL70203</a><br><i>Example:</i> Family Care Organization^L (not shown above)   |
| 14-19                     |      | X      | Not Supported           | N/A   |

| NK1 – Next of Kin Segment |      |        |                                   |  |
|---------------------------|------|--------|-----------------------------------|--|
| Seq                       | Type | Usage  | Name                              | Guidance   |
| 20                        | CWE  | O      | Primary Language                  | CTDPH is not processing this data element at this time.  |
| 21-29                     |      | X      | Not Supported                     | N/A  |
| 30                        | XPN  | C(R/X) | Contact Person's Name             | Use if NK1-13 is populated<br>Value sets: <a href="#">HL70200</a> , <a href="#">HL70360</a><br><i>Example:</i> Patient^Mother^M^^^L (not shown above)                                    |
| 31                        | XTN  | RE     | Contact Person's Telephone Number | Use if NK1-13 is populated<br>Value sets: <a href="#">HL70201</a> , <a href="#">HL70202</a><br><i>Example:</i> ^PRN^PH^^1^860^8888888^^B (not shown above)                               |
| 32                        | XAD  | RE     | Contact Person's Address          | Use if NK1-13 is populated<br>Value sets: <a href="#">HL70190</a> , <a href="#">PHVS State FIPS 5-2</a><br><i>Example:</i> 410 Capitol Avenue^^Hartford^CT^06106^USA^H (not shown above) |
| 33-39                     |      | X      | Not Supported                     | N/A  |

### ORC - Common Order Segment

The ORC segment includes identifiers related to ordering the specimen (i.e., who placed the order, when it was placed, what action to take regarding the order, etc.). This segment is important for documenting additional information about the ordering provider.

*Example:*

```
ORC|RE|236532410075810000020152760003282471179^EHR^07D0092913^CLIA|201599887755^EHR^07D0092913^CLIA|||||^Anydoctor^Adam^A^Jr^Dr^^^^^L|Outpatient Test Center|^WPN^PH^^^860^9995661|||||New Britain General Campus^L| 100 Grand Street^^New Britain^CT^06050^^B^^09003|^PH^^^860^9995011| 62 Seymour Ave^^New Britain^CT^06052^USA^B
```

| ORC – Common Order Segment   |       |        |                      |  |
|--|-------|--------|----------------------|--|
| Seq  | Type  | Usage  | Name                 | Guidance   |
| 1  | ID    | R      | Order Control        | Literal value: <b>RE</b>   |
| 2  | EI_CT | C(R/X) | Placer Order Number  | <p>This field is the placer application’s order number. Must contain the same value as OBR-2 if populated (i.e., identifier assigned to the placer of the specific order). <b>CTDPH will allow either an OID or a CLIA ID for the Universal ID subcomponent of this sequence. The Universal ID Type will be “ISO” or “CLIA”, respectively.</b></p> <p>See User defined Table 0363 Assigning Authority.</p> <p><i>Example:</i> 98765432112345678900^EHR^2.16.840.1.113883.19.3.2.3^ISO -- if OID is used</p> <p><i>Example:</i> 236532410075810000020152760003282471179^EHR^07D0092913^CLIA -- if CLIA ID is used</p> |
| 3  | EI_CT | R      | Filler Order Number  | <p>This field is the order number associated with the filling application. Must contain the same value as OBR-3 (the identifier assigned to the test by the organization performing the test). <b>CTDPH will allow either an OID or a CLIA ID for the Universal ID subcomponent of this sequence. The Universal ID Type will be “ISO” or “CLIA”, respectively.</b></p> <p><i>Example:</i> 201599887755^EHR^07D0092913^CLIA</p>   |
| <p><i>For ORC-2 and ORC-3, the data type is designated EI_CT to accommodate the use of OID or CLIA in these data elements.</i></p> |       |        |                      |  |
| 4  | EI_CT | I      | Placer Group Number. | CTDPH will not process this information but laboratories should be able to support and populate this data element.   |
| 5  | ID    | O      | Order Status         | CTDPH is not processing this data element at this time.  |

| ORC – Common Order Segment   |        |       |                        |   |
|--|--------|-------|------------------------|---|
| Seq  | Type   | Usage | Name                   | Guidance  |
| 6  | ID     | O     | Response Flag          | CTDPH is not processing this data element at this time.   |
| 7  | TQ     | X     | Not supported.         | N/A   |
| 8-11   | varies | O     | Optional               | CTDPH is not processing these data elements at this time (Parent, Date/Time of Transaction, Entered by, Verified by).   |
| 12   | XCN    | R     | Ordering Provider      | <p><b>CTDPH requires at least last and first names of the ordering provider.</b> This field must contain the same value as OBR-16, the provider that ordered the test. <u>If provided, please separate prefixes and suffixes from names.</u></p> <p>Value sets: <a href="#">HL70200</a>, <a href="#">HL70203 Identifier Type</a>, <a href="#">HL70360</a></p> <p><i>Example:</i> Minimal information<br/>                     ^Anydoctor^Adam^A^Jr^Dr^^^^^L</p> <p><i>Example:</i> Fully specified<br/>                     1234567^Anydoctor^Adam^A^Jr^DR^PHD^ADT01^The Hospital of Central Connecticut at New Britain&amp;2.16.840.1.113883.3.13.2.2.1&amp;ISO^L^4^NPI^MD</p> |
| <b>Note: ORC-12 is a required field in CT ELR so minimum cardinality is 1.</b> |        |       |                        |   |
| 13   | PL     | O     | Enterer’s Location     | <p>This information is optional, but CTDPH does capture it to assist in identifying the Ordering Provider’s location.</p> <p><i>Example:</i> Outpatient Test Center</p>   |
| 14   | XTN    | R     | Call Back Phone Number | <p><b>CTDPH requires a call back number.</b> Must contain the same value as OBR-17 (contact number of ordering provider). Value sets: <a href="#">HL70201</a>, <a href="#">HL70202</a></p> <p><i>Example:</i> ^WPN^PH^^^860^9995661</p>   |
| <b>Note: ORC-14 is a required field in CT ELR so minimum cardinality is 1.</b> |        |       |                        |   |
| 15-19  | vary   | O     | Optional               | CTDPH is not processing these data elements at this time (Order Effective Date/Time, Order Control Code Reason, Entering Organization, Entering Device, Action By).   |
| 20   | CWE    | X     | Not Supported          | N/A   |

| ORC – Common Order Segment |      |       |                                |  |
|----------------------------|------|-------|--------------------------------|--|
| Seq                        | Type | Usage | Name                           | Guidance   |
| 21                         | XON  | R     | Ordering Facility Name         | <p>This field contains the name of the facility placing the order.</p> <p>Value sets: <a href="#">HL70204</a>, <a href="#">HL70203</a></p> <p><i>Example:</i> New Britain General Campus^L</p> <p>Note: for this data type (XON) if populate component 10 (assigning authority), then component 6 (assigning authority) and 7 (organization identifier) must be present (and vice versa).</p>  |
| 22                         | XAD  | R     | Ordering Facility Address      | <p>Value sets: <a href="#">HL70190</a>, <a href="#">PHVS State FIPS 5-2</a></p> <p><i>Example:</i><br/>100 Grand Street^^New Britain^CT^06050^^B^^09003</p>  |
| 23                         | XTN  | R     | Ordering Facility Phone Number | <p>Value sets: <a href="#">HL70201</a>, <a href="#">HL70202</a></p> <p><i>Example:</i> ^^PH^^^860^2245011</p>  |
| 24                         | XAD  | R     | Ordering Provider Address      | <p><b>This field is required by CTDPH.</b></p> <p>This field contains the address of the care provider requesting the order. CTDPH <b>requires</b> address information for the following components: street address or mailing address, city, state, zip code (at least first 5 digits).</p> <p>Value sets: <a href="#">HL70190</a>, <a href="#">PHVS State FIPS 5-2</a></p> <p><i>Example:</i><br/>62 Seymour Ave^^New Britain^CT^06052^USA^B</p> |
| 25                         | CWE  | O     | Order Status Modifier          | CTDPH is not processing this data element at this time.  |
| 26                         | CWE  | X     | Not Supported                  | N/A  |
| 27-30                      | Vary | O     | Optional                       | CTDPH is not processing these data elements at this time (Filler’s Expected Availability Date/Time, Confidentiality Code, Order Type, Enterer Authorization Mode).   |

### OBR – Observation Request Segment

The OBR identifies the type of testing to be performed on the specimen and links that information to the testing order.

*Example:*

```
OBR|1|236532410075810000020152760003282471179^EHR^07D0092913^CLIA|201599887755^EHR^07D0092913^CLIA|22327-1^Hepatitis C Antibody (Anti HCV)^LN^^^2.26|||
20151003061900-0500||||None|||^Anydoctor^Adam^A^Jr^Dr^^^^L|^WPN^PH^^860^9995661|
||||20151003083100-0400|LAB|F
```

| OBR – Observation Request Segment |       |       |                     |   |
|-----------------------------------|-------|-------|---------------------|---|
| Seq                               | Type  | Usage | Name                | Guidance  |
| 1                                 | SI    | R     | Set ID – OBR        | Sequential number for each repeat of the OBR segment, must start with 1 for the first sequence, 2 for the second, etc.  |
| 2                                 | EI_CT | R     | Placer Order Number | Identifier assigned to the placer of the specific order; must contain the same value as ORC-2. <b>CTDPH will allow either an OID or a CLIA ID for the Universal ID subcomponent of this sequence. The Universal ID Type will be “ISO” or “CLIA”, respectively.</b><br><br><i>Example:</i><br>236532410075810000020152760003282471179^EHR^07D0092913^CLIA  |
| 3                                 | EI_CT | R     | Filler Order Number | This field is the order number associated with the filling application and is a permanent identifier for an order and its associated observations. Must uniquely identify the order from other orders in the same filling application (e.g., clinical laboratory). It is the same value as ORC-3. <b>CTDPH will allow either an OID or a CLIA ID for the Universal ID subcomponent of this sequence. The Universal ID Type will be “ISO” or “CLIA”, respectively.</b><br><br><i>Example:</i> 201599887755^EHR^07D0092913^CLIA |

Note: In the circumstance where some of the lab results are generated by the lab but others are performed by a reference lab, the sending lab can choose what filler order number to use. Whichever filler order number is used, the sending lab is expected to be able to trace all observations in the lab result back to the appropriate source lab based on the filler order number provided in OBR-3.

| OBR – Observation Request Segment |      |        |                               |  |
|-----------------------------------|------|--------|-------------------------------|--|
| Seq                               | Type | Usage  | Name                          | Guidance   |
| 4                                 | CWE  | R      | Universal Service Identifier  | Vocabulary standard: <b>LOINC (LN)</b><br><b>CTDPH requires the use of LOINC codes in OBR-4.</b><br>Local codes are not acceptable unless a LOINC is unavailable.<br>OBX-3 should be used to provide an unambiguous, specific test name and OBX-5 should provide the result to the test.<br><br><i>Example:</i><br>22327-1^Hepatitis C Antibody (Anti HCV)^LN^^^2.26 |
| 5-6                               |      | X      | Not Supported                 | N/A (both deprecated)  |
| 7                                 | TS   | R      | Observation Date/Time         | Date and time the specimen was collected or obtained. Must contain the same value as OBX-14 and SPM-17.<br><br><i>Example:</i> 20151003061900-0500   |
| 8                                 | TS   | C(R/X) | Observation End 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. Must contain the same value as SPM-17.2.<br>CTDPH will only process this data element for reportable conditions that need this information.   |
| 9                                 |      | X      | Not Supported                 | N/A.   |
| 10-12                             | vary | O      | Optional                      | CTDPH is not processing these data elements at this time (Collection Volume, Collector Identifier, Specimen Action Code, Danger Code).   |
| 13                                | ST   | RE     | Relevant Clinical Information | CTDPH is not processing this data element at this time; however, labs may be required to demonstrate they can populate this RE data element.<br><br><i>Example:</i> None   |
| 14-15                             |      | X      | Not Supported                 | N/A  |

| OBR – Observation Request Segment  |      |       |  |  |
|--|------|-------|--|--|
| Seq  | Type | Usage | Name                                     | Guidance   |
| 16   | XCN  | R     | Ordering Provider                        | <p><b>CTDPH requires at least the first and last names of the ordering provider.</b></p> <p>Provider who ordered the test; must be the same as ORC-12. <u>If provided, please separate prefixes, e.g., Dr., and suffixes, e.g., MD, from names.</u></p> <p>Value sets: <a href="#">HL70200</a>, <a href="#">HL70203</a>, <a href="#">HL70360</a></p> <p><i>Example:</i> Minimal information<br/>^Anydoctor^Adam^A^Jr^Dr^^^^^L</p> <p><i>Example:</i> Fully specified<br/>1234567^Anydoctor^Adam^A^Jr^DR^PHD^ADT01^The Hospital of Central Connecticut at New Britain&amp;2.16.840.1.113883.3.13.2.2.1&amp;ISO^L^4^NPI^MDMD</p> |
| <b>Note: OBR-16 is a required field in CT ELR so minimum cardinality is 1.</b> |      |       |  |  |
| 17   | XTN  | R     | Order Callback Phone Number              | <p><b>CTDPH requires this information.</b></p> <p>Contact number for the ordering provider; same as ORC-14.</p> <p>Value sets: <a href="#">HL70201</a>, <a href="#">HL70202</a></p> <p><i>Example:</i> ^WPN^PH^^^860^9995661</p>   |
| <b>Note: OBR-17 is a required field in CT ELR so minimum cardinality is 1.</b> |      |       |  |  |
| 18-21  |      | O     | Optional                                 | CTDPH is not processing these data elements at this time (Place Field 1 and 2, Filler Field 1 and 2).  |
| 22   | TS   | R     | Results Report/Status Change – Date/Time | <p>This field is used to indicate the date and time that the results are composed into a report and released, or that a status is entered or changed. Time zone is assumed to be that of the sender. GMT offset is required.</p> <p><i>Example:</i> 20151003083100-0400</p>  |
| 23   | MOC  | O     | Charge to Practice                       | CTDPH is not processing this data element at this time.  |
| 24   | ID   | O     | Diagnostic Services Section ID           | <p>Value set: <a href="#">HL70074</a></p> <p><i>Example:</i> MB</p>  |
| 25   | ID   | R     | Result Status                            | <p><b>CTDPH only supports final results of a test, unless otherwise specified in the Laboratory Report of Significant Findings (OL-15C). Corrections to final results may be sent.</b></p> <p>F = Final Results<br/>C = Correction to Results</p> <p><i>Example:</i> F</p>   |



| OBR – Observation Request Segment |      |       |                              |  |
|-----------------------------------|------|-------|------------------------------|--|
| Seq                               | Type | Usage | Name                         | Guidance   |
| 26                                | PRL  | CE    | Parent Result*               | Used with OBR-29 (Parent); allows linkages with a specific OBX segment associated with another OBR.<br><b>This field is required when linking child sensitivities to the parent culture.</b><br><br><i>Example:</i> (not shown above)<br>625-4^identified:Prid:Pt:Stool:Nom:Culture&LN<br>^1^Campylobacter jejuni  |
| 27                                |      | X     | Not Supported                | N/A  |
| 28                                | XCN  | O     | Not Supported                | CTDPH is not processing this data element at this time.  |
| 29                                | EIP  | CE    | Parent*                      | Used to link this OBR with a parent OBR; commonly used with microbiology results to link a susceptibility result with the parent culture that identified the organism.<br>OBR-2 and OBR-3 must uniquely identify the parent OBR; required if OBR-24 is 'MB' and OBR-4 indicates culture and sensitivity. This means that the same Filler Number cannot be used to identify multiple OBRs.<br><br><i>Example:</i> not shown above<br>23456&NewBritainGeneral_EHR&2.16.840.1.113883.43.19&ISO^56789PHL222&NewBritainGeneral_PHL_LIMS&2.16.840.1.114222.4.1.10412&ISO |
| 30                                |      | X     | Not Supported                | N/A  |
| 31                                | CWE  | RE    | Reason for Study             | The reason for study is indicated as ICD-9 codes and can contain multiple values using the ~ delimiter.<br>Value sets: <a href="#">PHVS AdministrativeDiagnosis CDC ICD-9CM, HL70396</a><br><br><i>Example:</i> 787.91^DIARRHEA^I9CDX (not shown above)  |
| 32                                | NDL  | I     | Principal Result Interpreter | CTDPH is not processing this data element at this time – used for pathology results.   |
| 33-36                             | vary | O     | Optional                     | CTDPH is not processing these data elements at this time.  |
| 37-38                             |      | X     | Not Supported                | N/A  |
| 39                                | CWE  | O     | Collector's Comment          | CTDPH is not processing this data element at this time.  |
| 40-43                             |      | X     | Not Supported                | N/A  |
| 44-50                             | vary | O     | Optional                     | CTDPH is not processing this data element at this time.  |

\*See Appendix A, Section A.4. Linking Parent and Child Results of the *HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 (US Realm)*.

### OBX – Observation/Result Segment

The OBX contains information regarding a single observation (result) related to a single test (OBR) or specimen (SPM) (including the specific type of observation, the result for the observation, when the observation was made, etc.).

*Example:*

```
OBX|1|NM|48159-8^HEPATITIS C VIRUS AB
SIGNAL/CUTOFF:RELACNC:PT:SER/PLAS:QN:EIA^LN^2365^Hepatitis C Signal Cutoff
Ratio^L^2.26^2002.01.31|1|31.8|{Copies}/mL^Copies per Milliliter^UCUM^^^^1.9|^0^0.990000|
H^High^HL70078^^^^2.5.1||F|||20151003061900-0500|||20151003083100-0500|||Cent CT
NewBritn Gen^^^^CLIA&2.16.840.1.113883.4.7&ISO^XX^^^07D0092913|100 Grand Street^^New
Britain^CT^06050^USA^B^^09003
```

| OBX – Observation/Result Segment |      |       |                        |   |
|----------------------------------|------|-------|------------------------|---|
| Seq                              | Type | Usage | Name                   | Guidance  |
| 1                                | SI   | R     | Set ID – OBX           | Sequential number for each repeat of the OBX segment, must start with 1 for the first sequence, 2 for the second, etc.  |
| 2                                | ID   | R     | Value Type             | This field identifies the data type used for OBX-5. The allowed value types for ELR are given in this value set: <a href="#">HL70125</a> but the most commonly used for ELR are CWE, NM (numeric), SN (structured numeric), and ST (string data), OBX-6 must be populated if Value Type is NM or SN. If data type is CWE (coded with exceptions), use SNOMED CT in OBX-5.<br><br><i>Example:</i> NM   |
| 3                                | CWE  | R     | Observation Identifier | <b>This is a Required field. CTDPH requires the use of LOINC codes. Local codes are not acceptable. Missing OBX-3 will trigger a rejection of the message if OBX-5 is also missing.</b><br><br>Vocabulary standard: <i>LOINC</i><br><br>For example above, OBX-2 NM:<br><i>Example:</i> 48159-8^HEPATITIS C VIRUS AB<br>SIGNAL/CUTOFF:RELACNC:PT:SER/PLAS:QN:EIA^LN^2365^Hepatitis C Signal Cutoff Ratio^L^2.26^2002.01.31<br><br>For example of OBX-2 CWE:<br><i>Example:</i> 600-7^BACTERIA<br>IDENTIFIED:PRID:PT:BLD:NOM:CULTURE^LN^76^Blood Culture^L^2.26^2002.01.31 |

| OBX – Observation/Result Segment |                              |         |                      |  |             |              |                                |           |              |                              |              |                              |
|----------------------------------|------------------------------|---------|----------------------|--|-------------|--------------|--------------------------------|-----------|--------------|------------------------------|--------------|------------------------------|
| Seq                              | Type                         | Usage   | Name                 | Guidance   |             |              |                                |           |              |                              |              |                              |
| 4                                | ST                           | C(R/RE) | Observational Sub-ID | <p>Required if there is more than one OBX with the same OBX-3. Typically a sequential number (1, 2, 3, etc.).</p> <p><i>Example:</i> 1</p>   |             |              |                                |           |              |                              |              |                              |
| 5                                | Var                          | C(RE/X) | Observation Value    | <p>Value must correspond to the data type entered in OBX-2. When OBX-2 is CWE, use SNOMED CT in OBX-5; if no SNOMED CT code is available, may use a suitable LOINC or other description.</p> <p>Either OBX-5 or OBX-8 (Abnormal flags) must be present in the message.</p> <p>Vocabulary standard: <b>SNOMED CT (SCT)</b></p> <p><i>Example:</i> 31.8</p> <p>Note: for HCV signal to cut off example above</p> <p><i>Example:</i> 5595000^Salmonella typhi^SCT</p> <p>Note: for OBX-2 CWE and OBX-3 LOINC 600-7</p>  |             |              |                                |           |              |                              |              |                              |
| 6                                | CWE                          | C(R/X)  | Units                | <p>If OBX-2 is NM or SN then this field is required.</p> <p><b>Units must follow UCUM standards.</b></p> <p>See <a href="http://loinc.org/usage/units">loinc.org/usage/units</a> for further information.</p> <p><i>Value sets:</i> <a href="#">PHVS UnitsOfMeasure</a> <a href="#">CDC</a>, <a href="#">HL70396</a></p> <p><i>Example:</i></p> <p>{Copies}/mL^Copies per Milliliter^UCUM^^^1.9</p>  |             |              |                                |           |              |                              |              |                              |
| 7                                | ST                           | RE      | References Range     | <p>Interpretation range that applies to OBX-5; should be enough information to understand abnormal flags in OBX-8.</p> <p><i>Example:</i> ^0^0.990000</p> <p>Recommended Formats:</p> <table border="1"> <thead> <tr> <th>Description</th> <th>Code Example</th> </tr> </thead> <tbody> <tr> <td>Lower limit to (-) upper limit</td> <td>'3.5-4.5'</td> </tr> <tr> <td>&gt;lower limit</td> <td>'&gt;10'<br/>(if no upper limit)</td> </tr> <tr> <td>&lt;upper limit</td> <td>'&lt;15'<br/>(if no lower limit)</td> </tr> </tbody> </table> <p>For alphabetical values, the normal value may be reported in OBX-7 as well. For instance, the normal result for an assay may be 'pink'.</p> | Description | Code Example | Lower limit to (-) upper limit | '3.5-4.5' | >lower limit | '>10'<br>(if no upper limit) | <upper limit | '<15'<br>(if no lower limit) |
| Description                      | Code Example                 |         |                      |  |             |              |                                |           |              |                              |              |                              |
| Lower limit to (-) upper limit   | '3.5-4.5'                    |         |                      |  |             |              |                                |           |              |                              |              |                              |
| >lower limit                     | '>10'<br>(if no upper limit) |         |                      |  |             |              |                                |           |              |                              |              |                              |
| <upper limit                     | '<15'<br>(if no lower limit) |         |                      |  |             |              |                                |           |              |                              |              |                              |

| OBX – Observation/Result Segment   |      |        |                               |  |
|--|------|--------|-------------------------------|--|
| Seq  | Type | Usage  | Name                          | Guidance   |
| 8  | CWE  | C(R/X) | Abnormal Flags                | Indicates the normalcy of OBX-5. Cardinality indicates the possible need for multiple abnormal flags.<br>Required if OBX-5 is empty.<br>Value sets: <a href="#">HL70078</a> (see Appendix A), <a href="#">HL70396</a><br><i>Example:</i> H^High^HL70078^^^^2.5.1 |
| 9-10   |      | O      | Optional                      | CTDPH is not processing these data elements at this time (Probability, Nature of Abnormal Test).   |
| 11   | ID   | R      | Observation Result Status     | Indicates the status of the observation result. <b>CTDPH accepts final (F), or corrected (C) results only.</b><br><i>Example:</i> F  |
| 12-13  |      | O      | Optional                      | CTDPH is not processing these data elements at this time (Effective Date of Reference Range, User-Defined Access Checks).  |
| 14   | TS   | R      | Date/Time of the Observation  | <b>CTDPH requires this information.</b><br>Specimen collection date/time; must be the same as OBR-7 and SPM-17.1. Follows ELR Condition predicate in National ELR Guide.<br><i>Example:</i> 20151003061900-0500  |
| <b>Note: OBX-14 is a required field in CT ELR so minimum cardinality is 1.</b> |      |        |                               |  |
| 15   | CWE  | O      | Producer's ID                 | CTDPH is not processing these data elements at this time.  |
| 16   | XCN  | O      | Responsible Observer          | CTDPH is not processing this data element at this time.  |
| 17   | CWE  | RE     | Observation Method            | Method of testing used by the laboratory. If the LOINC code in OBX-3 is methodless, this field <b>shall</b> be populated.<br>Value sets: <a href="#">PHVS LabTestMethods CDC</a> , <a href="#">HL70396</a>   |
| 18   | EI   | O      | Equipment Instance Identifier | CTDPH is not processing this data element at this time.  |
| 19   | TS   | RE     | Date/Time of the Analysis     | Date/Time the test <b>was performed.</b><br><i>Example:</i> 20151003083100-0500  |
| 20-22  |      | X      | Not supported                 | N/A  |

| OBX – Observation/Result Segment |      |       |  |  |
|----------------------------------|------|-------|--|--|
| Seq                              | Type | Usage | Name                                     | Guidance   |
| 23                               | XON  | R     | Performing Organization Name             | This field specifies the laboratory that produced the test result described in this OBX segment. If the test result was performed at an outside reference lab, that lab should be listed here. The CLIA identifier is used in component 10.<br>Value sets: <a href="#">HL70204</a> , <a href="#">HL70203</a><br><i>Example:</i> Cent CT NewBritn<br>Gen^^^^^CLIA&2.16.840.1.113883.4.7&ISO^XX^^^07D0092913 |
| 24                               | XAD  | R     | Performing Organization Address          | Address of the lab that performed the test.<br>Value sets: <a href="#">HL70190</a> , <a href="#">PHVS State FIPS 5-2</a><br><i>Example:</i> 100 Grand Street^^New Britain^CT^06050^USA^B^^09003  |
| 25                               | XCN  | RE    | Performing Organization Medical Director | Medical Director of the lab that performed the test.<br>Value sets: <a href="#">HL70200</a> , <a href="#">HL70203</a> , <a href="#">HL70360</a><br><i>Example:</i> 9876543^Slide^Stan^^^^^NPPES&2.16.840.1.113883.19.4.6.5 &ISO^L^^^NPI (not shown above)  |

Table 5-13 is excerpted from the *HL7 Version 2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1*, and describes the relationship between observation identifiers, observation values, interpretations, and comments. Refer to the guide for more information.

| Table 5-13 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 along with interpretation  | NM                     | QN   | number                  | UCUM Units required | May be populated with codes 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 codes from HL7 table 0078 | May be populated      | May be populated with comments, not clinical findings. |

| Table 5-13 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  |
| Conveys ordinal value and interpretation | CWE                    | ORD  | Ordinal as a code. SNOMED CT shall be used when code exists; otherwise it's a local code. Sending ordinals as codes is the preferred ELR approach. | [empty]     | May be populated with codes from HL7 table 0078 | May be populated      | May be populated with comments, not clinical findings. |
| Conveys ordinal value and interpretation | SN                     | ORD  | Ordinal as structured numeric  | [empty]     | May be populated with codes from HL7 table 0078 | Required              | May be populated with comments, not clinical findings. |
| Conveys observation and interpretation   | CWE                    | NOM  | Coded observation. SNOMED CT shall be used when code exists; otherwise it's a local code.  | [empty]     | May be populated with codes from HL7 table 0078 | May be populated      | May be populated with comments, not clinical findings. |
| Conveys observation and interpretation   | FT, TX or ST           | NAR  | text   | [empty]     | May be populated with codes from HL7 table 0078 | May be populated      | May be populated with comments, not clinical findings. |
| Conveys observation and interpretation   | FT, TX or ST           | MULTI  | text   | [empty]     | May be populated with codes from HL7 table 0078 | May be populated      | May be populated with comments, not clinical findings. |

### NTE – Notes and Comments Segment

The NTE is used to convey additional information regarding the associated segment. While one or more NTE segments can be associated with PID and OBR segments, CT ELR only expects NTEs associated with OBX segments. The contents of the NTE segment are primarily intended for human use and therefore **should not be used to relay relevant clinical or laboratory information**.

*Example:* NTE|1|L|This a comment|RE^Remark^HL70364

| NTE – Notes and Comments Segment |      |       |                   |   |
|----------------------------------|------|-------|-------------------|---|
| Seq                              | Type | Usage | Name              | Guidance  |
| 1                                | SI   | R     | Set ID – NTE      | Sequential number for each repeat of the NTE segment, must start with 1 for the first sequence, 2 for the second, etc.  |
| 2                                | ID   | RE    | Source of Comment | Specifies where the comment came from: Ancillary source ( <b>L</b> ), the orderer or provider ( <b>P</b> ), or other source ( <b>O</b> )<br><i>Example:</i> L |
| 3                                | FT   | R     | Comment           | <i>Example:</i> This is a comment   |
| 4                                | CWE  | RE    | Comment Type      | Value set: <a href="#">HL70364</a><br><i>Example:</i> RE^Remark^HL70364   |

### SPM – Specimen Segment

The SPM segment carries information regarding the type of specimen, where and how it was collected, who collected it, and some basic characteristics of the specimen. It differs from the intent of the OBR in that the OBR addresses order-specific information.

*Example:*

```
SPM|1|201599887755^201599887755&EHR&07D0092913&CLIA||
119297000^Blood^SCT^^^^20140131^^Blood|||VENIP^Venipuncture^HL70488^^^^2.5.1|||||||
20151003061900-0500|20151003062500-0500
```

| SPM – Specimen Segment |      |       |                        |  |
|------------------------|------|-------|------------------------|--|
| Seq                    | Type | Usage | Name                   | Guidance   |
| 1                      | SI   | R     | Set ID – SPM           | Sequential number for each repeat of the SPM segment, must start with 1 for the first sequence, 2 for the second, etc.   |
| 2                      | EIP  | 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.<br><i>Example:</i><br>201599887755^201599887755&EHR&07D0092913&CLIA |
| 3                      | EIP  | O     | Specimen Parent IDs    | CTDPH is not processing this data element at this time.  |
| 4                      | CWE  | R     | Specimen Type          | A nationally recognized coding system is to be used for this field. Valid coding sources include HL7 table 0487, SNOMED CT, etc. The first link below is one version of table 0487; the other link provides a list of other value sets.<br>Value set: <a href="#">PHVS SpecimenType HL7 2x</a> , <a href="#">HL70396</a><br><i>Example:</i><br>119297000^Blood^SCT^^^^20140131^^Blood  |
| 5                      | CWE  | RE    | Specimen Type Modifier | Use when SPM-4 is a SNOMED CT code.<br>Value sets: <a href="#">PHVS ModifierOrQualifier CDC</a> , <a href="#">HL70396</a>  |
| 6                      | CWE  | I     | Specimen Additives     | CTDPH is not processing this data element at this time; however, labs may have to demonstrate they can fill this data element.   |



| SPM – Specimen Segment |      |       |                               |   |
|------------------------|------|-------|-------------------------------|---|
| Seq                    | Type | Usage | Name                          | Guidance  |
| 7                      | CWE  | RE    | Specimen Collection Method    | Method used to collect the specimen.<br><i>Value sets:</i> <a href="#">PHVS SpecimenCollectionMethod HL7 2x, HL70396</a><br><i>Example:</i> VENIP^Venipuncture^HL70488^^^2.5.1  |
| 8                      | CWE  | RE    | Specimen Source Site          | For environmental samples, this may describe the location of the source specimen; for biological samples, it may represent the anatomical site from which the specimen was collected. SNOMED CT values could be used or can use HL7 table 0070.<br><i>Value sets:</i> <a href="#">PHVS BodySite HITSP, HL70396</a><br><i>Example:</i><br>127949000^Elbow^SCT^121^Elbow^L^20140131^2.5.1^Elbow (not shown above) |
| 9                      | CWE  | RE    | Specimen Source Site Modifier | Only used if SPM-8 is a SNOMED CT code.<br><i>Value sets:</i> <a href="#">PHVS ModifierOrQualifier CDC, HL70396</a>   |
| 10                     | CWE  | O     | Specimen Collection Site      | CTDPH is not processing this data element at this time.   |
| 11                     | CWE  | I     | Specimen Role                 | CTDPH is not processing this data element at this time; however, labs may have to demonstrate they can fill this data element.  |
| 12                     | CQ   | I     | Amount of Specimen Collection | CTDPH is not processing this data element at this time; however, labs may have to demonstrate they can fill this data element.  |
| 13-16                  | Vary | O     | Optional                      | CTDPH is not processing these data elements at this time (Grouped Specimen Count, Specimen Description, Specimen Handling Code, Specimen Risk Code).  |
| 17                     | DR   | R     | Specimen Collection Date/Time | Component 1 must match OBR-7 and OBX-14, component 2 must match OBR-8.<br><i>Example:</i> 20151003061900-0500   |
| 18                     | TS   | R     | Specimen Received Date/Time   | The time the specimen was received at the laboratory – may correspond to time logged into the system.<br><i>Example:</i> 20151003062500-0500  |
| 19-20                  |      | O     | Optional                      | CTDPH is not processing these data elements at this time (Specimen Expiration Date/Time, Specimen Availability).  |
| 21                     | CWE  | I     | Specimen Reject Reason        | CTDPH is not processing this data element at this time, however, labs should be able to demonstrate they can populate   |
| 22-29                  | vary | O     | Optional                      | CTDPH is not processing these data elements at this time.   |

## **Sending and Receiving the HL7 2.5.1 Message for CT ELR**

### **Electronic Message Transport**

Currently, the Public Health Information Network Message System (PHINMS) is the only allowed transport system for public health reporting to CTDPH. An overview of PHINMS is provided below on the CDC website at [CDC PHINMS webpage](#). For additional questions, please contact CTDPH at [DPH.ELR@CT.GOV](mailto:DPH.ELR@CT.GOV) and we can assist you with PHINMS.

### **PHINMS Overview**

CTDPH needs to reliably exchange critical and sensitive data with and between public health partners and their data systems. These messages are comprised of standard content and vocabulary, and are implemented in a range of formats, including HL7, XML, image files, CSV files, and so on. The effective exchange of these messages necessitates a bi-directional and secure messaging platform that can provide a common approach to security requirements (such as encryption and authentication), as well as a standard method for addressing and routing content. Such exchanges also require auditing capability and a consistent way to send and receive data exchange confirmations.

PHINMS is the CDC-provided software that fills this critical need for public health. Employing Electronic Business using Extensible Markup Language (ebXML) technology, PHINMS can securely send and receive any message type over the Internet, facilitating interoperability among myriad public health information systems.

### **How PHINMS Works**

A message is composed and inserted into a transport queue table at the sender site. The PHINMS Sender reads the transport queue, creates an ebXML message, encrypts it using the Receiver's public SDN key, and then posts this message to the URL of the CDC RNR (Route-Not-Read) Hub PHINMS receiver. The CDC RNR Hub works as a proxy between PHINMS Senders and Receivers to facilitate secure transport. The PHINMS receiver will periodically query the CDC RNR Hub and acquire any new messages.

## Batch Messaging

CT ELR will accept batch messaging for ELR. The following describes the message header and trailer segments to be used for batch messaging. Examples, as appropriate, are included in the segment attribute tables as well. **Please note: the count of messages in a batch must agree with the value in the Batch Trailer Segment. Any invalid batches will be removed from further processing.**

### FHS – File Header Segment

The FHS segment marks the beginning of a file containing one or more batches of messages.

*Example:* FHS|^~\&|HealthSentry^2.16.840.1.113883.3.13.2.2.1^ISO|Cerner

Corp|CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO|CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO|201511181828

| FHS – File Header Segment |      |       |                            |   |
|---------------------------|------|-------|----------------------------|---|
| Seq                       | Type | Usage | Name                       | Guidance  |
| 1                         | ST   | R     | File Field Separate        |   |
| 2                         | ST   | R     | File Encoding Characters   | Literal Value: ^~\&#  |
| 3                         | HD   | O     | File Sending Application   | Field that may be used to identify the sending application.<br><i>Example:</i><br>HealthSentry^2.16.840.1.113883.3.13.2.2.1^ISO   |
| 4                         | HD   | R     | File Sending Facility      | Name of originating facility; if appropriate, their CLIA unique identifier; the type of unique identifier.<br><i>Example:</i> Cerner Corp<br>If it were a hospital could see:<br>New Britain General Hospital^07D0092913^CLIA |
| 5                         | HD   | O     | File Receiving Application | <u>Testing/Staging:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO</b><br><u>Production:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO</b>   |
| 6                         | HD   | R     | File Receiving Facility    | CTDPH requires using the following literal value which is the same for testing and production:<br><b>CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO</b>   |
| 7                         | TS   | R     | File Creation Date/Time    | Date/Time message was created by the sending system.<br><i>Example:</i> 201511181828  |
| 8                         |      | X     | Not supported              | N/A   |
| 9                         | ST   | O     | File Name/ID               | CTDPH is not processing this data element at this time.   |
| 10-12                     |      | X     | Not supported              | N/A   |

## BHS – Batch Header Segment

The BHS segment marks the beginning of a batch of messages.

*Example:*

```
BHS|^~\&|HealthSentry^2.16.840.1.113883.3.13.2.2.1^ISO|Cerner
Corp|CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO|CTA-
DPH^2.16.840.1.113883.3.5609.4.1^ISO|201511181828
```

| BHS – Batch Header Segment |      |       |                             |   |
|----------------------------|------|-------|-----------------------------|---|
| Seq                        | Type | Usage | Name                        | Guidance  |
| 1                          | ST   | R     | Batch Field Separator       |   |
| 2                          | ST   | R     | Batch Encoding Characters   | ^~\&#   |
| 3                          | ST   | O     | Batch Sending Application   | Field that may be used to identify the sending application.<br><i>Example:</i> HealthSentry^2.16.840.1.113883.3.13.2.2.1^ISO  |
| 4                          | ST   | R     | Batch Sending Facility      | Name of originating facility; if appropriate, their CLIA unique identifier; the type of unique identifier.<br><i>Example:</i> Cerner Corp in above for hospital may see<br>New Britain General Hospital^07D0092913^CLIA |
| 5                          | ST   | O     | Batch Receiving Application | <u>Testing/Staging:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO</b><br><u>Production:</u><br><b>CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO</b>   |
| 6                          | ST   | O     | Batch Receiving Facility    | CTDPH requires using the following literal value which is the same for testing and production:<br><b>CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO</b>   |
| 7                          | TS   | R     | Batch Creation Date/Time    | Date/Time batch was created by the sending system.<br><i>Example:</i> 201511181828  |
| 8                          |      | X     | Not supported               | N/A   |
| 9                          | ST   | O     | Batch Name/ID/Type          | CTDPH is not processing this data element at this time.   |
| 10-12                      |      | X     | Not supported               | N/A   |

### BTS – Batch Trailer Segment

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

*Example:* BTS|11||

| BTS – Batch Trailer Segment |      |       |                     |   |
|-----------------------------|------|-------|---------------------|---|
| Seq                         | Type | Usage | Name                | Guidance  |
| 1                           | ST   | R     | Batch Message Count | Number of messages (MSH segments) or messages contained in batch.<br><b>Note: This count must match the number of messages in the batch. Any invalid batches will be removed from further processing.</b> |
| 2                           | ST   | O     | Batch Comment       | Not Supported   |
| 3                           | NM   | O     | Batch Totals        | Not Supported   |

### FTS – File Trailer Segment

The FTS segment defines the end of a file of batches.

*Example:* FTS|1||

| FTS – File Trailer Segment |      |       |                  |  |
|----------------------------|------|-------|------------------|--|
| Seq                        | Type | Usage | Name             | Guidance   |
| 1                          | ST   | O     | File Batch Count | The Number of batches contained in this file. Since this interface is constrained to one batch per file, this Number should always be <b>1</b> |
| 2                          | ST   | X     | File Comment     | Not Supported  |

### Receipt Acknowledgment of the ORU Message

CT ELR is not sending any message acknowledgements at this point as we do not have the capability to do so. Any errors found during message validation and processing will be submitted by email or fax to the submitting laboratory in a timely manner based on the process to be established with CT ELR.

## Appendix A – Value Sets

For a complete list of HL7 tables and values sets, please see the HL7 Messaging Standard Version 2.5.1 Appendix A (available at [www.hl7.org](http://www.hl7.org)). The value sets below are for reference for this local guide only.

### *User-Defined Table 0001 Administrative Sex*

| Value | Description |
|-------|-------------|
| F     | Female      |
| M     | Male        |
| O     | Other       |
| U     | Unknown     |

### *User-Defined Table 0005 Race*

| Value  | Description                               |
|--------|---|
| 1002-5 | American Indian or Alaska Native          |
| 2028-9 | Asian                                     |
| 2054-5 | Black or African American                 |
| 2076-8 | Native Hawaiian or Other Pacific Islander |
| 2106-3 | White                                     |
| 2131-1 | Other Race                                |

### **HL7 Table 0008 Acknowledgment Code**

These codes will be used once this function is implemented.

| VALUE | DESCRIPTION  |
|-------|--|
| AA    | Original mode: Application Accept - Enhanced mode: Application acknowledgment: <b>Accept</b> |
| AE    | Original mode: Application Error - Enhanced mode: Application acknowledgment: <b>Error</b>   |
| AR    | Original mode: Application Reject - Enhanced mode: Application acknowledgment: <b>Reject</b> |

### *User-Defined Table 0189 Ethnic Group*

| Value | Description            |
|-------|------------------------|
| H     | Hispanic or Latino     |
| N     | Not Hispanic or Latino |
| U     | Unknown                |

Facilities are encouraged to follow CTDPH published guidelines for the collection of race and ethnicity data. Documents can be provided on request.

**User-Defined Table Connecticut Town Names**

CT ELR prefers the use of the standard 169 town names for all addresses located in Connecticut.

|              |               |              |                  |               |               |
|--------------|---------------|--------------|------------------|---------------|---------------|
| Andover      | Colebrook     | Greenwich    | Monroe           | Portland      | Thompson      |
| Ansonia      | Columbia      | Griswold     | Montville        | Preston       | Tolland       |
| Ashford      | Cornwall      | Groton       | Morris           | Prospect      | Torrington    |
| Avon         | Coventry      | Guilford     | Naugatuck        | Putnam        | Trumbull      |
| Barkhamsted  | Cromwell      | Haddam       | New Britain      | Redding       | Union         |
| Beacon Falls | Danbury       | Hamden       | New Canaan       | Ridgefield    | Vernon        |
| Berlin       | Darien        | Hampton      | New Fairfield    | Rocky Hill    | Voluntown     |
| Bethany      | Deep River    | Hartford     | New Hartford     | Roxbury       | Wallingford   |
| Bethel       | Derby         | Hartland     | New Haven        | Salem         | Warren        |
| Bethlehem    | Durham        | Harwinton    | New London       | Salisbury     | Washington    |
| Bloomfield   | Eastford      | Hebron       | New Milford      | Scotland      | Waterbury     |
| Bolton       | East Granby   | Kent         | Newington        | Seymour       | Waterford     |
| Bozrah       | East Haddam   | Killingly    | Newtown          | Sharon        | Watertown     |
| Branford     | East Hampton  | Killingworth | Norfolk          | Shelton       | West Hartford |
| Bridgeport   | East Hartford | Lebanon      | North Branford   | Sherman       | West Haven    |
| Bridgewater  | East Haven    | Ledyard      | North Canaan     | Simsbury      | Westbrook     |
| Bristol      | East Lyme     | Lisbon       | North Haven      | Somers        | Weston        |
| Brookfield   | East Windsor  | Litchfield   | North Stonington | South Windsor | Westport      |
| Brooklyn     | Easton        | Lyme         | Norwalk          | Southbury     | Wethersfield  |
| Burlington   | Ellington     | Madison      | Norwich          | Southington   | Willington    |
| Canaan       | Enfield       | Manchester   | Old Lyme         | Sprague       | Wilton        |
| Canterbury   | Essex         | Mansfield    | Old Saybrook     | Stafford      | Winchester    |
| Canton       | Fairfield     | Marlborough  | Orange           | Stamford      | Windham       |
| Chaplin      | Farmington    | Meriden      | Oxford           | Sterling      | Windsor Locks |
| Cheshire     | Franklin      | Middlebury   | Plainfield       | Stonington    | Windsor       |
| Chester      | Glastonbury   | Middlefield  | Plainville       | Stratford     | Wolcott       |
| Clinton      | Goshen        | Middletown   | Plymouth         | Suffield      | Woodbridge    |
| Colchester   | Granby        | Milford      | Pomfret          | Thomaston     | Woodbury      |
|              |               |              |                  |               | Woodstock     |

**User Defined Table 0078 (HL70078)**

| VALUE | DESCRIPTION   |
|-------|---|
| L     | Below low normal  |
| H     | Above high normal   |
| LL    | Below lower panic limits  |
| HH    | Above high panic limits   |
| <     | Below absolute low-off instrument scale   |
| >     | Above absolute high-off instrument scale  |
| N     | Normal (applied 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.                       |

**User Defined Table 0363 (HL70363) Assigning Authority**

| Value | Description                                | Comment   |
|-------|--|---|
| OID   | Object Identifier                          | OID for submitting organization; HL7 registered or assigned by CTDPH. |
| CLIA  | Clinical Laboratory Improvements Amendment | CLIA ID as assigned by CLIA to the laboratory.                        |