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

February 2024

Version 2.1

Connecticut Electronic Laboratory Reporting

Contents

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
2.0	Dec. 7, 2022	Updated including reflex instructions
2.1	Feb. 16, 2024	Revised links and other updates

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 response and improving population health for Connecticut residents.

In Connecticut, CLIA licensed laboratories are required to report to the Department of Public Health (CT DPH) 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[1] and Sections 19a-2a and 19a-36-A2 of the Public Health Code[2]. 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 are required to only be submitted electronically. Laboratory reporting requirements are published annually in the *Connecticut Epidemiologist* newsletter and posted on the CT DPH website[3]. Forms can also be found by searching in the Forms link on the website.

Scope of This Document

This local implementation guide, the CT ELR Guide, is designed for use by analysts, laboratorians 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 Centers for Medicare and Medicaid Services (CMS) Promoting Interoperability requirements for public health reporting[4], HL7 version 2.5.1 is the only acceptable message format for ELR. This guide does not address CMS Promoting Interoperability attestation. However, messages constructed using this guide and transmitted to CT ELR will be appropriate for meeting Promoting Interoperability requirements. For more information on CT public health reporting requirements for Promoting Interoperability, please visit the Promoting Interoperability page of the CT DPH website[5].

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[1] https://www.cga.ct.gov/current/pub/chap_368a.htm

[2] https://portal.ct.gov/DPH/Public-Health-Code/Quick-Browse--Public-Health-Code-by-Section

[3] OL15C - 2024 (ct.gov)

[4] https://www.cms.gov/regulations-and-guidance/legislation/ehrincentiveprograms

[5] Promoting Interoperability (ct.gov)

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**.

CT DPH 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 another format for ELR, please contact the CT DPH ELR team at dph.informaticslab@ct.gov.

Resources

The following resources will be valuable as you develop and 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 its content.

This CT ELR Guide covers the subset of HL7 2.5.1 that should be used for generation of messages suitable for ELR of laboratory 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.

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 CT DPH. 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. To request copies of the National ELR Guide and clarification documents, or for answers to other questions, please email dph.informaticslab@ct.gov. This CT ELR Guide will be updated as appropriate when new releases of the National ELR Guide are made. *Note:* Implementers of ELR can also refer to *HL7 Version 2.5.1 Implementation Guide: Laboratory Results Interface, Release 1 STU Release 4 - US Realm* (also known as LRI). Although CT DPH is using the Release 1, laboratories should be familiar with the LRI as well.

A useful website for further information about HL7 v2 messages is supported by Caristix: https://hl7-definition.caristix.com/v2/HL7v2.5/Segments.

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.

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, CT DPH has OIDs that **must** be used for certain message segments (e.g., MSH-5, MSH-6, etc.) and may be different for testing vs. production messaging.

Logical Observation Identifiers Names and Codes (LOINC)

LOINC® is the acronym for Logical Observation Identifiers, Names and Codes and are the international standard for identifying health measurements, observations, and documents. LOINC codes are managed by the Regenstrief Institute[6] and are freely available for use.

Promoting Interoperability certification and standards criteria 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.

CT DPH will review all LOINCs 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 LOINCs before working with CT DPH. 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. As for the use of LOINC provided codes, SNOMED CT codes are required to meet Promoting Interoperability certification and standards criteria. CT ELR requires use of SNOMED CT codes for nominal and ordinal test results and for specimen type/source as a stricter usage than define in the National ELR Guide. 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 (i.e., 78181009^Giardia lamblia (organism)^SCT).

[6] LOINC and Health Data Standards - Regenstrief Institute

There are several SNOMED CT browsers available[7]. When using the International Edition access, please pick the browser for the United States. 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/.

Public Health Information Network Vocabulary Access and Distribution System (PHINVADS)

The main purpose of the Centers for Disease Control and Prevention (CDC) PHIN VADS is to provide 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 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.
https://phinvads.cdc.gov/vads/SearchVocab.action. HL7In the HL7 standards are other value sets as well. In this CT ELR IG, 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 6-9 above. Please note that as national data standards evolve, CT DPH may require additions or changes in the reference code sets for a particular data element.

'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 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[8] outlines what information shall be included in a laboratory report of significant findings, specifically: the name, address, age sex, race/ethnicity of the 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. Laboratories should allow for providers to include race and ethnicity in test orders.

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

[7] SNOMED CT - Home (ihtsdotools.org)

[8] The Connecticut Public Health Code can be browsed at: https://portal.ct.gov/DPH/Public-Health-Code/Quick-Browse--Public-Health-Code-by-Section

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 completed, 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. Appendix A, Value Sets, that lists a subset of some of the value set tables used in the HL7 2.5.1 ELR message. Appendix B describes how laboratories must construct reflex testing (such as susceptibilities) for those to be properly processed from the HL7 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.informaticslab@ct.gov.

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 delimiters include # (truncation character). Submitting laboratories are advised to add this 5th 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 that is a unique 3-character code (e.g., OBX). This guide only includes segments needed to construct a minimum required ORU-R01 message type.
Field	A field is a string of characters delimited by field separators (| or pipe). 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 (^). A particular field may have several components, but 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. **Proper use of data types is essential for the HL7 message to be properly processed.**
Delimiters	Delimiter values in MSH-1 (|) and MSH-2 (^&~\#) are used throughout the message. | Field Separator (ASCII 124) ^ Component Separator (ASCII 094) & Sub-Component Separator (ASCII 038) ~ Repetition Separator (ASCII 126) \ Escape Character (ASCII 091) # Truncation Character (ASCII 035)

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 CT DPH.

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.
PID	**Patient Identification**	**Demographic data on the subject of the test (i.e., the patient).**
[{NK1}]	Next of Kin/Associated Party	Used to document next of kin or associated party (employer, guardian, etc.). **Required when reporting blood lead results for children**; preferred in general.
[{PV1}]	Patient Visit Information	Used to document basic inpatient or outpatient encounter information. Optional segment.
{	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.

Segment	Name	Description
OBR	Observation Request	Information about the test being performed; linked to subsequent results.
{ OBX	Observation related to OBR	Information regarding a single result.
[{NTE}] }	Notes regarding the OBX	**CT ELR only expects NTEs associated with OBX segments. The contents of the NTE segment are primarily intended for human use and should not be used to relay relevant clinical or laboratory information that should be in other segments.**
SPM }	Specimen information 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. CT DPH has one change in data type conformance for the EI data type in that CT DPH 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 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, CT DPH, 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 CT DPH 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 CT DPH (**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 the cardinality for all sequences and data elements except where a change in data type or usage specific for CT DPH 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*.[9]

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".

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 "CT DPH" to mean the conforming receiving application.

Table 3. Usage for CT ELR

Usage Code	Interpretation	Comment for Submitting Laboratory	CT DPH Comment
R	Required	The Submitting Laboratory **SHALL** populate all "R" elements with a non-empty value. **CT DPH expects these to be populated.**	CT DPH **SHALL** process or ignore the information conveyed by required elements. CT DPH **must NOT** raise an error due to the presence of a required element, but **MAY** raise an error due to the absence of a required element. **CT DPH will contact submitting laboratories by email or other methods to let them know if required elements are missing.**

[9] www.hl7.org

Usage Code	Interpretation	Comment for Submitting Laboratory	CT DPH Comment
RE	Required but may be empty	The element may be missing from the message, but it **MUST** be sent by the Submitting Laboratory **IF** there is relevant data. A Submitting Laboratory should be capable of providing all "RE" elements. If the Submitting Laboratory knows the required values for the element, then it **MUST** send that element. If the Submitting Laboratory does not know the required values, then that element will be omitted.	CT DPH will be expected to process data contained in the element but **MUST** 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 HL7 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. **CT DPH may raise errors if an X element is received.**	
C(a/b) C(R/X) C(RE/X) C(R/RE) C(R/O)	Conditional	CT DPH 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: "An element with a conditional usage code has an associated condition predicate that determines the operational requirements (usage code) of the element. If the condition predicate associated with the element is **true**, follow the rules for which (the first sub-element) **a** shall be one of "R", "RE", "O" or X". If the condition predicate associated with the element is **false**, follow the rules for (the second sub-element) **b** which shall be one of "R", "RE", "O" or X". **a** and **b** shall be different and defined by the message profile." CT DPH is replacing "C" and "CE" with C(R/X), C(RE/X), C(R/RE) or C(R/O) with the following interpretations: 1) C(R/X) is interpreted as follows. If the condition predicate associated with the element is **true,** then the usage for the element is **R - Required**. If the condition predicate associated with the element is **false,** then the usage for the element is **X – Not Supported**. 2) C(RE/X) is interpreted as follows. If the condition predicate associated with the element is **true,** then the usage for the element is **RE – Required but may be empty**. If the condition predicate associated with the element is **false,** then the usage for the element is **X – Not Supported**. 3) C(R/RE) is interpreted as follows. If the condition predicate associated with the element is **true,** then the usage for the element is **R - Required**. If the condition predicate associated with the element is **false,** then the usage for the element is **RE – Required but may be empty**.	

Usage Code	Interpretation	Comment for Submitting Laboratory	CT DPH Comment
		4) C(R/O) is interpreted as follows. If the condition predicate associated with the element is **true,** then the usage for the element is **R - Required**. If the condition predicate associated with the element is **false,** then the usage for the element is **O – Optional**.	
O	Optional	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).	CT DPH will ignore the element if it is sent, unless the local profile specifies otherwise. CT DPH may not raise an error if it receives an unexpected optional element.
I	Indifferent	CT DPH is using "I" (indifferent) to indicate those elements that CT DPH currently does not support, i.e., does not currently process. It is important to note that even if CT DPH 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 nationally required elements, as they also form the standard for meaningful use ELR reporting. CT DPH will ignore the data for these elements if present.	CT DPH will not process the element but will not raise an error if the element is 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.

Laboratories are encouraged to use the National Institute of Standards and Testing (NIST) ELR message validation testing tool. CT DPH will also evaluate HL7 ELR messages.

To use the tool, a laboratory should go to this website, click on the Context-free Validation tab. A test message (with no patient identifiers) can be copied into the Message Content box. The validation results will appear in that box. The tool can be set to show errors, warnings, alerts, and informationals. These are found in the Settings tab. Laboratories may want to select both errors and warnings. If you have any questions on what the errors or questions mean,

please contact CT DPH. This will also be discussed during the laboratories' ELR onboarding process.

CT DPH has some additional conformance changes that differ from the National ELR Guide. There is only one data type that has been changed to meet a CT conformance – the EI datatype. This change reflects that CT DPH 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. Table 4 outlines these differences in usage for the ELR HL7 2.5.1 message.

Table 4. Differences between the CT ELR Guide and the National ELR Guide.

Segment-Sequence	National ELR Usage	CT ELR Usage	Comments/Constraints
Message Header (MSH) Segment			
MSH-5 Receiving Application	R	R	CT DPH requires using the following literal values. Testing/Staging: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO** Production: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO** These OIDs are specific for ELR HL7 2.5.1 Release 1.
MSH-6 Receiving Facility	R	R	CT DPH requires using the following literal value which is the same for testing and production: **CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO** This OID is specific for ELR HL7 2.5.1 Release 1.
MSH-15 Accept Acknowledgment Type	C(R/RE)	**I**	CT DPH is not processing this data element at this time. CT DPH will inform the sending facility by email of any errors found in the message.
MSH-16 Accept Application Type	C(R/RE)	**I**	CT DPH is not processing this data element at this time. CT DPH 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 CT DPH recommends populating this data element with: **PHLabReport-NoAck^^2.16.840.1.113883.3.5609.9.2.1^ISO**
Patient Identification (PID) Segment			

Table 4. Differences between the CT ELR Guide and the National ELR Guide.			
Segment-Sequence	**National ELR Usage**	**CT ELR Usage**	**Comments/Constraints**
PID-3 Patient Identifier List	R	R	CT DPH 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 conformances CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type).
PID-11 Patient Address	RE	**R**	CT DPH **requires** the following address information as a minimum: 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**	CT DPH is not processing this data element at this time.
Next of Kin (NK 1) Segment			
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.
Common Order (ORC) Segment			
ORC-2 Placer Order Number	C(R/RE)	**R**	CT DPH 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 conformances CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type).
ORC-3 Filler Order Number	R	R	CT DPH 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 conformances CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type).
ORC-4 Placer Group Number	RE	**I**	CT DPH is not processing this data element 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.

Table 4. Differences between the CT ELR Guide and the National ELR Guide.			
Segment-Sequence	**National ELR Usage**	**CT ELR Usage**	**Comments/Constraints**
ORC-12 Ordering Provider	C(R/X)	**R**	Populated with the same values as OBR-16. CT DPH **requires** 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. CT DPH **requires** a contact number for the ordering provider in OBR-17.
ORC-24 Ordering Provider Address	RE	**R**	CT DPH **requires** that an address for the ordering provider be sent. The address must follow the minimum elements as for PID-11.
Observation Request (OBR) Segment			
OBR-2 Placer Order Number	R	R	CT DPH 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 conformances CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type).
OBR-3 Filler Order Number	R	R	CT DPH 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 conformances CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type).
OBR-16 Ordering Provider	RE	**R**	CT DPH **requires** at least the **first and last names** of the ordering provider be provided. ORC-12 is populated with the same values.
OBR-17 Order Callback Phone Number	RE	**R**	CT DPH **requires** 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	**I**	CT DPH is not processing this data element at this time.
Observation/Result (OBX) Segment			
OBX-2 Value Type	C(R/X)	**R**	CT DPH **requires** that OBX-2 Value Type be populated. The OBX-5 (Observation Value), -6 (Units) and -7 (References Ranges) **must** be consistent with the OBX-2 Value Type.

Table 4. Differences between the CT ELR Guide and the National ELR Guide.			
Segment-Sequence	**National ELR Usage**	**CT ELR Usage**	**Comments/Constraints**
Specimen (SPM) Segment			
SPM-2 Specimen ID	R	R	CT DPH 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 conformances CT-ELR-003 (Universal ID) and CT-ELR-004 (Universal ID Type).
SPM-6 Specimen Additives	RE	**I**	CT DPH is not processing this data element at this time. Laboratories should be able to demonstrate they can populate this data element.
SPM-12 Specimen Collection Amount	RE	**I**	CT DPH is not processing this data element at this time. Laboratories should be able to demonstrate they can populate this data element.
SPM-21 Specimen Reject Reason	RE	**I**	CT DPH is not processing this data element at this time. Laboratories should be able to demonstrate they can populate this data element.

Segment by Segment Review

A segment-by-segment review of the HL7 ELR 2.5.1 message required for CT DPH reporting starts on the next page.

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|20151004154319015O7|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. *Example:* HealthSentry^2.16.840.1.113883.3.13.2.2.1^ISO
4	HD	R	Sending Facility	Name and **CLIA ID** for the sending facility. *Example:* The Hospital of Central Connecticut at New Britain^07D0092913^CLIA Note: Either an OID or CLIA ID is acceptable.
5	HD	R	Receiving Application	Testing/Staging: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO** Production: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO**
6	HD	R	Receiving Facility	CT DPH requires using the following literal value which is the same for testing and production: **CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO**
7	TS	R	Date/Time of Message	*Example:* 20151004154300-0400 Note: GMT offset required.
8		O	Security	CT DPH is not processing this data element at this time.
9	MSG	R	Message Type	Literal value: **ORU^R01^ORU_R01**
10	ST	R	Message Control ID	Unique message identifier generated by the sending application; MSH-3 plus MSH-10 must be globally unique. *Example:* 20151004154319015O7
11	PT	R	Processing ID	Denotes whether the message is for testing (**T**), debugging (**D**), or production (**P**); **data element currently ignored by CT ELR.** *Example*: P

MSH – Message Header Segment				
Seq	**Type**	**Usage**	**Name**	**Guidance**
12	VID	R	Version ID	Literal value: **2.5.1**
13-14	vary	O	Sequence Number/Continuation Pointer	CT DPH is not processing this data element at this time.
15	ID	**I**	Accept Acknowledgment Type	CT DPH is not processing this data element at this time. CT DPH will inform the sending facility by email of any errors found in the message.
16	ID	**I**	Application Acknowledgment	CT DPH is not processing this data element at this time. CT DPH will inform the sending facility by email of any errors found in the message.
17	ID	O	Country Code	Value Set: *PHVS_Country_ISO_3166-1* *Example:* USA
18	ID	O	Character Set	CT DPH is not processing this data element at this time.
19	CWE	O	Principal Language of Message	CT DPH is not processing this data element at this time.
20	ID	O	Alternate Character Set Handling Scheme	CT DPH is not processing this data element at this time.
21	EI	R	Message Profile Identifier	**DPHLabReport-NoAck^^2.16.840.1.113883.3.5609.9.2.1^ISO**

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	*Example:* 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	*Example:* 20101001
3	ST	R	Software Product Name	*Example:* HealthSentry
4	ST	R	Software Binary ID	*Example:* 0100100001010011
5	TX	O	Software Product Information	*Example:* HealthSentry
6	TS	RE	Software Install Date	*Example:* 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: **1**
2	CX	X	Patient ID	Deprecated. See PID-3.
3	CX	R	Patient Identifier List	This field contains the list of identifiers (one or more) used by the healthcare facility to uniquely identify a patient. CT DPH requires the use of the patient medical record number in this sequence noted as MR, MRN. If not available, PI can also be used. **Please note in Connecticut use of a social security number in the PID as the only identifier is not allowed.** *Example:* 999QQQ1234z^^^The Hospital of Central Connecticut at New Britain&07D0092913&CLIA^MR^The Hospital of Central
4	CX	X	Alternate Patient ID	Deprecated. See PID-3.
5	XPN	R	Patient Name	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: *HL70200 Name Type* *Example:* for patient Test A. Patient, Jr. Patient^Test^A^Jr^^^L
6	XPN	RE	Mother's Maiden Name	Value sets: *HL70200*, *HL70360* *Example:* MaidenLast^MomFirst^MomMI^^^^M
7	**TS**	**R**	Date/Time of Birth	**This field is required by CT DPH with minimum format YYYYMMDD. If birth time unknown, use 0000 (HHSS)** *Example:* 19380510040000
Note: PID-7 is a required field in CT ELR so minimum cardinality is 1.				

PID – Patient Identification Segment				
Seq	**Type**	**Usage**	**Name**	**Guidance**
8	IS	RE	Administrative Sex	*User-Defined Table 0001* (see Appendix A) Female (**F**), Male (**M**), Other (**O**), or Unknown (**U**) *Example:* M
9	XPN	X	Patient Alias.	Deprecated. See PID-5.
10	CWE	RE	Race	Accepts one or more race codes with multiple entries delimited with **~** Value set: *User-Defined Table 0005* (see Appendix A) *HL70396 Coding System* *Example:* 2028-9^Asian^CDCREC^^^^2.5.1
11	**XAD**	**R**	Patient Address	**CT DPH requires address information for the following components: street address or mailing address, city, state, zip code (at least first 5 digits).** Value sets: *HL70190 Address Type*, *PHVS_County_FIPS_6-4*, *PHVS_State_FIPS_5-2* For the City component for Connecticut cities and towns, **CT DPH strongly prefers the use of the 169 town names**. See the User Defined Table Connecticut Town Names in Appendix A. *Example:* 426 Somewhere St^^NEW BRITAIN^CT^06052^USA^C
Note: PID-11 is a required field in CT ELR so minimum cardinality is 1.				
12	IS	X	County Code	Deprecated. See PID-11, component 9.
13	XTN	RE	Phone Number – Home	CT DPH requests at least one phone number for the patient is provided if available. It is becoming more common that people use their cell/mobile number as their primary number. Let us know how you will designate the type for a cell/mobile number. Value sets: *HL70201 Telecommunication Use Code*, *HL70202 Telecommunication Equipment Type* *Example:* ^PRN^PH^^^860^9999999^^H
14	XTN	RE	Phone Number – Business	Value sets: *HL70201*, *HL70202* *Example:* ^WPN^PH^^1^860^4444444^^B
15-18	CWE	O	Optional	CT DPH is not processing these data elements at this time (Primary Language, Marital Status, Religion).

PID – Patient Identification Segment				
Seq	**Type**	**Usage**	**Name**	**Guidance**
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	CT DPH is not processing this data element at this time.
22	CWE	RE	Ethnic Group	Ethnicity Value sets: *User Defined Table NCHSEthnicity*, (see Appendix A) *NCHSEthnicity* *Example:* U^Unknown^NCHSEthnicity^^^^2.5.1
23-27		O	Optional	CT DPH 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	*Example:* 201302060827-0400 (not shown above)
30	ID	RE	Patient Death Indicator	If PID-29 is populated, then PID-30 must be **Y.**
31	ID	RE	Identity Unknown Indicator	CT DPH 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	CT DPH is not processing this data element at this time.
33	TS	RE	Last Update Date/Time	*Example:* 201302061133-0500 (not shown above)
34	HD	C(R/O)	Last Update Date Facility	This field is required **if** PID-33 is populated. *Example:* New Britain General Campus^2.16.840.1.113883.4.6^ISO
35	CWE	**I**	Species Code	CT DPH is not processing this data element at this time
36-39	vary	O	Optional	CT DPH is not processing these data elements at this time.

NK1 – Next of Kin Segment

The NK1 segment is 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. CT DPH recommends providing next of kin information, if available, in all ELR messages.

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) Value sets: *HL70200*, *HL70360* *Example:* Patient^Mother^M^^^^L
3	CWE	RE	Relationship	The associated party's relationship to the patient Value sets: *HL70063*, *HL70396* *Example:* MTH^Mother^HL70063
4	**XAD**	RE	Address	Address of the associated party. **CT DPH strongly prefers the use of the 169 town names**. See *User Defined Table Connecticut Town Names* in Appendix A. Value sets: *HL70190*, *PHVS_State_FIPS_5-2* *Example:* 410 Capitol Avenue^^Hartford^CT^06106^USA^H
5	XTN	RE	Phone Number	Telephone number(s) of associated party Value sets: *HL70201*, *HL70202* *Example:* ^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 Value sets: *HL70204*, *HL70203* *Example:* 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	CT DPH 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 Value sets: *HL70200*, *HL70360* *Example:* Patient^Mother^M^^^^L (not shown above)
31	XTN	RE	Contact Person's Telephone Number	Use if NK1-13 is populated Value sets: *HL70201*, *HL70202* *Example:* ^PRN^PH^^1^860^8888888^^B (Not shown above)
32	XAD	RE	Contact Person's Address	Use if NK1-13 is populated Value sets: *HL70190*, *PHVS_State_FIPS_5-2* *Example:* 410 Capitol Avenue^^Hartford^CT^06106^USA^H (Not shown above)
33-39		X	Not Supported	N/A

PV1 – Patient Visit Information

The PV1 segment is used to document information about patient encounters, either in- or out-patient. This is an optional segment for CT DPH, but we can accept and process this information. Only Required, Required but Empty, and CE sequences are shown in the table below. To use this segment for visit level data (and not account level data), PV1-51 - Visit Indicator must be valued to V.

Example:

PV1|1|O|4E^234^A^Good Health Hospital&2.16.840.1.113883.19.3.2.3&ISO^N^N^Building 1^4^Nursing unit 4 East^1234&&2.16.840.1.113883.19.3.2.3&ISO^&2.16.840.1.113883.19.3.2.3&ISO|R|||||||||||||||||||||||||||||||||||||200808151000-0700|200808151200-0700||||||V|

NK1 – Next of Kin Segment				
Seq	**Type**	**Usage**	**Name**	**Guidance**
1	SI	R	Set ID – PV1	Literal value: '1'.
2	IS	R	Patient Class	Gross identification of the classification of the patient's visit. Value sets: *HL70004* *Example:* |O|
3	PL	C or O	Assigned Location	If the Patient Class is inpatient (I) this field can be included. *Example:* 4E^234^A^Good Health Hospital&2.16.840.1.113883.19.3.2.3&ISO^N^N^Building 1^4^Nursing unit 4 East^1234&&2.16.840.1.113883.19.3.2.3&ISO^&2.16.840.1.113883.19.3.2.3&ISO
4	IS	RE	Admission Type	Admission Type Value Set (HL7) *User Defined Table 0007* *Example:* |R|
5- 12	Varies	O		Not required for ELR
13	IS	X	Re-admission indicator	Not supported
14	IS	O	Admit source	Not required for ELR
15-16	IS	X		Not supported
17	XCN	O	Admitting Doctor	Can include, but must follow XCN - Extended Composite ID Number and Name for Persons
18	IS	O	Patient Type	Not required

NK1 – Next of Kin Segment				
Seq	**Type**	**Usage**	**Name**	**Guidance**
19, 20	CX	O	Visit Number and Financial Class	Not required
21-29	Varies	X		Not supported
30-35	Varies	O		Not required
36	IS	O	Discharge Disposition	Disposition of the patient at discharge once the visit is completed. Uses Uniform Billing Codes. Can include. *HL70112* *Example:* 01 (Discharged to home care or self-care)
37	DLD	O	Discharged to location and date	Not required
38-39	Varies	O		Not required
40	IS	X		Not supported
42-43	PL	O		Not required
44	TS	RE	Admit Date/Time	Date and Time patient arrived for service. ELR supports a single discharge date/time. Minimum format is **YYYYMMDD** but can include time. Time zone is assumed to be that of the sender. GMT offset is required if time included. *Example:* 19380510040000-0400
45	TS	RE	Discharge Date/Time	Date and Time patient services ended. ELR supports a single discharge date/time. Minimum format is **YYYYMMDD** but can include time. Time zone is assumed to be that of the sender. GMT offset is required if time included. *Example:* 19380510040000-0400
46-49	Varies	O		Not required
50	CX	O	Alternate Visit ID	Not required
51	IS	O	Visit Indicator	To use PV1 to send patient visit data, this must be set to **V**.
52	XCN	O	Other Healthcare Provider	Not required but if used must conform to XCN Extended Composite ID Number and Name for Persons

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: **RE**
2	EI_CT	C(R/X)	Placer Order Number	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). **CT DPH 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.** See User-defined Table 0363 Assigning Authority. *Example:* 98765432112345678900^EHR^2.16.840.1.113883.19.3.2.3^ISO -- if OID is used *Example:* 236532410075810000020152760003282471179^EHR^07D0092913^CLIA -- if CLIA ID is used
3	EI_CT	R	Filler Order Number	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). **CT DPH 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.** *Example:* 201599887755^EHR^07D0092913^CLIA
*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.*				
4	EI_CT	**I**	Placer Group Number.	CT DPH will not process this information, but laboratories should be able to support and populate this data element.

ORC – Common Order Segment				
Seq	**Type**	**Usage**	**Name**	**Guidance**
5	ID	O	Order Status	CT DPH is not processing this data element at this time.
6	ID	O	Response Flag	CT DPH is not processing this data element at this time.
7	TQ	X	Not supported.	N/A
8-11	varies	O	Optional	CT DPH is not processing these data elements at this time (Parent, Date/Time of Transaction, Entered by, Verified by).
12	**XCN**	**R**	Ordering Provider	**CT DPH requires at least last and first names of the ordering provider.** This field must contain the same value as OBR-16, the provider that ordered the test. If provided, please separate prefixes and suffixes from names. Value sets: *HL70200*, *HL70203 Identifier Type*, *HL70360* *Example:* Minimal information ^Anydoctor^Adam^A^Jr^Dr^^^^^L *Example:* Fully specified 1234567^Anydoctor^Adam^A^Jr^DR^PHD^ADT01^The Hospital of Central Connecticut at New Britain&2.16.840.1.113883.3.13.2.2.1&ISO^L^4^NPI^MD
Note: ORC-12 is a required field in CT ELR so minimum cardinality is 1.				
13	PL	O	Enterer's Location	This information is optional, but CT DPH does capture it to assist in identifying the Ordering Provider's location. *Example:* Outpatient Test Center
14	XTN	**R**	Call Back Phone Number	**CT DPH requires a call back number.** Must contain the same value as OBR-17 (contact number of ordering provider). Value sets: *HL70201*, *HL70202* *Example:* ^WPN^PH^^^860^9995661
Note: ORC-14 is a required field in CT ELR so minimum cardinality is 1.				
15-19	vary	O	Optional	CT DPH 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	This field contains the name of the facility placing the order. Value sets: *HL70204*, *HL70203* *Example:* New Britain General Campus^L 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).
22	XAD	R	Ordering Facility Address	Value sets: *HL70190*, *PHVS_State_FIPS_5-2* *Example:* 100 Grand Street^^New Britain^CT^06050^^B^^09003
23	XTN	R	Ordering Facility Phone Number	Value sets: *HL70201*, *HL70202* *Example:* ^^PH^^^860^2245011
24	**XAD**	**R**	Ordering Provider Address	**This field is required by CT DPH.** This field contains the address of the care provider requesting the order. CT DPH **requires** address information for the following components: street address or mailing address, city, state, zip code (at least first 5 digits). Value sets: *HL70190*, *PHVS_State_FIPS_5-2* *Example:* 62 Seymour Ave^^New Britain^CT^06052^USA^B
25	CWE	O	Order Status Modifier	CT DPH is not processing this data element at this time.
26	CWE	X	Not Supported	N/A
27-30	Vary	O	Optional	CT DPH 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. Correct formatting and use of the OBR segment is critical especially for the reporting of reflex results. Reflex result reporting is described in Appendix B.

Example:

OBR|1|2365324100758100000201527600032824711179^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. **CT DPH 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.** *Example:* 2365324100758100000201527600032824711179^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. **CT DPH 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.** *Example:* 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: ***LOINC (LN)*** This is a required element under HL7 ELR standards, however, CT is not using this at this time. Labs should make an attempt to include LOINC codes here. Local codes are not acceptable unless a LOINC is unavailable. Note: OBX-3 should be used to provide an unambiguous, specific test name and OBX-5 should provide the result to the test. *Example:* 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. *Example:* 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. CT DPH will only process this data element for reportable conditions that need this information.
9		X	Not Supported	N/A.
10-12	vary	O	Optional	CT DPH is not processing these data elements at this time (Collection Volume, Collector Identifier, Specimen Action Code, Danger Code).
13	ST	RE	Relevant Clinical Information	CT DPH is not processing this data element at this time; however, labs may be required to demonstrate they can populate this RE data element. *Example:* None
14-15		X	Not Supported	N/A

OBR – Observation Request Segment				
Seq	**Type**	**Usage**	**Name**	**Guidance**
16	**XCN**	**R**	Ordering Provider	**CT DPH requires at least the first and last names of the ordering provider.** Provider who ordered the test; must be the same as ORC-12. If provided, please separate prefixes, e.g., Dr., and suffixes, e.g., MD, from names. Value sets: *HL70200*, *HL70203*, *HL70360* *Example:* Minimal information ^Anydoctor^Adam^A^Jr^Dr^^^^^L *Example:* Fully specified 1234567^Anydoctor^Adam^A^Jr^DR^PHD^ADT01^The Hospital of Central Connecticut at New Britain&2.16.840.1.113883.3.13.2.2.1&ISO^L^4^NPI^MDMD
Note: OBR-16 is a required field in CT ELR so minimum cardinality is 1.				
17	**XTN**	**R**	Order Callback Phone Number	**CT DPH requires this information.** Contact number for the ordering provider; same as ORC-14. Value sets: *HL70201*, *HL70202* *Example:* ^WPN^PH^^^860^9995661
Note: OBR-17 is a required field in CT ELR so minimum cardinality is 1.				
18-21		O	Optional	CT DPH 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	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. *Example:* 20151003083100-0400
23	MOC	O	Charge to Practice	CT DPH is not processing this data element at this time.
24	ID	O	Diagnostic Services Section ID	Value set: *HL70074* *Example*: MB
25	ID	R	Result Status	**CT DPH only supports final results of a test, unless otherwise specified in the CT Reportable Laboratory Findings (OL-15C). Corrections to final results may be sent.** F = Final Results C = Correction to Results *Example:* F

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. **This field is required when linking child sensitivities to the parent culture** (see Appendix B). *Example:* (not shown above) 625-4^identified:Prid:Pt:Stool:Nom:Culture&LN^1^Campylobacter jejuni
27		X	Not Supported	N/A
28	XCN	O	Not Supported	CT DPH 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 (see Appendix B). 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. *Example:* (not shown above) 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. Value sets: *PHVS_AdministrativeDiagnosis_CDC_ICD-9CM*, *HL70396* *Example:* 787.91^DIARRHEA^I9CDX (not shown above)
32	NDL	**I**	Principal Result Interpreter	CT DPH is not processing this data element at this time – used for pathology results.
33-36	vary	O	Optional	CT DPH is not processing these data elements at this time.
37-38		X	Not Supported	N/A
39	CWE	O	Collector's Comment	CT DPH is not processing this data element at this time.
40-43		X	Not Supported	N/A
44-50	vary	O	Optional	CT DPH is not processing this data element at this time.

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: *HL70125* 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 the data type is CWE (coded with exceptions), use SNOMED CT in OBX-5. It is critical that labs understand how and what to use for data types in the messages correctly. CT DPH will be glad to assist. *Example:* NM
3	CWE	R	Observation Identifier	**This is a Required field. CT DPH 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.** Vocabulary standard: *LOINC* For the example above, OBX-2 NM: *Example:* 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 For the example of OBX-2 CWE: *Example:* 600-7^BACTERIA IDENTIFIED:PRID:PT:BLD:NOM:CULTURE^LN^76^Blood

<table>
<tr><th colspan="5">OBX – Observation/Result Segment</th></tr>
<tr><th>Seq</th><th>Type</th><th>Usage</th><th>Name</th><th>Guidance</th></tr>
<tr><td>4</td><td>ST</td><td>C(R/RE)</td><td>Observational Sub-ID</td><td>Required if there is more than one OBX with the same OBX-3. Typically, a sequential number (1, 2, 3, etc.).
Example: 1</td></tr>
<tr><td>5</td><td>Var</td><td>C(RE/X)</td><td>Observation Value</td><td>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.
Either OBX-5 or OBX-8 (Abnormal flags) must be present in the message.
Vocabulary standard: SNOMED CT (SCT)
Example: 31.8
Note: for HCV signal to cut off example above
Example: 5595000^Salmonella typhi^SCT
Note: for OBX-2 CWE and OBX-3 LOINC 600-7</td></tr>
<tr><td>6</td><td>CWE</td><td>C(R/X)</td><td>Units</td><td>If OBX-2 is NM or SN then this field is required.
Units must follow UCUM standards.
See loinc.org/usage/units for further information.
Value sets: PHVS_UnitsOfMeasure_CDC, HL70396
Example:
{Copies}/mL^Copies per Milliliter^UCUM^^^^1.9</td></tr>
<tr><td>7</td><td>ST</td><td>RE</td><td>References Range</td><td>Interpretation range that applies to OBX-5; should be enough information to understand abnormal flags in OBX-8.
Example: ^0^0.990000
Recommended Formats:<table><tr><th>Description</th><th>Code Example</th></tr><tr><td>Lower limit to (-) upper limit</td><td>‘3.5-4.5’</td></tr><tr><td>>lower limit</td><td>‘>10’
(if no upper limit)</td></tr><tr><td><upper limit</td><td>‘<15’
(if no lower limit)</td></tr></table>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'.</td></tr>
</table>

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. Required if OBX-5 is empty. Value sets: *HL70078* (see Appendix A), *HL70396* *Example:* H^High^HL70078^^^^2.5.1
9-10		O	Optional	CT DPH 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. **CT DPH accepts final (F) or corrected (C) results only.** *Example:* F
12-13		O	Optional	CT DPH 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	**CT DPH requires this information.** Specimen collection date/time; must be the same as OBR-7 and SPM-17.1. Follows ELR Condition predicate in National ELR Guide. *Example:* 20151003061900-0500
Note: OBX-14 is a required field in CT ELR so minimum cardinality is 1.				
15	CWE	O	Producer's ID	CT DPH is not processing these data elements at this time.
16	XCN	O	Responsible Observer	CT DPH 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 **shall** be populated. Value sets: *PHVS_LabTestMethods_CDC*, *HL70396*
18	EI	O	Equipment Instance Identifier	CT DPH is not processing this data element at this time.
19	TS	RE	Date/Time of the Analysis	Date/Time the test **was performed**. *Example:* 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. Value sets: *HL70204*, *HL70203* *Example:* Cent CT NewBritn 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. Value sets: *HL70190*, *PHVS_State_FIPS_5-2* *Example:* 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. Value sets: *HL70200*, *HL70203*, *HL70360* *Example:* 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 (**L**), the orderer or provider (**P**), or other source (**O**) *Example:* L
3	FT	R	Comment	*Example:* This is a comment
4	CWE	RE	Comment Type	Value set: *HL70364* *Example:* 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. *Example:* 201599887755^201599887755&EHR&07D0092913&CLIA
3	EIP	O	Specimen Parent IDs	CT DPH 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. Value set: *PHVS_SpecimenType_HL7_2x*, *HL70396* *Example:* 119297000^Blood^SCT^^^^20140131^^Blood
5	CWE	RE	Specimen Type Modifier	Use when SPM-4 is a SNOMED CT code. Value sets: *PHVS_ModifierOrQualifier_CDC*, *HL70396*
6	CWE	I	Specimen Additives	CT DPH 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. *Value sets:* *PHVS_SpecimenCollectionMethod_HL7_2x*, *HL70396* *Example:* 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. Value sets: *PHVS_BodySite_HITSP*, *HL70396* *Example:* 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. Value sets: *PHVS_ModifierOrQualifier_CDC*, *HL70396*
10	CWE	O	Specimen Collection Site	CT DPH is not processing this data element at this time.
11	CWE	I	Specimen Role	CT DPH 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	CT DPH 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	CT DPH 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. *Example:* 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. *Example:* 20151003062500-0500
19-20		O	Optional	CT DPH is not processing these data elements at this time (Specimen Expiration Date/Time, Specimen Availability).
21	CWE	I	Specimen Reject Reason	CT DPH is not processing this data element at this time; however, labs should be able to demonstrate they can populate
22-29	vary	O	Optional	CT DPH is not processing these data elements at this time.

Sending the HL7 2.5.1 Message for CT ELR

Electronic Message Transport

In the past, the only real secure option for laboratories to send ELR messages was using the CDC's PHIN Messaging System (PHIN MS)[10]. CT DPH is transitioning away from the use of PHIN MS to use of state supported secure FTP folders that we will request for your lab's use. We will be working with our central state IT to stand up other processes as well, for example, the use of AWS S3, and will keep laboratories informed as these options are made available.

[10] PHIN Messaging System (PHINMS) | CDC

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. *Example:* 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. *Example:* Cerner Corp Or if a hospital: New Britain General Hospital^07D0092913^CLIA
5	HD	O	File Receiving Application	Testing/Staging: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO** Production: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO**
6	HD	R	File Receiving Facility	CT DPH requires using the following literal value which is the same for testing and production: **CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO**
7	TS	R	File Creation Date/Time	Date/Time message was created by the sending system. *Example:* 201511181828
8		X	Not supported	N/A
9	ST	O	File Name/ID	CT DPH 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. *Example:* 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. *Example:* Cerner Corp in above for hospital may see New Britain General Hospital^07D0092913^CLIA
5	ST	O	Batch Receiving Application	Testing/Staging: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.2^ISO** Production: **CT^2.16.840.1.113883.3.5609.4.1.1.3.2.1^ISO**
6	ST	O	Batch Receiving Facility	CT DPH requires using the following literal value which is the same for testing and production: **CTA-DPH^2.16.840.1.113883.3.5609.4.1^ISO**
7	TS	R	Batch Creation Date/Time	Date/Time batch was created by the sending system. *Example:* 201511181828
8		X	Not supported	N/A
9	ST	O	Batch Name/ID/Type	CT DPH 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. **Note: This count must match the number of messages in the batch. Any invalid batches will be removed from further processing.**
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 **1**
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). The value sets below are for reference for this local guide only. Note that these value sets may be refined or changed.

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
PHC1175	Refused to answer
UNK	unknown
2131-1	Other Race

User-Defined Table NCHS Ethnicity Ethnic Group

Value	Description
H	Hispanic or Latino
N	Not Hispanic or Latino
UNK	Unknown
PHC1367	Refused
PHC1369	Not obtainable
ASKU	asked but unknown

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

A note on county: CT has gotten US Census Bureau approval to use the nine regional planning regions as county equivalents. Determination of these county equivalents is based on town of residence and are identified within the end surveillance systems at CT DPH. More information on the regional planning regions can be found at Maps - Regional Planning in Connecticut - LibGuides Home at Connecticut State Library. (ctstatelibrary.org)

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 CT DPH.
CLIA	Clinical Laboratory Improvements Amendment	CLIA ID as assigned by CLIA to the laboratory.

Appendix B. Reflex Test Formatting in the HL7 2.5.1 ORU ELR Message

Background

Reflex testing is when the results of one test leads to one or more order(s) of new tests. The new tests are the reflex tests. Reflex test results are related to the original result that led to the reflex test. There is a strict relationship that must be maintained in reporting these results in the HL7 2.5.1 ORU message.

- The first test is called the 'parent'.
- The reflex test(s) is called the 'child'.
- The child references the parent.

Examples of reflex testing are:

- Culture and susceptibility testing.
- Culture and other follow-on studies.
- Pathology workflows.
- Complex workflows for Chemistry/Hematology

In this appendix we will outline how to report susceptibility results based on the linkages required in the HL7 message; this would apply to other reflex test result reporting as well.

Parent-Child Linkage

To fully assess antimicrobial resistance, DPH must receive enough information about resistance testing for specific organisms. This includes:

1. The antimicrobial/bactericidal agent being tested,
2. The method of testing (Kirby-Bauer, MIC, etc.), and,
3. The actual quantitative and qualitative results and interpretations

Specific fields and segments in the HL7 v2.5.1 ELR message allow for the antimicrobial susceptibilities to be reported to public health. The messages must contain the organism identified (OBX), antimicrobial susceptibilities found (OBX), and the specimen source/type (SPM). The parent observation is the identified observation, e.g., organism identified, and the child observation is the antimicrobial susceptibility result. To meet CT DPH reporting requirements, the child observations should list all antimicrobials tested against the organism, the measured MIC values, and the phenotypic interpretation. Any antimicrobials that are normally suppressed for provider result reporting should be included in the susceptibilities sent to DPH, if possible, for surveillance purposes.

The linkage is assigned using the parent result link (PRL) data type defined in HL7 2.5.1. This linkage uniquely identifies the parent result's OBX segment related to the current order, together with the information in OBR-26-parent. The resulting parent link is composed of 3 parts.

1. Parent Observation Identifier (CWE/CE)
    a. Contains the unique identifier of the parent observation as defined in the OBX-3 of the parent result. The value is the same as the OBX-3 of the parent.
2. Parent Observation Sub-identifier (ST)
    a. Contains the sub-ID of the parent result as defined in the OBX-4 of the parent result. The value is the same as the OBX-4 of the parent.
3. Parent Observation Value Descriptor (TX)
    a. Contains a descriptor of the parent observation value as specified in the OBX-5 of the parent result.

We require the population of the CWE/CE and the ST. We suggest populating the TX to allow for better logging of the linkages. The following figures will walk through a representative ELR message to illustrate what is needed.

Figure 1 (next page) is an excerpt of an ELR message containing susceptibility results, with the OBR segments in dark blue font. The first **OBR** segment (parent) contains the test codes and descriptions of the microbial culture. The second **OBR** segment (child) is for the child susceptibility results.

Figure 1 Parent and Child OBRs

OBR|1|ACCESSNO^QUEST^2.16.840.1.113883.3.165.5^ISO|SPECIMENID_395X^QUEST^2.16.840.1.113883.3.165.4^ISO|^^^395^CULTURE, URINE, ROUTINE^L^^v unknown|||202204121554-0500|||||||||[redacted]^[redacted]^[redacted]^^^^^^NPI&2.16.840.1.113883.4.6&ISO^L^^^NPI^^^^^^^^|^^^^^^|||||20220417160313-0500|||F||||||N30.00^ACUTE CYSTITIS W/O HEMAT^I10C^^^^2022

OBX|1|CE|43409-2^BACTERIA ISLT CULT^LN^75000300^ISOLATE 1:^L^^v unknown|1|714007005^Enterobacter cloacae (CRE)^SCT^ENCCRE^Enterobacter cloacae (CRE)^L|||A^Abnormal (applies to non-numeric results)^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229|||20220417153804-0500||||QUEST DIAGNOSTICS LLC^L^^^^CLIA&2.16.840.1.113883.4.7&ISO^XX^^^22D0076229|200 FOREST ST 3RD FLOOR,SUITE B^^MARLBOROUGH^MA^01752-3023^^L|^KABAWAT^SALIM^E^^^^^^^^^^^^^^^^^MD

NTE|1||THIS ORGANISM IS A CARBAPENEM RESISTANT

NTE|2||ENTEROBACTERIACEAE.

NTE|3||ENTEROBACTER CLOACAE (CRE)

NTE|4||GREATER THAN 100,000 CFU/ML OF

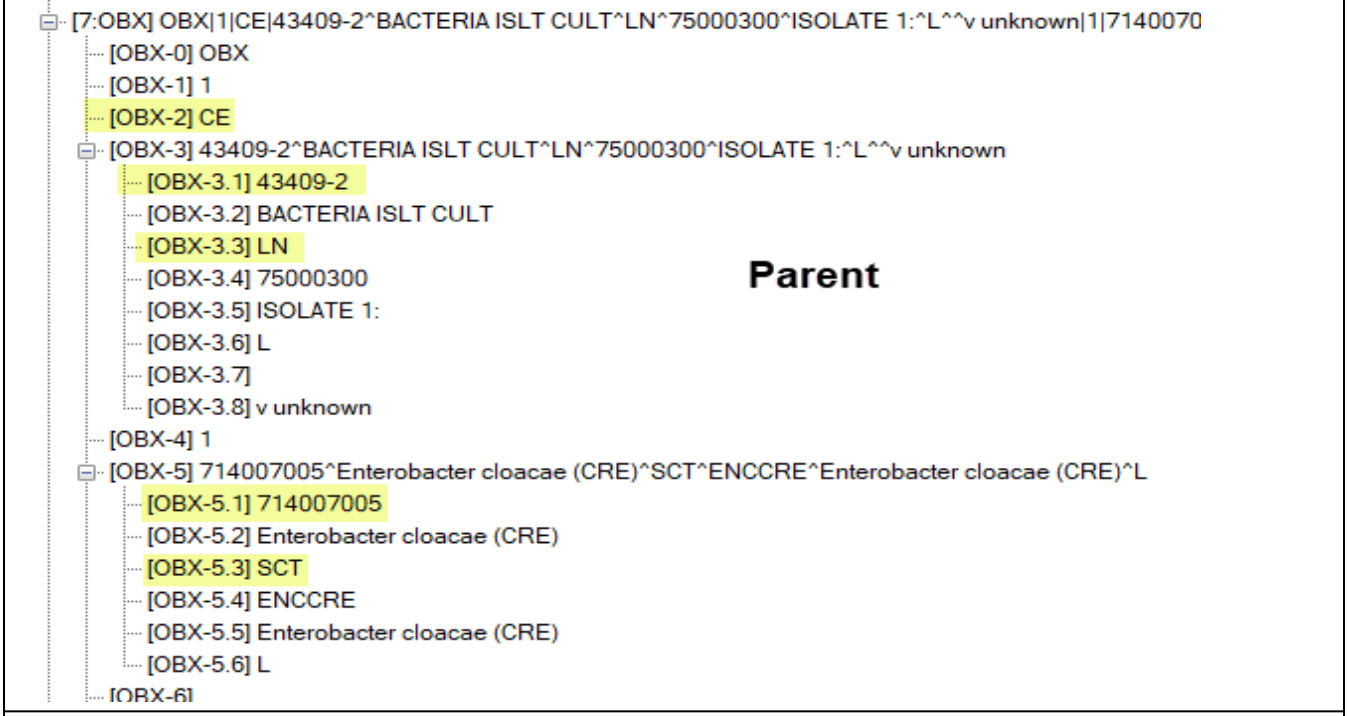
SPM|1|ACCESSNO&QUEST&2.16.840.1.113883.3.165.5&ISO^SPECIMENID&QUEST&2.16.840.1.113883.3.165.4&ISO||122880004^Urine specimen obtained by clean catch procedure (specimen)^SCT^URC^Urine clean catch^HL70487^2.5.1^V UNKNOWN^URINE, CLEAN CATCH||||||||||||202204121554-0500|20220413002800-0500

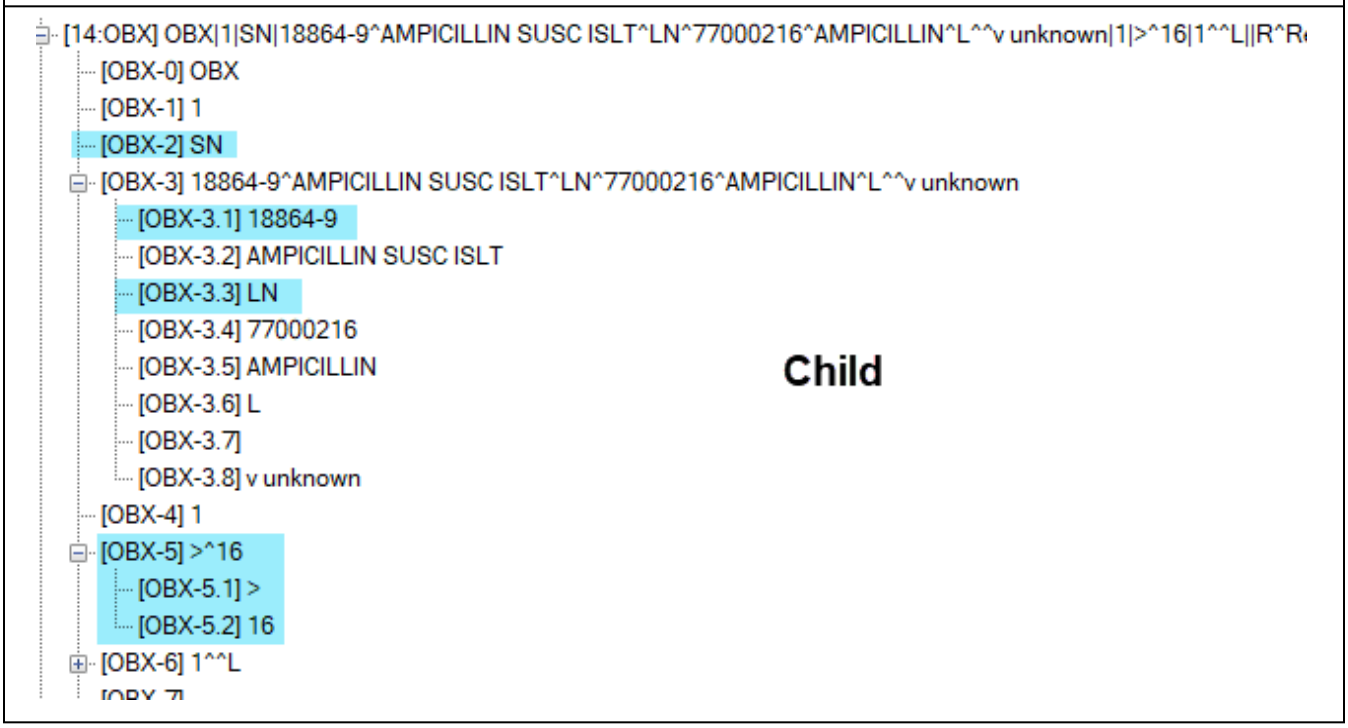
OBR|2|ACCESSNO^QUEST^2.16.840.1.113883.3.165.5^ISO|SPECIMENID_URANEG1,395X,75000300^QUEST^2.16.840.1.113883.3.165.4^ISO|^^^URANEG1^URA,1NEG ^L^^v unknown|||202204121554-0500|||||||||[redacted]^[redacted]^[redacted]^^^^^^NPI&2.16.840.1.113883.4.6&ISO^L^^^NPI^^^^^^^^|^^^^^^|||||20220417160313-0500|||F|43409-2&BACTERIA ISLT CULT&LN&75000300&ISOLATE 1:&L&&v unknown^1^Enterobacter cloacae (CRE)|||ACCESSNO&QUEST&2.16.840.1.113883.3.165.5&ISO^SPECIMENID_395X&QUEST&2.16.840.1.113883.3.165.4&ISO||N30.00^ACUTE CYSTITIS W/O HEMAT^I10C^^^^2022

OBX|1|SN|18864-9^AMPICILLIN SUSC ISLT^LN^77000216^AMPICILLIN^L^^v unknown|1|>^16|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229|||20220417153804-0500||||QUEST DIAGNOSTICS LLC^L^^^^CLIA&2.16.840.1.113883.4.7&ISO^XX^^^22D0076229|200 FOREST ST 3RD FLOOR,SUITE B^^MARLBOROUGH^MA^01752-3023^^L|^KABAWAT^SALIM^E^^^^^^^^^^^^^^^^^MD

Figure 2 shows a portion of the above message to better display the OBX-3/5 segments for the parent and child results. Note that for both the parent (highlighted in yellow) and child (highlighted in blue) results, the OBX-2, OBX-3.1 and OBX-5.1 must be populated correctly per the HL7 combination of value-type (OBX-2), observation identifier (OBX-3.1), and observation value (OBX-5.1). Each child result must be constructed correctly to be captured.

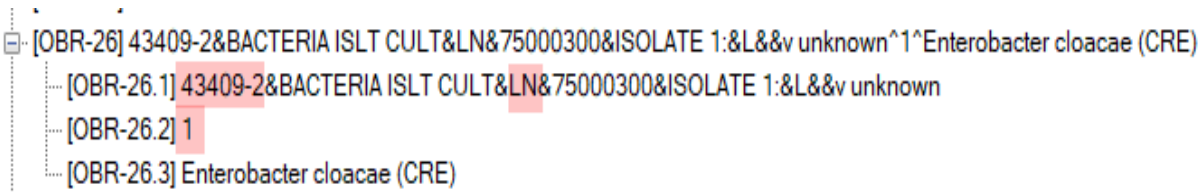
Figure 2 Parent and Child OBX segments





Next, we need to look at the second OBR (child) for the susceptibility results linking. Figure 3 shows what is needed in the second (child) OBR-26 so the linkages can work in message processing.

Figure 3 Child OBR-26 construct



We can break down the CWE element of OBR-26.1 by components and subcomponents. The items in red are required for the linkage to work. Based on the example in Figure 3:

1. OBR-26.1 (in child portion)
    a. 43409-2 is the Identifier and is required. This is also the LOINC from parent OBX-3.1.
    b. BACTERIA ISLT CULT is the text which is usually the LOINC description.
    c. LN is the Name of Coding System (here it is LN for LOINC). This is required and is also the coding system from parent OBX-3.3.
    d. 75000300 is the Alternate Identifier (usually a local code used at the reporting lab).
    e. ISOLATE 1 is the Alternate Text for the local code.
    f. L is the Alternate Coding System name from the reporting lab system.
    g. If populated, this would be the Coding System Version ID.
    h. v unknown is the Original Text from the reporting lab system.
2. OBR-26.2
    a. 1 is the sub-ID of the parent observation and is required.
3. OBR-26.3
    a. Enterobacter cloacae (CRE) – The result description of the parent observation

Table 1 shows how the linkage works between the parent OBX and child OBR. The OBX-3.1, OBX-3.3, and OBX-4. OBX-5.2 are only used for logging purposes but are recommended.

Table 1. Linkage between Parent OBX and Child OBR.

Parent Data Element	Child Data Element	What is it	Value	Required?
OBX-3.1	OBR-26.1.1	Identifier	LOINC Code for reported test method	YES
OBX-3.3	OBR-26.1.3	Name of Coding System	LN (If value is a LOINC code)	YES
OBX-4	OBR-26.2	Sub-ID of parent observation	1	YES
OBX-5.2	OBR-26.3	Result description of parent result	Text of SNOMED code in 5.1	Recommended

Table 2 shows the additional fields that can be used to assist in linking are parent OBR-2, OBR-3, OBR-4 that link to child OBR-29.

Table 2. Additional linking fields.

Parent Data Element	Child Data Element	What is it	Value	Required?
OBR-2.1	OBR-29.1	Placer Order Number	Lab assigned value	No
OBR-3.1	OBR-29.2	Filler Order Number	Lab assigned value	No

A final note: the data types for each reported susceptibility result must have a datatype of SN (structured numeric) or NM (numeric). Susceptibilities should be reported with the actual values found as well as the interpretation (S, I, R). Datatypes sent as ST or TX will not be processed as that would violate the OBX-3 to OBX-5 structure.

For additional information please contact DPH.InformaticsLab@ct.gov.

A copy of the entire message used in the is example starts on the next page.

Redacted message that shows susceptibility layout in the HL7 2.5.1 ORU message

MSH|^~\&|NEL^2.16.840.1.113883.3.165.2^ISO|[redacted]
[redacted]^[redacted]^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|20220417180112.0556-0400||ORU^R01^ORU_R01|[redacted]|P|2.5.1|||AL|AL|USA||||PHLabReport-Ack^^2.16.840.1.113883.9.11^ISO~PHLabReport-NoAck^^2.16.840.1.113883.3.5609.9.2.1^ISO

SFT|[redacted]^L^^^^^^CW&2.16.840.1.113883.3.165.2&ISO|1.0|ANTRIM|BINARY ID UNKNOWN

PID|1||SPECIMENID^^^LAB&2.16.840.1.113883.3.165.4&ISO^PI~[redacted]^^^LAB&2.16.840.1.113883.3.165.3&ISO^PT~[redacted]^^^LAB&2.16.840.1.113883.3.165.3&ISO^U||[redacted]^^^^L||[redacted]|F|||[redacted]||^PRN^PH^^1^[redacted]|||||||||U^^HL70189^^^^2.5.1^^

NK1|1|[redacted]

PV1|1|U|^^^^^^^^|||||||||||||||||||||||||||||||||||||||||

ORC|RE|SPECIMENID^LAB^2.16.840.1.113883.3.165.5^ISO|SPECIMENID_ID^LAB^2.16.840.1.113883.3.165.4^ISO||CM|||||||1588999353^PROVIDERLAST^PROVIDERFIRST^^^^^^NPI&OID for NPI&ISO^L^^^NPI^^^^^^^^||^^^^^^|||||||PROVIDER FACILITY^D|FACILITY ADDRESS^^TRUMBULL^CT^06611-5387^USA^O|^WPN^PH^^1^[redacted]^^OFFICE CONTACT: [redacted]|PROVIDER ADDRESS^^TRUMBULL^CT^06611-5387

OBR|1|SPECIMENID^LAB^2.16.840.1.113883.3.165.5^ISO| SPECIMENID_ID ^LAB^2.16.840.1.113883.3.165.4^ISO|^^^395^CULTURE, URINE, ROUTINE^L^^v unknown|||202204121554-0500|||||||||1588999353^ PROVIDERLAST^PROVIDERFIRST ^^^^^^NPI& OID for NPI &ISO^L^^^NPI^^^^^^^^|^^^^^^|||||20220417160313-0500|||F||||||N30.00^ACUTE CYSTITIS W/O HEMAT^I10C^^^^2022

OBX|1|CE|43409-2^BACTERIA ISLT CULT^LN^75000300^ISOLATE 1:^L^^v unknown|1|714007005^Enterobacter cloacae (CRE)^SCT^ENCCRE^Enterobacter cloacae (CRE)^L|||A^Abnormal (applies to non-numeric results)^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB LLC^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

NTE|1||THIS ORGANISM IS A CARBAPENEM RESISTANT

NTE|2||ENTEROBACTERIACEAE.

NTE|3||ENTEROBACTER CLOACAE (CRE)

NTE|4||GREATER THAN 100,000 CFU/ML OF

SPM|1|SPECIMENID2&LAB&2.16.840.1.113883.3.165.5&ISO^SPECIMENID&LAB&2.16.840.1.113883.3.165.4&ISO||122880004^Urine specimen obtained by clean catch procedure (specimen)^SCT^URC^Urine clean catch^HL70487^2.5.1^V UNKNOWN^URINE, CLEAN CATCH||||||||||||202204121554-0500|20220413002800-0500

OBR|2|SPECIMENID2^LAB^2.16.840.1.113883.3.165.5^ISO|SPECIMENID_URANEG1,395X,75000300^LAB^2.16.840.1.113883.3.165.4^ISO|^^^URANEG1^URA,1NEG ^L^^v unknown|||202204121554-0500|||||||||1588999353^PROVIDERLAST^PROVIDERFIRST^^^^^^NPI&NPIOID&ISO^L^^^NPI^^^^^^^^|^^^^^^|||||20220417160313-0500|||F|43409-2&BACTERIA ISLT CULT&LN&75000300&ISOLATE 1:&L&&v unknown^1^Enterobacter cloacae (CRE)|||SPECIMENID2&LAB&2.16.840.1.113883.3.165.5&ISO^SPECIMENID_ID&LAB&2.16.840.1.113883.3.165.4&ISO||N30.00^ACUTE CYSTITIS W/O HEMAT^I10C^^^^2022

OBX|1|SN|18864-9^AMPICILLIN SUSC ISLT^LN^77000216^AMPICILLIN^L^^v unknown|1|>^16|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|2|SN|18865-6^AMPICILLIN+SULBAC SUSC ISLT^LN^77000316^AMP/SULBACTAM^L^^v unknown|1|>^16^/^8|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||

LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|3|SN|18862-3^AMOXICILLIN+CLAV SUSC ISLT^LN^77000106^AMOX/CLAVULANATE^L^^v unknown|1|>^16^/^8|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|4|SN|18895-3^CEFTRIAXONE SUSC ISLT^LN^77002206^CEFTRIAXONE^L^^v unknown|1|>^32|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|5|SN|18878-9^CEFAZOLIN SUSC ISLT^LN^77000906^CEFAZOLIN^L^^v unknown|1|>^4|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

NTE|1||FOR UNCOMPLICATED UTI CAUSED BY E. COLI,

NTE|2||K. PNEUMONIAE OR P. MIRABILIS: CEFAZOLIN IS

NTE|3||SUSCEPTIBLE IF MIC <32 MCG/ML AND PREDICTS

NTE|4||SUSCEPTIBLE TO THE ORAL AGENTS CEFACLOR, CEFDINIR,

NTE|5||CEFPODOXIME, CEFPROZIL, CEFUROXIME, CEPHALEXIN

NTE|6||AND LORACARBEF.

OBX|6|SN|51724-3^CEFUROXIME SUSC ISLT^LN^77006815^CEFUROXIME, SODIUM^L^^v unknown|1|>^16|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|7|SN|18879-7^CEFEPIME SUSC ISLT^LN^77002006^CEFEPIME^L^^v unknown|1|>^16|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|8|SN|18928-2^GENTAMICIN SUSC ISLT^LN^77003706^GENTAMICIN^L^^v unknown|1|<^2|1^^L||S^Susceptible. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|9|SN|18932-4^IMIPENEM SUSC ISLT^LN^77003906^IMIPENEM^L^^v unknown|1|<^1|1^^L||S^Susceptible. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

NTE|1||THIS ORGANISM DEMONSTRATES CARBAPENEM RESISTANCE.

OBX|10|SN|18943-1^MEROPENEM SUSC ISLT^LN^77004056^MEROPENEM^L^^v unknown|1|<^1|1^^L||S^Susceptible. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|11|SN|18970-4^PIPERACILLIN+TAZOBAC SUSC ISLT^LN^77005456^PIP/TAZOBACTAM^L^^v unknown|1|>^64|1^^L||R^Resistant. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-

0500|22D0076229||||20220417153804-0500||||
LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|12|SN|18998-5^TMP SMX SUSC ISLT^LN^77006506^TRIMETHOPRIM/SULFA^L^^v
unknown|1|<^2^/^38|1^^L||S^Susceptible. Indicates for microbiology susceptibilities
only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||
LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

OBX|13|SN|18996-9^TOBRAMYCIN SUSC ISLT^LN^77006306^TOBRAMYCIN^L^^v unknown|1|<^4|1^^L||S^Susceptible. Indicates for microbiology susceptibilities only.^HL70078^^^^2.7|||F|||202204121554-0500|22D0076229||||20220417153804-0500||||
LAB^L^^^^CLIA&LABOID&ISO^XX^^^LABCLIA|LABSTREET^^LABTOWN^LABSTATE^LABZIP^^L|^LABDIRLASTNAME^LABDIRFIRSTNAME^E^^^^^^^^^^^^^^^^MD

SPM|1|SPECIMENID2&LAB&2.16.840.1.113883.3.165.5&ISO^SPECIMENID&LAB&2.16.840.1.113883.3.165.4&ISO||122880004^Urine specimen obtained by clean catch procedure (specimen)^SCT^URC^Urine clean catch^HL70487^2.5.1^V
UNKNOWN^URINE, CLEAN CATCH||||||||||||202204121554-0500|20220413002800-0500