South Carolina Electronic Laboratory Result (ELR)

HL7 version 2.5.1

Implementation Guide

Version 3.0

Revised March 31, 2017

NOTE: This implementation guide is intended to help healthcare organizations structure information for use in South Carolina but should not be considered the definitive implementation guide. The CDC Public Health Information Network (PHIN) Messaging Guides and the HL7 2.5.1 Implementation Guides documents should be used to structure messages.

**** South Carolina Department of Health and Environmental Control reserves the right to change its requirements and/or update the contents of this implementation guide at any time.***

Contents

I. Key Terms and Acronyms Defined

Term/Acronym	Definition
CAH	Critical access hospital
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare and Medicaid Services
DADE	Division of Acute Disease Epidemiology
DHEC	South Carolina Department of Health and Environmental Control
EH	Eligible hospital
EHR	Electronic health record
ELR	Electronic laboratory reporting
EP	Eligible professional (physician offices/group practices)
HCO	Healthcare organization
HL7	Health Level-7
LOINC	Logical Observation Identifiers Names and Codes
MU	Meaningful Use
NIST	National Institute of Standards and Technology
NPI	National Provider Identifier
OID	Object identifiers
ONC	Office of the National Coordinator for Health Information Technology
PHIN	Public Health Information Network
PHINMS	Public Health Information Network Messaging System
PHIN-VADS	Public Health Information Network Vocabulary Access and Distribution System
SNOMED-CT	Systemized Nomenclature of Medicine Clinical Terms

II. Process Overview

Purpose:

To implement electronic submission of laboratory result (ELR) data from a healthcare organization (HCO) to the South Carolina Department of Health and Environmental Control (DHEC).

NOTE: This implementation guide is intended to help HCOs build messages for use in South Carolina but should not be considered the definitive implementation guide. The *HL7 v2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1*, with accompanying errata, should be used to structure messages according to national standards.

Process Outline:

This section is meant to provide a general overview of DHEC's protocol for the implementation of ELR messaging from an HCO. Additional information about each of the following steps is contained in this document.

1. Preliminary Communication - HCO acquires key documents.

2. Registration - HCO completes and submits registration of intent.

3. Message Building - HCO builds ELR messages using test data.

4. HCO Testing/Validation - HCO tests and validates messages until 0 errors achieved.

5. DHEC Testing/Validation - DHEC reviews messages and validation reports. HCO corrects any errors identified as needed and updates Feedback Worksheet provided by DHEC.

6. PHINMS Setup - DHEC provides information on PHINMS installation. HCO installs PHINMS mechanism.

7. Batch Testing/Validation - HCO sends production data via PHINMS. DHEC reviews batch messages for compliance of structural and technical standards.

8. Programmatic Validation - DHEC program area(s) review messages for content.

9. Ongoing Submission - HCO begins submitting live data into the DHEC production environment.

III. Roles and Responsibilities

Responsibilities of DHEC:

DHEC is committed to facilitating testing, validation, and transition to production of ELR messages.

DHEC is expected to fulfill the following responsibilities:

- Provide DHEC contact information to participating HCOs,
- Provide access to ELR implementation guidelines and specifications to participating HCOs,
- Assist HCO personnel in the implementation of ELR messages,
- Collaborate with HCO personnel to assist in the installation of the national standard for messaging, evaluate the data transfer, and monitor the transfer process, and
- Provide documentation of ELR implementation to the HCO for Meaningful Use purposes as necessary.

Responsibilities of Reporting HCO:

HCOs must submit a completed registration of intent to DHEC and are expected to fulfill the following responsibilities:

- Obtain and review the HL7 v2.5.1 guidance from the Health Level-7 website through membership or purchase (see **Appendix B: Resources**),
- Obtain and review LOINC and SNOMED references (see **Appendix B: Resources**),
- Identify individuals to implement ELR messages and provide and maintain contact information to DHEC for those individuals,
- Notify DHEC when there are changes to staff or EHR systems, and
- Develop messages that are compliant with HL7 2.5.1 and DHEC standards.

IV. Reporting Requirements

Eligibility:

DHEC accepts ELR messages for Meaningful Use from Eligible Hospitals and Critical Access Hospitals performing in-house testing of laboratory specimens reportable per the South Carolina List of Reportable Conditions (updated yearly; see **Appendix B: Resources**). If applicable, DHEC also accepts ELRs for tests performed at reference/commercial labs sent by Eligible Hospitals and Critical Access Hospitals.

DHEC does not accept ELR messages from Eligible Providers.

EHs/CAHs must be able to format electronic messages in accordance with the *HL7 v2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1*, plus additional constraints set forth by this implementation guide.

South Carolina State Reporting Requirements:

Meaningful Use activities do not preempt applicable state or local laws that govern reporting of notifiable conditions.[1]

Hospitals must adhere to the timelines and methods for reporting to DHEC urgently and immediately reportable conditions set forth by the South Carolina List of Reportable Conditions. The establishment of ELR reporting capabilities for Meaningful Use does not exclude a facility from reporting urgently and immediately reportable conditions in accordance with South Carolina State regulations (i.e. by phone, to a live representative).

The below paragraphs from South Carolina Code §44-29-10 and §44-29-15[2] **detail the specific organizations responsible for reporting contagious and infectious disease.**

> **SECTION 44-29-10.** *Reporting deaths from contagious or infectious diseases and chemical or other terrorism; increased prescription rates of drugs for diseases caused by chemical terrorism or infectious agents.*
>
> (A) In all cases of known or suspected contagious or infectious diseases occurring within this State the attending physician must report these diseases to the county health department within twenty-four hours, stating the name and address of the patient and the nature of the disease. The county health department must report to the Department of Health and Environmental Control all such cases of infectious and contagious diseases as have been reported during the preceding month, these reports to be made upon blanks furnished by the Department of Health and Environmental Control. The Department of Health and Environmental Control must designate the diseases it considers contagious and infectious. The Department of Health and Environmental Control may also designate other diseases for mandatory reporting by physicians. Any physician who fails to comply with the provisions of this section is guilty of a misdemeanor and, upon conviction, must be fined not more than one hundred dollars or be imprisoned for a period not exceeding thirty days.
>
> (B) A health care provider, coroner, medical examiner, or any person or entity that maintains a database containing health care data must report all cases of persons who harbor any illness or health condition that may be caused by chemical terrorism, bioterrorism, radiological terrorism, epidemic or pandemic disease, or novel and highly fatal infectious agents and might pose a substantial risk of a significant number of human fatalities or incidents of permanent or long-term disability. The Department of Health and Environmental Control must designate reportable illnesses and health conditions as set forth in subsection (A).

[1] 77 FR 53967. http://www.gpo.gov/fdsys/pkg/FR-2012-09-04/pdf/2012-21050.pdf.
[2] S.C. Code of Laws Unannotated. Title 44, Chapter 29 – Contagious and Infectious Diseases. http://www.scstatehouse.gov/code/t44c029.php

(C) A pharmacist must report any unusual or increased prescription rates, unusual types of prescriptions, or unusual trends in pharmacy visits that may be caused by chemical terrorism, bioterrorism, radiological terrorism, epidemic or pandemic disease, or novel and highly fatal infectious agents and might pose a substantial risk of a significant number of human fatalities or incidents of permanent or long-term disability. Prescription-related events that require a report include, but are not limited to:

(1) an unusual increase in the number of prescriptions to treat fever, respiratory, or gastrointestinal complaints;

(2) an unusual increase in the number of prescriptions for antibiotics;

(3) an unusual increase in the number of requests for information on over- the-counter pharmaceuticals to treat fever, respiratory, or gastrointestinal complaints; and

(4) any prescription that treats a disease that is relatively uncommon and has bioterrorism potential.

(D) The reports of conditions must be made in the form and manner as prescribed by DHEC in regulations concerning infectious diseases. The reports must be made to the Bureau of Disease Control in the manner required in the regulations. When available, clinical information supporting the diagnoses, including results of specific diagnostic tests, must be included.

(E) For purposes of this section, the terms chemical terrorism, bioterrorism, and radiological terrorism have the same meanings as provided in Section 44-4-130.

HISTORY: 1962 Code Section 32-552; 1952 Code Section 32-552; 1942 Code Section 5031; 1932 Code Sections 1502, 5008; Civ. C. '22 Section 2319; Cr. C. '22 Section 450; Civ. C. '12 Section 1578; Cr. C. '12 Section 440; 1900 (23) 444; 1910 (26) 728; 1972 (57) 2496; 2002 Act No. 339, Section 25, eff July 2, 2002.

Effect of Amendment

The 2002 amendment designated subsection (A); added subsections (B), (C), (D) and (E); and made nonsubstantive changes.

SECTION 44-29-15. *Reporting requirements for laboratories testing for certain infectious or other diseases; civil penalty.*

(A) A laboratory, within or outside the State, responsible for performing a test for any of the infectious or other diseases required by the Department of Health and Environmental Control to be reported pursuant to Section 44-29-10, shall report positive or reactive tests to the department. This includes, but is not limited to, all laboratories, within or outside the State, which collect specimens in South Carolina or which receive the initial order for testing from a practitioner, blood

bank, plasmapheresis center, or other health care provider located in South Carolina. The department also may require that all results of certain, specifically identified laboratory tests be reported. All reports must be submitted within the time frame and in the form and manner designated by the department.

(B) Laboratories, within or outside the State, which perform tests as described in subsection (A) and which determine positive or reactive test results, shall, if required by the department, provide clinical specimens and isolates to the department or another laboratory designated by the department for further testing to determine incidence and other epidemiological information. These clinical specimens and isolates must be submitted within the time frame and in the form and manner designated by the department. The testing must be performed for epidemiological surveillance only; source consent is not required, and results are not required to be returned to the source patient or physician. The clinical specimens and isolates must be destroyed after tests are successfully completed, unless otherwise directed by the department.

(C) Persons and entities, which are required to report test results to the department pursuant to this section and which send clinical specimens and isolates out of state for testing, are responsible for ensuring that results are reported and clinical specimens and isolates are submitted to the department, or a laboratory designated by the department, as required under this section and related regulations.

(D) If a laboratory forwards clinical specimens and isolates out of state for testing, the originating laboratory retains the duty to comply with this section and related regulations, either by:

(1) reporting the results, providing the name and address of the testing laboratory, and submitting the clinical specimens and isolates to the department; or

(2) ensuring that the results are reported and that the clinical specimens and isolates are submitted to the department or another laboratory designated by the department.

(E) A person, laboratory, or other entity violating a provision of this section or related regulations is subject to a civil monetary penalty of not more than one thousand dollars for the first offense and not more than five thousand dollars for each subsequent offense. Each instance of noncompliance constitutes a separate violation and offense.

HISTORY: 2010 Act No. 166, Section 1, eff. May 12, 2010.

V. ELR Implementation Process

1. Preliminary Communication

HCO visits the ELR webpage from DHEC's EHR Incentive Program website to obtain key documentation (see **Appendix B: Resources**).

These documents include:

- SC ELR Registration for Meaningful Use
- SC ELR Implementation Guide v3.0
- SC List of Reportable Conditions
- HL7 v2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1

2. Registration

HCO will download the SC ELR Registration form.

HCO will complete all fields of the registration form and email to **muhelpdesk@dhec.sc.gov** to initiate implementation process.

DHEC will notify HCO when registration has been received and may request edits as needed until all fields are complete and appear correct.

NOTE: Federal guidance from CMS requires this registration occur within 60 days of the start of the EHR reporting period.

3. Message Building

HCO builds ELR message using test data.

DHEC accepts ELR messages according to the *HL7 v2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1*. DHEC also provides tables which define DHEC-specific constraints for ELR messages (see **Appendix A: Key Guidance for Message Structuring**).

HCO should reference the SC List of Reportable Conditions (see **Appendix B: Resources**) to determine what conditions are reportable and should be tested via ELR. **NOTE**: Not all listings on the SC List of Reportable Conditions may be reportable via ELR.

DHEC recommends that HCOs develop messages initially using the HL7 v2.5.1 Implementation Guide, and then reference the DHEC-specific constraint tables.

HCOs should consider all fields labeled "RE" and "CE" to be "R" for the purposes of testing.

4. HCO Testing/Validation

HCO validates test messages using the NIST Validation Tool (see **Appendix B: Resources**).

When a **zero (0) error** validation report has been achieved, HCO emails the report along with a .txt file of the corresponding test message to **muhelpdesk@dhec.sc.gov**. If the HCO performs multiple in-house tests, the HCO will send a variety of 0 error test messages with validation reports.

5. DHEC Testing/Validation

Once a 0 error validation report(s) and .txt file(s) of the corresponding test message(s) has been received, DHEC will revalidate the message(s) using the NIST Validation Tool.

If remaining errors or questions concerning the test message are identified, DHEC will provide a Feedback Worksheet to the HCO containing additional information. The HCO will follow the instructions contained within the Feedback Worksheet.

The HCO will generate new test messages and will email them along with corresponding NIST reports and an updated Feedback Worksheet to **muhelpdesk@dhec.sc.gov**. If an HCO is experiencing multiple errors with their test messages, they should resolve as many as possible before submitting new messages for testing and validation.

This process will repeat as necessary until a 0 error report has been achieved and/or until a robust sampling of all reportable conditions performed in-house by the HCO have been tested and approved by DHEC.

6. PHINMS Setup

Once DHEC and the HCO are reasonably certain that no errors remain in the test messages, DHEC will send the PHINMS implementation package with installation instructions to HCO.

DHEC will work with HCO as needed until PHINMS transmission capability between sender and DHEC meets requirements.

Once PHINMS transmission capabilities are installed, the HCO typically does not need to continue to update and submit the Feedback Worksheet or submit NIST validation reports. However, if new or recurring errors are identified, DHEC reserves the right to reinstate both as needed.

HCO reports successful implementation of sender PHINMS capability to DHEC.

7. Batch Testing/Validation

HCO will send batch messages containing live patient data via PHINMS connection. File transfer process:

- File is to contain **all records** for the previous 24 hour period. If the facility is unable to meet this data requirement due to system constraints or other non-modifiable reasons, notify DHEC at **muhelpdesk@dhec.sc.gov** prior to submitting the first batch.
- File to be generated and delivered to DHEC via secure PHINMS transfer daily (24 hours) by 6:00 a.m. EST.
- File naming convention is ELRxxxYYYYMMDD.hl7 where "xxx" is a 3 character filename assigned by DHEC which identifies the sending facility and where "YYYYMMDD" is the year, month, and day that the file was generated [e.g. On January 25, 2016, facility ABC generates the file ELRABC20160125.HL7]. Do not include additional characters or punctuation.

For two weeks, DHEC will monitor daily batch files from HCO to ensure batch files are structured correctly. If errors are identified either by DHEC or by HCO, HCO must resolve errors before DHEC will resume evaluating batch files. When corrections are completed, HCO will email **muhelpdesk@dhec.sc.gov**.

This process will repeat as necessary until all errors have been corrected.

If, due to low volume, there are no batch files generated after PHINMS installation is successful, the two week assessment period will begin when the HCO is able to generate a batch file.

NOTE: Any emails containing live patient data must be sent via encrypted email.

8. Programmatic Validation

Once both the HCO and DHEC are reasonably sure that there are no more technical errors, the messages are sent to the DHEC Division of Acute Disease Epidemiology (DADE) to confirm that message contents are meaningful and useful.

DADE will send the Pre-Production Worksheet to HCO. HCO will submit the completed worksheet to **muhelpdesk@dhec.sc.gov**.

Typically, Programmatic Validation proceeds as follows:

1. For one week, HCO submits daily batch files containing live patient data via PHINMS (ELRs) along with corresponding faxed paper lab results (standard).
2. For one week, DADE reviews the information by comparing the ELRs against the standard copies to ensure that there is no information that is mismatched or absent. If

errors are identified, Programmatic Validation stops until HCO resolves errors. If no errors are identified, Programmatic Validation proceeds to step 3.

3. For one additional week, HCO submits daily ELRs along with corresponding faxed paper standards.
4. For one additional week, DADE reviews the information by comparing the ELRs against the standard copies. If errors are identified, Programmatic Validation will repeat after HCO resolves errors. If no errors are identified, Programmatic Validation is complete.

Factors such as ELR volume, configuration of the HCO's EHR system, and variety of in-house tests performed may impact how Programmatic Validation is performed. DADE reserves the right to implement changes to the standard Programmatic Validation procedure on a facility-by-facility basis.

DHEC may provide documentation of message testing and validation upon request of the HCO.

9. Ongoing Submission

DHEC and HCO work together to implement ongoing electronic submission of live ELR data from the HCO to DHEC's production environment.

Production messages must be transmitted via PHINMS as a batch by 6:00 a.m. EST daily.

For the duration of its ELR messaging interface with DHEC, the HCO will continue to ensure that messages are structurally and qualitatively sound, and will notify DHEC of any EHR or staff changes which may impact the connection.

DHEC may provide documentation of ongoing submission upon request of the HCO.

Regarding submission of live patient results during testing and validation: Beginning with step **1. Preliminary Communication** and continuing until step **9. Ongoing Submission**, whereby ongoing submission of the HCO's production data into DHEC's production environment is implemented, or until otherwise notified by a DHEC representative, the HCO **must** continue to report data to DHEC as it has historically done so, whether by phone call, fax, manual data entry into a DHEC provider portal, etc. Data being received via HL7 v2.5.1 ELR messaging is not considered production data until step **9. Ongoing Submission** has been completed.

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Appendix A: Key Guidance for Message Structuring

This implementation guide is intended to help HCOs structure information for use in South Carolina but should not be considered the definitive implementation guide. DHEC uses the HL7 v2.5.1 Implementation Guide to develop the SC ELR Implementation Guide (see **Appendix B: Resources**).

DHEC requires the use of LOINC codes and text descriptions for tests and coded values for results, applicable to non-numeric results (such as SNOMED codes). If the HCO does not use LOINC codes, the HCO will need to translate local test codes and text descriptions to the appropriate LOINC codes prior to sending ELR messages to DHEC for testing and validation. HCOs must use LOINC does and associated names per the LOINC Manual (see **Appendix B: Resources**).

For programmatic purposes, if the HCO sends a message containing results that are later found to have been a false positive or false negative, or if any other erroneous data was contained in the message, the HCO **must** send a corrected report containing true, corrected data using the appropriate Result Status (OBX-11) value.

It is the responsibility of the HCO to ensure that ELRs are compliant with both HL7 and SC-specific standards.

Definitions of Usage Codes

Code	Definition
R	Required, must always be populated
RE	Required, but may be empty if no data available. If sender has data, then R.
O	Optional, no specified conformance rules.
C	Conditional, when conditionality is met (“true”), then R. When conditionality is not met (“false”), then X.
CE	Conditionally empty, when conditionality is met (“true”), then RE. When conditionality is not met (“false”), then X.
X	Not supported, sender must not populate.

NOTE: All fields labeled RE and CE are to be considered R for the purposes of this testing

Messaging Infrastructure:

NOTE: For basic HL7 terms, message element attribute definitions, and data type definitions, reference the *HL7 v2.5.1 Implementation Guide: Electronic Laboratory Reporting, Release 1*.

File Header Segment (FHS)
(HL7 v2.5.1 Implementation Guide Table 5-16)

Seq.	Name	Description	Usage	Recommended Values
FHS-1	File Field Separator	The character used to separate fields is a pipe |	R	Literal value: | (pipe delimiter)
FHS-2	File Encoding Characters	The five characters always appear in the same order	R	Literal value: ^~\&#
FHS-3	File Sending Application		O	Values should match MSH-3
FHS-4	File Sending Facility		O	Values should match MSH-4
FHS-5	File Receiving Application		O	Values should match MSH-5
FHS-6	File Receiving Facility	A unique identifier of the facility that is to receive the message.	O	Values should match MSH-6
FHS-7	File Creation Date/Time		O	
FHS-8	File Security		X	
FHS-9	File Name/ID		X	
FHS-10	File Header Comment		X	
FHS-11	File Control/ID		X	
FHS-12	Reference File Control ID		X	

Batch Header Segment (BHS)
(HL7 v2.5.1 Implementation Guide Table 5-18)

Seq.	Name	Description	Usage	Recommended Values
BHS-1	Batch Field Separator		R	Literal value: |
BHS-2	Batch Encoding Characters		R	Literal value: ^~\&#
BHS-3	Batch Sending Application		O	
BHS-4	Batch Sending Facility		O	Values should match those in MSH-4
BHS-5	Batch Receiving Application		O	Values should match those in MSH-5
BHS-6	Batch Receiving Facility		O	Values should match those in MSH-6
BHS-7	Batch Creation Date/Time		O	
BHS-8	Batch Security		X	
BHS-9	Batch Name/ID/Type		X	
BHS-10	Batch Comment		X	
BHS-11	Batch Control ID		X	
BSH-12	Reference Batch Control		X	

Message Header Segment (MSH)
(HL7 v2.5.1 Implementation Guide Table 5-1)

Seq.	Name	Description	Usage	Recommended Values
MSH-1	Field Separator		R	Literal value: | (pipe delimiter)
MSH-2	Encoding Characters		R	Literal value: ^~\&#
MSH-3	Sending Application		R	Values should match those in FHS-3

MSH-4	Sending Facility		R	
[4.1]	Namespace ID	Name of the sending application	RE	Use a user-friendly, distinct name to identify your unique facility. Please do not use an acronym.
[4.2]	Universal ID	CLIA Number of the reporting laboratory	R	CLIA# of the sending application
[4.3]	Universal ID Type	Indicates that 4.2 is a CLIA number	R	Literal value: CLIA
MSH-5	Receiving Application		R	
[5.1]	Namespace ID	Name of the receiving application	RE	Literal value: SCDOH
[5.2]	Universal ID	OID of the receiving application	R	Literal Value: 2.16.840.1.114222.4.3.2.2.1.179.1
[5.3]	Universal ID Type	Indicates that 5.2 is an OID	R	Literal value: ISO
MSH-6	Receiving Facility		R	
[6.1]	Namespace ID		RE	Literal value: SC
[6.2]	Universal ID	OID of the receiving facility	R	Literal value: 2.16.840.1.114222.4.1.3680
[6.3]	Universal ID Type	Indicates that 6.2 is an OID	R	Literal value: ISO
MSH-7	Date/Time of message		R	
MSH-8	Security		X	
MSH-9	Message Type		R	Literal value: ORU^R01^ORU_R01
MSH-10	Message Control ID	Unique message ID	R	Ex.: 201311220000007 20134514080608207007
MSH-11	Processing ID		R	Literal value if testing: T Literal value if live: P
MSH-12	Version ID	HL7 Version used to interpret the format and content of the message.	R	Literal value: 2.5.1
MSH-13	Sequence Number		X	
MSH-14	Continuation Pointer		X	
MSH-15	Accept Acknowledgement Type		CE	
MSH-16	Application		CE	

	Acknowledgement Type			
MSH-17	Country Code		X	
MSH-18	Character Set		X	
MSH-19	Principal Language of Message		X	
MSH-20	Alternate Character Set Handling Scheme		X	
MSH-21	Message Profile Identifier		R	See HL7 v2.5.1 Implementation Guide, Section 3.3 Dynamic Definitions for acceptable values.

Software Segment (SFT)
(HL7 v2.5.1 Implementation Guide Table 5-2)

Seq.	Name	Description	Usage	Recommended Values
SFT-1	Software Vendor Organization		R	
SFT-2	Software Certified Version or Release Number		R	
SFT-3	Software Product Name		R	

SFT-4	Software Binary ID		R	
SFT-5	Software Product Information		O	
SFT-6	Software Install Date		RE	

Patient Identifier List (PID)
(HL7 v2.5.1 Implementation Guide Table 5-5)

Seq.	Name	Description	Usage	Recommended Values
PID-1	Set ID- PID		R	Literal value: 1
PID-2	Patient ID		X	
PID-3	Patient Identifier List	Pursuant to S.C. Code 44-1-110, **include the last 5 digits of the patient's SSN**. If no SSN is provided and/or available, provide alternate identifiers such as medical record #, account #, visit #, etc.	R	**HL7**: HL7 Table 0203 **PHINVADS**: PHVS_IdentifierType_CDC_V3. **OID**: 2.16.840.1.113883.12.203
PID-4	Alternate Patient ID		X	
PID-5	Patient Name		R	
PID-6	Mother's Maiden Name		RE	
PID-7	Patient Date/Time of Birth		R	
PID-8	Administrative Sex		R	**HL7**: HL7 0001 Table **PHINVADS**: PHVS_AdministrativeSex_HL7_2x **OID**: 2.16.840.1.114222.4.11.927

PID-9	Patient Alias		X	
PID-10	Patient Race		R	**HL7**: 0005 **PHINVADS:** PHVS_Race_HL7_2x **OID:** 2.16.840.1.113883.12.5
PID-11	Patient Address		R	
PID-12	County Code		X	
PID-13	Patient Phone Number - Home		R	Do not leave area code blank
PID-14	Patient Phone Number - Business		RE	
PID-15	Primary Language		O	
PID-16	Marital Status		O	**HL7**: 0002 Table **PHINVADS**: PHVS_MaritalStatus_HL7_2x **OID**: 2.16.840.1.114222.4.11.809
PID-17	Religion		O	
PID-18	Patient Account Number	Use PID-3	X	
PID-19	Patient Social Security Number	Use PID-3	X	
PID-20	Patient Driver's License Number	Use PID-3	X	
PID-21	Mother's Identifier		O	
PID-22	Patient Ethnicity		RE	**HL7**: HL7 0189 table

				PHINVADS: PHVS_EthnicGroup_HL7_ 2x **OID**: 2.16.840.1.114222.4.11.6066
PID-23	Birth Place		O	
PID-24	Multiple Birth Indicator		O	
PID-25	Birth Order		O	
PID-26	Citizenship		O	
PID-27	Veterans Military Status		O	
PID-28	Nationality		X	
PID-29	Patient Death Date/Time		RE	
PID-30	Patient Death Indicator		RE	
PID-31	Identity Unknown Indicator		X	
PID-32	Identity Reliability Code		X	
PID-33	Last Update Date/Time		RE	
PID-34	Last Update Facility		CE	
PID-35	Species Code	When sample is of non-human origin, the species code identifier is required.	RE	**PHINVADS**: PHVS_Animal_CDC value set
PID-36	Breed Code		X	
PID-37	Strain		X	
PID-38	Production Class Code		X	
PID-39	Tribal Citizenship		X	

Next of Kin (NK1)

(HL7 v2.5.1 Implementation Guide Table 5-6)

Seq.	Name	Description	Usage	Recommended Values
NK1-1	Set ID	NK1 is created regardless of	R	

		whether contact info was present		
NK1-2	Next of Kin Name	If associated party is an individual person, use this field.	CE	
NK1-3	Relationship		RE	
NK1-4	Address		RE	
NK1-5	Phone Number		RE	
NK1-7	Contact Role		X	
NK1-8	Start Date		X	
NK1-9	End Date		X	
NK1-10	Next of Kin Associated Parties Job Title		X	
NK1-11	Next of Kin Associated Parties Job Code/Class		X	
NK1-12	Next of Kin Associated Parties Employee Number		X	
NK1-13	Organization Name	If associated party is an organization, use this field.	CE	
NK1-14	Marital Status		X	
NK1-15	Administrative Sex		X	
NK1-16	Date/Time of Birth		X	
NK1-17	Living Dependency		X	
NK1-18	Ambulatory Status		X	
NK1-19	Citizenship		X	
NK1-20	Primary Language		X	
NK1-21	Living Arrangement		X	
NK1-22	Publicity Code		X	
NK1-23	Protection Indicator		X	
NK1-24	Student Indicator		X	
NK1-25	Religion		X	
NK1-26	Mother's Maiden Name		X	
NK1-27	Nationality		X	
NK1-28	Ethnic Group		X	

NK1-29	Contact Reason		X	
NK1-30	Contact Person's Name		CE	
NK1-31	Contact Person's Telephone Number		RE	
NK1-32	Contact Person's Address		RE	
NK1-33	Next of Kin/Associated Party's Identifier		X	

Common Order Segment (ORC)
(HL7 v2.5.1 Implementation Guide Table 5-9)

Seq.	Name	Description	Usage	Recommended Values
ORC-1	Order Control	Determiner of the function of the order segment.	R	Literal value: RE
ORC-2	Placer Order Number		CE	If populated, must contain the same values as OBR-2.
ORC-3	Filler Order Number		R	Must contain the same values as OBR-3. Should NOT be the accession number.
ORC-4	Placer Group Number		RE	
ORC-5	Order Status		X	
ORC-6	Response Flag		X	
ORC-7	Quantity/Timing		X	
ORC-8	Parent		X	
ORC-9	Date/Time of Transaction		X	
ORC-10	Entered By		X	
ORC-11	Verified By		X	
ORC-12	Ordering Provider		CE	If OBR-16 is populated, this field will contain the same value.
ORC-13	Enterer's Location		X	

ORC-14	Call Back Phone Number	Should be a phone number associated with the original order placer.	CE	If OBR-17 is populated, this field will contain the same value.
ORC-15	Order Effective Date/Time		X	
ORC-16	Order Control Code Reason		X	
ORC-17	Entering Organization		X	
ORC-18	Entering Device		X	
ORC-19	Action By		X	
ORC-20	Advanced Beneficiary Notice Code		X	
ORC-21	Ordering Facility Name		R	Use a distinct name to identify your unique facility.
ORC-22	Ordering Facility Address		R	
ORC-23	Ordering Facility Phone Number		R	
ORC-24	Ordering Provider Address		RE	
ORC-25	Order Status Modifier		X	
ORC-26	Advanced Beneficiary Notice Override Reason		X	
ORC-27	Filler's Expected Availability Date/Time		X	

ORC-28	Confidentiality Code		X	
ORC-29	Order Type		X	
ORC-30	Enterer Authorization Mode		X	
ORC-31	Parent Universal Service Identifier		X	

Observation Request Segment (OBR)
(HL7 v2.5.1 Implementation Guide Table 5-10)

Seq.	Name	Description	Usage	Recommended Values
OBR-1	Set ID- OBR		R	|1|, |2|, |3|, etc for repeating OBRs.
OBR-2	Placer Order Number		RE	
OBR-3	Filler Order Number	Normally a system identifier assigned by the filler software system.	R	Each OBR in a multiple resulted test must be unique in order to create parent/child relationships.
OBR-4	Universal Service Identifier		R	Use LOINC codes. Use Laboratory Order Value Set from HITSP. **PHINVADS:** PHVS_LabTestOrderables_CDC **OID:** 2.16.840.1.114222.4.11.1004
OBR-5	Priority- OBR		X	
OBR-6	Requested Date/Time		X	
OBR-7	Observation Date/Time		R	Must contain the same value as OBX-14 and SPM-17.1.

OBR-8	Observation End Date/Time	The end point time when the specimen was collected.	CE	Must contain the same value as SPM-17.2.
OBR-9	Collection Volume		X	
OBR-10	Collector Identifier		X	
OBR-11	Specimen Action Code		X	
OBR-12	Danger Code		X	
OBR-13	Relevant Clinical Information		RE	
OBR-14	Specimen Received Date/Time		X	
OBR-15	Specimen Source		X	
OBR-16	Ordering Provider	Identifier of the provider who ordered the testing.	RE	If populated, ORC-12 will contain the same value.
OBR-17	Order Callback Phone Number	This is the number DHEC can call with questions regarding the order. Must be associated with the original order placer.	RE	If populated, ORC-14 will contain the same value. Do not leave area code blank.
OBR-18	Placer Field 1		X	
OBR-19	Placer Field 2		X	
OBR-20	Filler Field 1		O	
OBR-21	Filler Field 2		O	
OBR-22	Results Rpt/ Status Change Date/Time		R	
OBR-23	Charge to Practice		X	
OBR-24	Diagnostic Serv Sect ID		X	
OBR-25	Result Status		R	**HL7**: HL7 0123 **PHINVADS**: PHVS_ResultStatus_HL7_2x **OID**: 2.16.840.1.114222.4.11.815
OBR-26	Parent Result	Used to link child sensitivities to the parent	CE	See OBR-29.

		culture		
OBR-27	Quantity/Timing		X	
OBR-28	Result Copies To		X	
OBR-29	Parent	**Required if Micro Culture & Sensitivity.**	CE	See HL7 v2.5.1 Implementation Guide Appendix A for detailed examples.
OBR-30	Transportation Mode		X	
OBR-31	Reason for Study		RE	Use Reason For Study Value Set.
OBR-32	Principal Result Interpreter		RE	
OBR-33	Assistant Result Interpreter		X	
OBR-34	Technician		X	
OBR-35	Transcriptionist		X	
OBR-36	Scheduled Date/Time		X	

Observation Result Segment (OBX)
(HL7 v2.5.1 Implementation Guide Table 5-12)

Seq.	Name	Description	Usage	Recommended Values
OBX-1	Set ID- OBX	The OBX contains info regarding a single observation related to a single test (OBR). This field indicates the sequence number.	R	|1|, |2|, |3|, etc for incremental OBXs.
OBX-2	Value Type		CE	Required if OBX-5 is populated. **HL7**: HL7 0125 **PHINVADS**: PHVS_ValueType_ELR

				OID: 2.16.840.1.114222.4.11.6064 If OBX-2 is NM or SN, the following fields are required: OBX-5, -6, -7, and -8.
OBX-3	Observation Identifier	In conjunction with OBX-3 and OBX-4, should uniquely identify this OBX from all other OBXs associated with this OBR.	R	Use LOINC codes. **PHINVADS**: PHVS_LabTestOrderables_CDC **OID**: 2.16.840.1.114222.4.11.1004
OBX-4	Observation Sub-ID	Value if there is one or more OBXs with the same OBX-3 associated with the same OBR. **For Micro C&S:** Must have sub-ID data, even if message only includes 1 organism.	CE	
OBX-5	Observation Value	DHEC accepts results only in this field. If results include comments, use NTE segment.	CE	Refer to the HL7 0125 table from HL7 2.5.1 Implementation Guide for values. Use SNOMED-CT, where applicable.
OBX-6	Observation Units	Units must be provided for all quantitative results. If OBX-2 is NM or SN, this field is required.	CE	**HL7**: Unified Code for Units of Measure (UCUM) **PHINVADS**: PHVS_UnitsOfMeasure_CDC **OID**: 2.16.840.1.114222.4.11.838 Do not populate the field with "1" if the results do not have required units (ex. qualitative results).

OBX-7	Reference Range		RE	
OBX-8	Abnormal Flags	Indicator of the normality of the result contained in OBX-5.	CE	**HL7**: HL7 0078 **PHINVADS**: PHVS_AbnormalFlag_HL7_27 **OID**: 2.16.840.1.114222.4.11.3343
OBX-9	Probability		X	
OBX-10	Nature of Abnormal Test		X	
OBX-11	Observation Result Status		R	**HL7**: HL7 table 0085 **PHINVADS**: PHVS_ObservationResultStatus_HL7_2x **OID**: 2.16.840.1.114222.4.11.811
OBX-12	Effective Date of Reference Range		X	
OBX-13	User-Defined Access Checks		X	
OBX-14	Date/Time of Observation	Specimen collection time.	CE	If populated, will be valued the same as OBR-7 and SPM-17.1.
OBX-15	Producer's ID		RE	If populated, must identify the same performing organization identified in OBX-23.
OBX-16	Responsible Observer		X	
OBX-17	Observation Method	Method of testing by the laboratory.	RE	If the LOINC code in OBX-3 is methodless, this field will be populated. The method may be extrapolated from the local test codes.
OBX-18	Equipment Instance Identifier		X	
OBX-19	Date/Time of Analysis	Time at which testing was performed.	R	
OBX-20	Reserved for		X	

	harmonization with Version 2.6			
OBX-21	Reserved for harmonization with Version 2.6		X	
OBX-22	Reserved for harmonization with Version 2.6		X	
OBX-23	Performing Organization Name	Name of the laboratory that produced the test result.	R	Use CLIA Number of performing lab.
OBX-24	Performing Organization Address	Address of the laboratory performing the test.	R	
OBX-25	Performing Organization Medical Director		RE	

Notes and Comments Segment (NTE)
(HL7 v2.5.1 Implementation Guide Table 5-15)

Seq.	Name	Description	Usage	Recommended Values
NTE-1	Set ID- NTE	Sequential numbering of repeats.	R	|1|
NTE-2	Source of Comment		RE	
NTE-3	Comment		R	Do not place lab test results in this field. Lab test results must be sent in OBX-5.
NTE-4	Comment Type		RE	

Specimen Segment (SPM)
(HL7 v2.5.1 Implementation Guide Table 5-14)

Seq.	Name	Description	Usage	Recommended Values
SPM-1	Set ID- SPM		R	Literal value: 1
SPM-2	Specimen ID		R	
SPM-3	Specimen Parent IDs		X	
SPM-4	Specimen Type		R	**Be specific** (blood vs. serum vs. plasma, etc.). Usually matches LOINC code in OBR-4 and OBX-3. Either HL7 0487 or SNOMED CT. **HL7**: HL7 0487 **PHINVADS**: PHVS_SpecimenType_HL7_2x **OID**: 2.16.840.1.114222.4.11.6046 **SNOMED CT**: SNOMED CT Specimen sub-tree (12303009) **PHINVADS**: PHVS_Specimen_CDC OID: 2.16.840.1.114222.4.11.946
SPM-5	Specimen Type Modifier		RE	Allows sending qualifiers for a SNOMED CT term from a single axis. **Only used if SPM-4 is a SNOMED code.**

SPM-6	Specimen Additives		RE	
SPM-7	Specimen Collection Method		RE	
SPM-8	Specimen Source Site		RE	
SPM-9	Specimen Source Site Modifier		RE	
SPM-10	Specimen Collection Site		O	
SPM-11	Specimen Role		RE	
SPM-12	Specimen Collection Amount		RE	
SPM-13	Grouped Specimen Count		X	
SPM-14	Specimen Description		X	
SPM-15	Specimen Handling Code		X	
SPM-16	Specimen Risk Code		X	
SPM-17	Specimen Collection Date/Time		R	OBX-14 should contain the same value as SPM-17.1.
SPM-18	Specimen Received Date/Time		R	

Batch Trailer Segment (BTS)

(HL7 v2.5.1 Implementation Guide Table 5-19)

Seq.	Name	Description	Usage	Recommended Values
BTS-1	Batch Message Count	Total number of messages contained in this batch.	R	
BTS-2	Batch Comment		X	
BTS-3	Batch Totals		X	

File Trailer Segment (FTS)
(HL7 v2.5.1 Implementation Guide Table 5-17)

Seq.	Name	Description	Usage	Recommended Values
FTS-1	File Batch Count	Number of batches contained in this file. Will always be "1" for this interface.	R	Literal value: 1
FTS-2	File Trailer Comment		X	

Appendix B: Resources

Centers for Disease Control and Prevention (CDC):

- Meaningful Use Introduction:
  https://www.cdc.gov/EHRmeaningfuluse/introduction.html

- PHIN-VADS:
  https://www.cdc.gov/phin/tools/phinvads/index.html

- HL7 ELR Implementation Guide to PHINVADS Crosswalk (Value Sets):
  http://phinvads.cdc.gov/vads/DownloadHotTopicDetailFile.action?filename=368D12BD-1514-E211-989D-001A4BE7FA90

- LOINC and SNOMED Mapping Tool:
  http://phinvads.cdc.gov/vads/ViewCodeSystemConcept.action?oid=2.16.840.1.114222.4.5.274&code=RCMT

- PHINMS:
  https://www.cdc.gov/phin/tools/PHINms/index.html

Centers for Medicare & Medicaid Services (CMS):

- 2017 Program Requirements:
  https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/2017ProgramRequirements.html

- Public Health Reporting for Eligible Hospitals, CAHs, and Dual-Eligible Hospitals Attesting to CMS Modified Stage 2 of the EHR Incentive Programs in 2017:
  https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/PublicHealthReporting_2017_Hospitals.pdf

- Public Health and Clinical Data Registry Reporting Tip Sheet for Eligible Hospitals, CAHs, and Dual-Eligible Hospitals Attesting to CMS Stage 3 of the EHR Incentive Programs:
  https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/PublicHealthReporting_Stage3_MedicareHospitals.pdf

- NPI Registry:
  https://npiregistry.cms.hhs.gov/

Health Level Seven (HL7) International:

- HL7 v2.5.1 Implementation Guide: Electronic Laboratory Reporting to Public Health, Release 1 (US Realm): https://www.hl7.org/implement/standards/product_brief.cfm?product_id=98

- HL7 Store: https://www.hl7.org/store/index.cfm?ref=nav

Logical Observation Identifiers Names and Codes (LOINC):

- LOINC Users' Guide: http://loinc.org/downloads/files/LOINCManual.pdf

National Institute of Standards and Technology (NIST):

- ELR HL7 v2.5.1 Validation Tool: http://hl7v2-elr-testing.nist.gov/mu-elr/

- NIST Google Group for developers: https://groups.google.com/forum/#!forum/hl7v2-reportable-lab-testing

SC Department of Health and Environmental Control (DHEC):

- Electronic Reportable Lab Results (ELR) webpage: http://www.scdhec.gov/Health/FHPF/MeaningfulUse/Labs/

- SC List of Reportable Conditions (updated annually): http://www.scdhec.gov/library/CR-009025.pdf

SNOMED:

- SNOMED CT Browser: http://browser.ihtsdotools.org/?perspective=full&conceptId1=410607006&edition=us-edition&release=v20170301&server=https://prod-browser-exten.ihtsdotools.org/api/snomed&langRefset=900000000000509007 (*NOTE: Use "Organism" or "Specimen" taxonomy and search with Options).

- NIH SNOMED CT Browser: https://www.nlm.nih.gov/research/umls/Snomed/snomed_browsers.html