PHIN Messaging Standard
Laboratory Result - OUL^R22
HL7 2.5

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1. Introduction

Background

Each state and territory has requirements for laboratories to report certain findings to health officials. In the past, these reports were written by hand on forms provided by health departments and mailed to appropriate offices. With computerization of laboratories, it has become possible for laboratories to send reportable data to health departments electronically.

This guide contains the standards for sending laboratory-reportable findings to appropriate state, territorial, and federal health agencies using Health Level Seven (HL7) messages. The message is not specific to any pathogen or reportable condition and is applicable for most laboratory-reportable findings in the National Public Health Surveillance System (NPHSS) as defined by the Council of State and Territorial Epidemiologists (CSTE).

This document is a guide for electronic communication of reportable diseases, consistent with recommended reporting of reportable conditions from laboratories to public health agencies using HL7 Version 2.5. The PHIN Messaging Standard for Laboratory Results follows the specifications described in the HL7 Standard Version 2.5 and focuses on one type of HL7 message, the specimen centric Observational Report - Unsolicited (OUL^R22). HL7 describes the order and structure of data fields for sharing test results, but does not stipulate which coding system or dictionary of descriptive terms should be used to identify specific tests and findings unambiguously; this is determined by agreement of the parties sharing the information. For sharing laboratory-based reports of public health findings, these coding systems are required:

- Logical Observation Identifier Names and Codes (LOINC®) for specific laboratory procedure names.
- The Systematized Nomenclature for Human and Veterinary Medicine (SNOMED®) for descriptions of findings, notably organism names.

The following coding system is recommended:

- International Classification of Diseases, Clinical Modification (ICD-9-CM) coding system to code signs, symptoms, injuries, diseases, and conditions.

In general, the vocabulary for this message will be contained in PHIN VADS (PHIN Vocabulary Access and Distribution System).

The document gives a description of the utility and requirement of data fields of interest to public health in the OUL^R22 message, provides examples of complete messages, and includes tables of recommended codes.

This document is associated with the PHIN requirements for “Connecting Lab Systems” (CLS).

HIPAA

The Health Insurance Portability and Accountability Act (HIPAA, or the Act), P.L. 104-191, was enacted on

August 21, 1996. The Act included provisions relating to insurance coverage, but it also included a section that is relevant to electronic reporting of health care information. Among the requirements in this section called administrative simplification were: the adoption of standards for electronic health information transactions for certain uniform financial and administrative transactions and data elements, including claims, enrollment, eligibility, payment, coordination of benefits, and for the security of electronic health information systems. HIPAA also addressed safeguards of information, electronic signatures, and standards for various unique health identifiers, and specific code sets to be used in the transactions. HIPAA also included provisions for adopting standards for the privacy of health information. The Law preempts State laws and imposes civil money penalties and prison for certain violations and made some changes in the membership and duties of the National Committee on Vital and Health Statistics (NCVHS). There is also a provision that NCVHS will make recommendations and legislative proposals to the Secretary on the adoption of uniform data standards for patient medical record information and the electronic exchange of such information. It also addresses state regulatory reporting by stating, "Nothing in this part shall limit the ability of a State to require a health plan to report, or to provide access to, information for management audits, financial audits, program monitoring and evaluation, facility licensure or certification, or individual licensure or certification." Regulations issued under the Act provide the implementation detail.

On the issue of public health, HIPAA states, "Nothing in this part shall be construed to invalidate or limit the authority, power, or procedures established under any law providing for the reporting of disease or injury, child abuse, birth, or death, public health surveillance, or public health investigation or intervention." The covered entities (those who have to comply) named in the HIPAA legislation are "health plans, health care clearinghouses, and health care providers who transmit any health information in electronic form in connection with a transaction referred to in Section 1173(a) of the Act." The transactions listed in Section 1173(a) deal specifically with eligibility, enrollment, claims, and others related to payment of insurance claims. Many of the public health reports will occur between parties that are not covered entities under the Act and do not involve the covered transactions, because public health agencies generally do not file insurance claims. The regulation implementing the HIPAA privacy provisions allowed public health exemptions for disclosure without patient consent of individually identifiable health information for the purposes quoted above.

Public health reporting is not a part of the claims process and conceptually is most closely aligned with the patient medical record, with Health Level Seven (HL7) as a recognized standards development organization in that subject area. We do not believe the HIPAA requirements related to electronic transactions will in any way affect our planned use of HL7 for electronic laboratory reporting. The HL7 message as defined in this document was carefully developed to provide a method for evidence of reportable conditions to be transmitted electronically. We believe that laboratories can report this public health information using the HL7 standard as described here and that these reports will not be altered by HIPAA provisions.

Scope

The standards in this guide are not intended as a tutorial for either HL7 or interfacing in general. The reader is expected to have a basic understanding of interface concepts, HL7, and electronic laboratory based reporting of public health information. This document describes a data exchange protocol applicable for reporting most diseases of public health importance.

This laboratory messaging standard guide is based on and consistent with the HL7 Standard, Version 2.5. Any user- defined variations from the standard are clearly described. Reporting requirements for reportable diseases may vary by state. Electronic copies of this document are available.

Contacts

Austin Kreisler
Science Applications International Corporation
3395 NE Expressway, Suite 300
Atlanta, GA 30341
Office - (404) 498-2959

2. HL7 Concepts

While the use of some non-HL7 tables is necessary for vocabulary purposed, this document remains true to the HL7 v2.5 Final Standard, dated July 2003. The entries below are derived from that standard for use with Electronic Laboratory Reporting.

HL7 Definitions

Message: A message is the entire unit of data transferred between systems in a single transmission. It is a series of segments in a defined sequence, with a message type and a trigger event. Between text messages in a batch, two carriage returns/line feeds (hex characters 0D0A0D0A) represent the end of each message.

Segment: "A segment is a logical grouping of data fields."[1] Segments within a defined message may be required or optional, may occur only once, or may be allowed to repeat. Each segment is named and is identified by a segment ID, a unique 3-character code. The hex characters '0D0A' that act as a Segment Terminator (equivalent to a Carriage Return and Line Feed) denote the end of each segment.

Field: "A field is a string of characters."[2] The segment it is in and the position within the segment identify each field; e.g., PID-5 is the fifth field of the PID segment. Optional data fields need not be valued. Whether a field is required, optional, or conditional in a segment is specified in the segment attribute tables. The designations are:

M=Mandatory; the field must be valued
R=Required; if the information is available it should be sent
O=Optional; the information might be collected and the information might be sent
C=Conditional; the information is required or mandatory based on the presence or absence of another value
D=Deprecated; the value is not longer valid. Do not use
B=Backward Compatibility; left in for compatibility with previous versions of HL7; the value is scheduled to be Deprecated within two HL7 versions; use is discouraged
X=Not Used; for this trigger event

A maximum length of the field is stated as normative information. Exceeding the listed length should not be considered an error.

Component: A component is one of a logical grouping of items that comprise the contents of a coded or composite field. Within a field having several components, not all components are required to be valued. Examples in this document demonstrate both fully valued and partially valued coded and composite fields.
Item number: Each field is assigned a unique item number. Fields that are used in more than one segment will retain their unique item number across segments.

Null and empty fields: The null value is transmitted as two double quote marks (""). A null-valued field differs from an empty field. An empty field should not overwrite previously entered data in the field. The null value means that any previous value in this field should be overwritten.

Data type: A data type restricts the contents and format of the data field. Data types are given a 2- or 3-letter code. Some data types are coded or composite types with several components. The applicable data type is listed and defined in each field definition. Chapter 2A of the HL7 v2.5 standard provides a complete listing of data types used in this document and their definitions.

Delimiters: The delimiter values are given in MSH-1 and MSH-2 and used throughout the message. Applications must use agreed upon delimiters to parse the message. The recommended delimiters for laboratory messages are:

<CR> (hex 0D0A = The Carriage Return is the symbol for the Segment Terminator; *Note:* Designation cannot be changed
| = The vertical bar is the symbol for the Field Separator
^ = The circumflex accent mark or hat is the symbol for the Component Separator
& = The ampersand is the symbol for the Sub-Component Separator
~ = The tilde or squiggled line is the symbol for the Repetition Separator
\ = The back slash is the symbol for the Escape Character

Message syntax: Each abstract message is defined in special notation that lists the 3-letter segment identifiers in the order they will appear in the message. Braces, **{ }**, indicate that one or more of the enclosed group of segments may repeat, and brackets, **[ ]**, indicate that the enclosed group of segments is optional.

Trigger events: "The HL7 Standard is written from the assumption that an event in the real world of healthcare creates the need for data to flow among systems. The real-world event is called the trigger event. For example, the trigger event, an observation (e.g., a CBC result) for a patient is available, may cause the need for that observation to be sent to a number of other systems. When the transfer of information is initiated by the application system that deals with the triggering event, the transaction is termed an unsolicited update. "[3]

Z segments: All message types trigger event codes, and segment ID codes beginning with Z are reserved for locally defined messages. No Z segments codes have been defined in the HL7 v2.5 Standard for the OUL^R22 message; this document does not contain customized Z segments for the OUL^R22 message.

Basic Message Construction Rules

Encoding Rules for Sending

Encode each segment in the order specified in the abstract message format.
Place the Segment ID first in the segment.
Precede each data field with the field separator.
Encode the data fields in the order and data type specified in the segment definition table.
End each segment with the segment terminator.
Component separators need not be represented for components, subcomponents, or repetitions that come at the end of a field. The data fields below, for example, are equivalent:

```
^XXX&YYY&&^ is equal to ^XXX&YYY^
|ABC^DEF^^| is equal to  |ABC^DEF|
```

Encoding Rules for Receiving

If a data segment is included that is not expected, ignore it; this is not an error.
If data fields are found at the end of a data segment that are not expected, ignore them; this is not an error.
If a segment contains fields that are not expected, ignore them; this is not an error.

Note: XML can be used as an alternative method for message encoding. There are basic rules that must be followed in addition to maintaining the HL7 v2.x standards. For XML encoding information refer to the document HL7 Version 2: XML Encoding Syntax, Release 1. The document and more information about XML encoding can be found on the HL7.org website.

Data Types

The data types names and descriptions used in this document follow:

Data Type	Data Type Description
CE	Coded Element
CQ	Composite Quantity with Units
CWE	Coded With Exceptions
CX	Extended Composite ID with Check Digit
DR	Date/Time Range
DT	Date
DTM	Date/Time
EI	Entity Identifier
EIP	Entity Identifier Pair
FN	Family Name
FT	Formatted Text Data
HD	Hierarchic Designator
ID	Coded Value for HL7 defined tables
IS	Coded Value for User defined tables
MSG	Message Type
NA	Numeric Array
NM	Numeric
PRL	Parent Result Link
PT	Processing Type
SAD	Street Address
SI	Sequence ID
SN	Structured Numeric
ST	String Data
TS	Time Stamp
TX	Text Data
VID	Version Identifier
XAD	Extended Address
XCN	Extended Composite ID Number and Name for Persons
XON	Extended Composite Name and ID Number for Organizations
XPN	Extended Person Name

XTN	Extended Telephone Number

CE - Coded Element

HL7 Component Table - CE – Coded Element

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	20	ST	O		Identifier	
2	199	ST	O		Text	
3	20	ID	O	0396	Name of Coding System	Table 0396 should be imported into PHIN-VAD. Additional Codes will be added.
4	20	ST	O		Alternate Identifier	
5	199	ST	O		Alternate Text	
6	20	ID	O	0396	Name of Alternate Coding System	

Definition: "This data type transmits codes and the text associated with the code. Maximum Length: 483.

```
Example:
|F-11380^CREATININE^I9^2148-5^CREATININE^LN|"[4]
```

CQ - Composite Quantity with Units

HL7 Component Table - CQ –Composite Quantity with Units

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	16	NM	O		Quantity	
2	483	CE	O		Units	

Definition: "Maximum Length: 500.

```
Examples:
|123.7^kg|        kilograms is an ISO unit
|150^lb&&ANSI+|   weight in pounds is a customary US unit
      defined within ANSI+."[5]
```

CWE – Coded With Exceptions

HL7 Component Table - CWE – Coded with Exceptions

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	20	ST	O		Identifier	
2	199	ST	O		Text	
3	20	ID	O	0396	Name of Coding System	
4	20	ST	O		Alternate Identifier	
5	199	ST	O		Alternate Text	
6	20	ID	O	0396	Name of Alternate Coding System	
7	10	ST	C		Coding System Version ID	
8	10	ST	O		Alternate Coding System Version ID	
9	199	ST	O		Original Text	

Definition: "Specifies a coded element and its associated detail. The CWE data type is used when 1) more than one table may be applicable or 2) the specified HL7 or externally defined table may be extended with local values or 3) when text is in place, the code may be omitted. Maximum Length: 705.

Usage Notes: This is a field that is generally sent using a code, but where the code may be omitted in exceptional instances or by site agreement. Exceptional instances arise when the coding system being used does not have a code to describe the concept in the text.

Components 1-3 & 7 are used in one of three ways:

- ✓ Coded: The identifier contains a valid code from a coding system. The coding system must either be present and have a value from the set of allowed coding systems, or if not present, it will be interpreted to have the same meaning as if it had been valued with the code meaning "HL7 coding system". Refer to HL7 Table 0396 in section 2.17.5 for valid values. The table includes ASTM E1238-94, Diagnostic, procedure, observation, drug ID, and health outcomes coding systems. If the coding system is any system other than "HL7 coding system," version ID must be valued with an actual version ID. If the coding system is "HL7 coding system," version ID may have an actual value or it may be absent. If version ID is absent, it will be interpreted to have the same value as the HL7 version number in the message header. Text description is optional, but its use should be encouraged to aid in readability of the message during testing and debugging.

```
Example 1a: OBX segment where the observation identifier is a
LOINC code and the observation value is being sent as a CWE
value, and the value is taken from SNOMED International.

OBX|1|CWE|883-9^ABO Group^LN|1|F-D1250^Type
   O^SNM3^^^^3.4|||N||F<cr>
```

```
Example 1b: OBX segment where the observation identifier is a
LOINC code and the observation value is being sent as an CWE
value, and the value is taken from a (currently hypothetical)
HL7 table.

OBX|1|CWE|883-9^ABO Group^LN|1|O^Type
   O^HL74875^^^^2.3.1|||N||F<cr>
```

- ✓ Uncoded: Text is valued, the identifier has no value, and coding system and version ID follow the same rules as discussed for option 1.

```
Example 2: OBX segment where the observation identifier is a
LOINC code and the observation value is being sent as a CWE
value, and the value is sent as text because the correct
clinical value, "Wesnerian" was not found in the set of
allowed values.

OBX|1|CWE|883-9^ABO
   Group^LN|1|^Wesnerian^SNM3^^^^3.4|||A||F<cr>
```

- ✓ Data missing: The name of the coding system is "HL7 CWE Status," version ID is either a real version, or if not present it has the same meaning as the version in the message header, and the identifier takes its value from one of the allowed CWE field statuses. The codes for the allowed CWE field statuses are shown below and will be maintained in a table as part of the HL7 vocabulary. Text description of code is optional.

```
Example 3: OBX segment where the observation identifier is a
LOINC code and the observation value is being sent as an LCE
value, and no value can be sent because the test was not done.

OBX|1|CWE|883-9^ABO Group^LN|1|NAV^Not
   Available^HL70353^^^^2.3.1|||N||F<cr>
```

Component 9: This is the original text that was available to an automated process or a human before a specific code was assigned. This field is optional.

Components 3-6 & 8: Components 3-6 & 8 are optional. They are used to represent the local or user seen code. If present, components 3-6 & 8 obey the same rules of use and interpretation as described for components 1-3 & 7 (of the CWE data type). If both are present, the identifiers in component 4 and component 1 should have exactly the same meaning; i.e. they should be exact synonyms.

```
Example 4: OBX segment where the observation identifier is a
LOINC code and the observation value is being sent as an CWE
value, and the value is taken from SNOMED International. The
user seen fields are being used to represent a local coding
system (99LAB) used in the sending system.

OBX|1|CWE|883-9^ABO Group^LN|1|F-D1250^Type O^SNM3^O^O Type
   Blood^99LAB^3.4^|||||F<cr>
```

Summary of CWE usage notes with table of status values for various states without values: The CWE data type should be used for coded fields that are optional or where it is permissible to send text for items that are not yet a part of the approved value set. In the normal situation, the identifier

is valued with the code from the value set. If the value of the field is known, but is not part of the value set, then the value is sent as text, and the identifier has no value. If the field has an unknown status, then third form of the field is used (see Data missing above), and the appropriate status for the field is selected from the table of allowed statuses. When no code exists, refer to *HL7 Table 0353 – CWE statuses* for valid values.

HL7 Table 0353 - CWE statuses

Code	Description	Comment
U	Unknown	
UASK	Asked but Unknown	
NAV	Not available	
NA	Not applicable	
NASK	Not asked	

Where a text modifier might accompany a code, the "field" in the HL7 message would be of data type CWE and would be allowed to repeat. The first instance of the field would be used, as per option 1; i.e. the identifier would have a valid code. The second instance of the repeating field would be used, as per option 2, that is, the text description would take the value of the free text modifier."[6]

CX - Extended Composite ID with Check Digit

HL7 Component Table - CX – Extended Composite ID with Check Digit

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	15	ST	R		ID Number	
2	1	ST	O		Check Digit	
3	3	ID	O	0061	Check Digit Scheme	
4	227	HD	O	0363	Assigning Authority	
5	5	ID	O	0203	Identifier Type Code	PHIN Vocab : PHVS_EI_TYPE
6	227	HD	O		Assigning Facility	
7	8	DT	O		Effective Date	
8	8	DT	O		Expiration Date	
9	705	CWE	O		Assigning Jurisdiction	
10	705	CWE	O		Assigning Agency or Department	

Definition: "This data type is used for specifying an identifier with its associated administrative detail.
Maximum Length: 1913

Note: The check digit and the check digit scheme are null of the ID is alphanumeric.

```
Example:
|1234567^4^M11^ADT01^MR^University Hospital|"[7]
```

The value will be drawn from the table PHVS_EI_Type. (Note, this is a nested value set that concatenates EI_Type_CDC and EI_Type_HL7 in order to support the range of identifier types that are relevant to PHIN Messaging.

DR - Date/Time Range

HL7 Component Table - DR – Date/Time Range

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	26	TS	O		Range Start Date/Time	
2	26	TS	O		Range End Date/Time	

Definition: "Maximum Length: 53."[8]

DT - Date

HL7 Component Table - DT – Date

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
	8				Date	

Definition: "Specifies the century and year with optional precision to month and day. Maximum Length: 8

As of v 2.3, the number of digits populated specifies the precision using the format specification YYYY[MM[DD]]. Thus:

a) only the first four digits are used to specify a precision of "year"

b) the first six are used to specify a precision of "month"

c) the first eight are used to specify a precision of "day"

Examples: |19880704|

|199503|"[9]

DTM - Date/Time

HL7 Component Table - DTM – Date/Time

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
	24				Date/Time	

Definition: "Specifies a point in time using a 24-hour clock notation. Maximum Length: 24. The number of characters populated (excluding the time zone specification) specifies the precision.

Format: YYYY[MM[DD[HH[MM[SS[.S[S[S[S]]]]]]]]][+/-ZZZZ].

Thus:

d) only the first four are used to specify a precision of "year"

e) the first six are used to specify a precision of "month"

f) the first eight are used to specify a precision of "day"

g) the first ten are used to specify a precision of "hour"

h) the first twelve are used to specify a precision of "minute"

i) the first fourteen are used to specify a precision of "second"

j) the first sixteen are used to specify a precision of "one tenth of a second"

k) the first nineteen are used to specify a precision of " one ten thousandths of a second"

Example: |199904| specifies April 1999.

The time zone (+/-ZZZZ) is represented as +/-HHMM offset from Co-ordinated Universal Time (UTC) (formerly Greenwich Mean Time (GMT)), where +0000 or -0000 both represent UTC (without offset). The specific data representations used in the HL7 encoding rules are compatible with ISO 8824-1987(E).

Note that if the time zone is not included, the time zone defaults to that of the local time zone of the sender. Also note that a DTM or TS valued field with the HHMM part set to "0000" represents midnight of the night extending from the previous day to the day given by the YYYYMMDD part (see example below).

Examples:

Example	Description
|19760704010159-0500|	1:01:59 on July 4, 1976 in the Eastern Standard Time zone (USA)
|19760704010159-0400|	1:01:59 on July 4, 1976 in the Eastern Daylight Saving Time zone (USA).
|198807050000|	Midnight of the night extending from July 4 to July 5, 1988 in the local time zone of the sender.
|19880705|	Same as prior example, but precision extends only to the day. Could be used for a birth date, if the time of birth is unknown.
|19981004010159+0100|	1:01:59 on October 4, 1998 in Amsterdam, NL. (Time zone=+0100).

The HL7 Standard strongly recommends that all systems routinely send the time zone offset but does not require it. All HL7 systems are required to accept the time zone offset, but its implementation is application specific. For many applications the time of interest is the local time of the sender. For example, an application in the Eastern Standard Time zone receiving notification of an admission that takes place at 11:00 PM in San Francisco on December 11 would prefer to treat the admission as having occurred on December 11 rather than advancing the date to December 12.

Note: The time zone [+/-ZZZZ], when used, is restricted to legally-defined time zones and is represented in HHMM format.

One exception to this rule would be a clinical system that processed patient data collected in a clinic and a nearby hospital that happens to be in a different time zone. Such applications may choose to convert the data to a common representation. Similar concerns apply to the transitions to and from daylight saving time. HL7 supports such requirements by requiring that the time zone information be present when the information is sent. It does not, however, specify which of the treatments discussed here will be applied by the receiving system."[10]

EI - Entity Identifier

HL7 Component Table - EI – Entity Identifier

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	199	ST	O		Entity Identifier	
2	20	IS	O	0363	Namespace ID	
3	199	ST	C		Universal ID	
4	6	ID	C	0301	Universal ID Type	

Definition: "The entity identifier defines a given entity within a specified series of identifiers. Message Length: 427.

The EI is appropriate for, but not limited to, machine or software generated identifiers. The generated identifier goes in the first component. The remaining components, 2 through 4, are known as the assigning authority; they identify the machine/system responsible for generating the identifier in component 1.

The specified series, the assigning authority, is defined by components 2 through 4. The assigning authority is of the hierarchic designator (HD) data type, but it is defined as three separate components in the EI data type, rather than as a single component as would normally be the case. This is in order to maintain backward compatibility with the EI's use as a component in several existing data fields."[11]

EIP - Entity Identifier Pair

HL7 Component Table - EIP – Entity Identifier Pair

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	427	EI	O		Placer Assigned Identifier	
2	427	EI	O		Filler Assigned Identifier	

Definition: "Specifies an identifier assigned to an entity by either the placer or the filler system. If both components are populated the identifiers must refer to the same entity. Maximum Length: 855."[12]

FN - Family Name

HL7 Component Table - FN – Family Name

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	50	ST	R		Surname	
2	20	ST	O		Own Surname Prefix	
3	50	ST	O		Own Surname	
4	20	ST	O		Surname Prefix From Partner/Spouse	

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
5	50	ST	O		Surname From Partner/Spouse	

Definition: "This data type allows full specification of the surname of a person. Where appropriate, it differentiates the person's own surname from that of the person's partner or spouse, in cases where the person's name may contain elements from either name. It also permits messages to distinguish the surname prefix (such as "van" or "de") from the surname root. Maximum Length: 194."[13]

FT - Formatted Text Data

HL7 Component Table - FT – Formatted Text Data

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
	65536				Coded Value for HL7-Defined Tables	

Definition: "This data type is derived from the string data type by allowing the addition of embedded formatting instructions. These instructions are limited to those that are intrinsic and independent of the circumstances under which the field is being used. The actual instructions and their representation are described elsewhere in this chapter. *The FT field is of arbitrary length (up to 64k)* and may contain formatting commands enclosed in escape characters. Maximum Length: 65536.

Example:

|\.sp\(skip one vertical line)|"[14]

HD - Hierarchic Designator

HL7 Component Table - HD – Hierarchic Designator

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	20	IS	O	0300	Namespace ID	
2	199	ST	C		Universal ID	
3	6	ID	C	0301	Universal ID Type	

Definition: "The basic definition of the HD is that it identifies an (administrative or system or application or other) entity that has responsibility for managing or assigning a defined set of instance identifiers (such as placer or filler number, patient identifiers, provider identifiers, etc.). This entity could be a particular health care application such as a registration system that assigns patient identifiers, a governmental entity such as a licensing authority that assigns professional identifiers or drivers' license numbers, or a facility where such identifiers are assigned. Maximum Length: 227.

The HD is designed to be a more powerful and more general replacement for the application identifier of HL7 versions 2.1 and 2.2. It adds two additional components, the <universal ID> and the <universal ID type> to the former application ID (which is renamed more generically to be the namespace ID).

In the case where an HD identifies an entity that assigns/creates instance identifiers such as a particular patient registration system, it defines an "assigning authority". In the case where an HD identifies a location where instance identifiers are given out (although they may be created by another entity at another location) such as a particular "department of motor vehicles office location," it defines an "assigning facility". These two different uses of the HD appear in many of the extended data types.

The "assigning authority" defined by the HD is similar in its role to the coding system (and version) part of the coded element data types: both identify a set of more discrete instance identifiers. The difference is that the set of HD-defined discrete instances contain identifiers of "real-world" things such as patient or clinical orders, while the coded element-defined set of discrete instances contains concept identifiers (codes).

The HD is designed to be used either as a local identifier (with only the <namespace ID> valued) or a publicly-assigned identifier, a UID (<universal ID> and <universal ID type> both valued). Syntactically, the HD is a group of two identifiers: a local identifier defined by the first component and a universal identifier defined by the second and third components. HDs that have defined third components (defined UID types) must have a second component that is unique within the series of IDs defined by that component.

Note: The HD is used in fields that in earlier versions of HL7 used the IS data type. Thus, a single component HD (only the first component valued) will look like a simple IS data type for older systems expecting a single component in the place of the HD data type.

If the first component for the HD data type is present, the second and third components are optional. If the third component is present, then the second must also be present (although in this case the first is optional). The second and third components must either both be valued (both non-null), or both be not valued (both null).

This means that if all three components of the HD are valued, the entity identified by the first component is the same as the entity identified by components two and three taken together. However, implementers may choose, by site agreement, to specify that if all three components of the HD are valued, the first component defines a member in the set defined by the second and third components.

Examples:

```
Example 1: ISO examples with only the 2nd and 3rd components
valued:

          |^1.2.344.24.1.1.3^ISO|
          |^1.2.34.4.1.5.1.5.1,1.13143143.131.3131.1^ISO|
```

The syntax of the second component is defined by the ISO standard for object identifiers, not by HL7 (for which the second component is of the ST data type). Thus the periods (".") and comma (",") in the second component are part of the ISO syntax, but are legal by the definition of the HL7 ST data type.

```
Example 2: A GUID example

          |^14344.14144321.4122344.14434.654^GUID|

Example 3: An internet example

          |^falcon.iupui.edu^DNS|

Example 4: a RANDOM UID
```

```
|^40C983F09183B0295822009258A3290582^RANDOM|
```

Local examples:

```
Example 5: Local use only: a HD that looks like an IS data type
        |LAB1|
        |RX.PIMS.SystemB.KP.CA.SCA|
```

Note that the syntax of the first component is not defined by HL7 but by the site according to its own needs: the only requirement is that the first component's structure is allowed by the HL7 string (ST) data type, which is used for values by the IS data type.

```
Example 6: Local identifier using components 2 and 3 only
    |^RX.PIMS.SystemB.CA.SCA^M|
```

An alternate way to encode the previous example, illustrating the use of the third component value of "M" (see above HL7 Table 0301) to identify a locally-defined identifier set. The second component has the same value as the previous example but is now defined to be a member of a set of allowable values defined by a site for the identifier set "M".

```
Example 7: Local identifier with 2nd and 3rd components populated.
    |PathLab^PL.UCF.UC^L|
```

The 'PathLab' application is identified by the namespace component but it is also identified by the 2nd and 3rd components, (i.e., by the locally-defined UID system "L"). The two identifiers are equivalent.

This is a more complex HD in which the middle component, which is locally defined, is itself structured. As with the ISO example above, the middle component's structure is not defined by HL7 but by the site according to its own needs: the only requirement is that the middle component's structure is allowed by the HL7 string (ST) data type.

```
Example 8: local identifier and universal ID types:
    |LAB1^1.2.3.3.4.6.7^ISO|
```

A HD with an ISO "object Identifier" as a UID and a locally defined system name. Both the first component and the second and third (taken together) refer to the same entity. This example shows that the local value and the universal ID value may be transmitted with a single HD field."[15]

ID - Coded Value for HL7 Defined Tables

HL7 Component Table - ID – String Data

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
					Coded Value for HL7-Defined Tables	

Definition: "The value of such a field follows the formatting rules for an ST field except that it is drawn from a table of legal values. There shall be an HL7 table number associated with ID data types. An example of an ID field is OBR-25-result status. This data type should be used only for HL7 tables (see Section 2.5.3.6 -Table). The reverse is not true, since in some circumstances it is more appropriate to use the CNE or CWE data type for HL7 tables. Maximum Length: varies."[16]

IS - Coded Value for User-Defined Tables

HL7 Component Table - IS – String Data

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
	20				Coded Value for User-Defined Tables	

Definition: "The value of such a field follows the formatting rules for a ST field except that it is drawn from a site-defined (or user-defined) table of legal values. There shall be an HL7 table number associated with IS data types. An example of an IS field is the Event reason code defined in Section 3.3.1.4, "Event reason code". This data type should be used only for user-defined tables (see Section 2.5.3.6 - Table). The reverse is not true, since in some circumstances, it is more appropriate to use the CWE data type for user-defined tables. Maximum Length: 20."[17]

MSG – Message Type

HL7 Component Table - MSG – Message Type

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	3	ID	R	0076	Message Code	
2	3	ID	R	0003	Trigger Event	
3	7	ID	R	0354	Message Structure	

Definition: "This field contains the message type, trigger event, and the message structure ID for the message. Maximum Length: 15."[18]

NA - Numeric Array

HL7 Component Table - NA – Numeric Array

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	16	NM	R		Value1	
2	16	NM	O		Value2	
3	16	NM	O		Value3	
4	16	NM	O		Value4	

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
…						

Definition: "This data type is used to represent a series (array) of numeric values. A field of this type may contain a one-dimensional array (vector or row) of numbers. Also, by allowing the field to repeat, a two-dimensional array (table) of numbers may be transmitted using this format, with each row of the table represented as one repetition of the field. Arrays that have one or more values not present may be transmitted using this data type. "Not present" values are represented as two adjacent component delimiters. If the absent values occur at the end of a row, the trailing component delimiters may be omitted. If an entire row of a table has no values, no component delimiters are necessary (in this case, there will be two adjacent repetition delimiters). Maximum Length: 65536.

Example 1: vector of 8 numbers

|125^34^-22^-234^569^442^-212^6|

Example 2: 3 x 3 array of numbers

|1.2^-3.5^5.2~2.0^3.1^-6.2~3.5^7.8^-1.3|

Example 3: 5 x 4 array of numbers with the values in positions (1,1), (2,2), (2,3), (3,3), (3,4), (4,1), (4,2), (4,3), and (4,4) not present

|^2^3^4~5^^^8~9^10~~17^18^19^20|"[19]

NM - Numeric

HL7 Component Table - NM – Numeric

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
	16				Numeric	

Definition: "A number represented as a series of ASCII numeric characters consisting of an optional leading sign (+ or -), the digits and an optional decimal point. In the absence of a sign, the number is assumed to be positive. If there is no decimal point the number is assumed to be an integer. Maximum Length: 16.

Examples: |999| or |-123.792|

Leading zeros, or trailing zeros after a decimal point, are not significant. For example, the following two values with different representations, "01.20" and "1.2," are identical. Except for the optional leading sign (+ or -) and the optional decimal point (.), no non-numeric ASCII characters are allowed. Thus, the value <12 should be encoded as a structured numeric (SN) (preferred) or as a string (ST) (allowed, but not preferred) data type."[20]

PRL - Parent Result Link

HL7 Component Table - PRL – Parent Result Link

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	483	CE	R		Parent Observation Identifier	Defined in the OBX-3 of the parent result.
2	20	ST	O		Parent Observation Sub-identifier	Defined in the OBX-4 of the parent result.
3	250	TX	O		Parent Observation Value Descriptor	Taken from the OBX-5 of the parent result.

Definition: "Uniquely identifies the parent result's OBX segment related to the current order, together with the information in OBR-29-parent.

Usage Note: This data type is applied only to OBR-26 - Parent Result where it serves to make information available for other types of linkages (e.g., toxicology). This important information, together with the information in OBR-29-parent, uniquely identifies the parent result's OBX segment related to this order. The value of this OBX segment in the parent result is the organism or chemical species about which this battery reports. For example, if the current battery is an antimicrobial susceptibility, the parent results identified OBX contains a result that identifies the organism on which the susceptibility was run. This indirect linkage is preferred because the name of the organism in the parent result may undergo several preliminary values prior to finalization.

We emphasize that this field does not take the entire result field from the parent. It is meant only for the text name of the organism or chemical subspecies identified. This field is included only to provide a method for linking back to the parent result for those systems that could not generate unambiguous Observation IDs and sub-IDs.

This field is present only when the parent result is identified by OBR-29-parent and the parent spawns child orders for each of many results. See Chapter 7 for more details about this linkage."[21]

PT - Processing Type

HL7 Component Table - PT – Processing Type

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	1	ID	O	0103	Processing ID	
2	1	ID	O	0207	Processing Mode	

Definition: "This data type indicates whether to process a message as defined in HL7 Application (level 7) Processing rules. Maximum Length: 3."[22]

SAD – Street Address

HL7 Component Table - SAD – Street Address

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	120	ST	O		Street or Mailing Address	
2	50	ST	O		Street Name	
3	12	ST	O		Dwelling Number	

Definition: "This data type specifies an entity's street address and associated detail. Appears only in the XAD data type. Maximum Length: 184."[23]

SI - Sequence ID

HL7 Component Table - SI – Sequence ID

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
	4				Sequence ID	

Definition: A non-negative integer in the form of a NM field. The uses of this data type are defined in the chapters defining the segments and messages in which it appears. Maximum Length: 4."[24]

SN - Structured Numeric

HL7 Component Table - SN – Structured Numeric

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	2	ST	O		Comparator	
2	15	NM	O		Num1	
3	1	ST	O		Separator/Suffix	
4	15	NM	O		Num2	

Definition: "The structured numeric data type is used to unambiguously express numeric clinical results along with qualifications. This enables receiving systems to store the components separately, and facilitates the use of numeric database queries. The corresponding sets of values indicated with the <comparator> and <separator/suffix> components are intended to be the authoritative and complete set of values. If additional values are needed for the <comparator> and <separator/suffix> components, they should be submitted to HL7 for inclusion in the Standard. Maximum Length: 36."[25]

ST - String Data

HL7 Component Table - ST – String Data

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS	SEC.REF.
	199				String Data		

Definition: "String data is left justified with trailing blanks optional. Any displayable (printable) ACSII characters (hexadecimal values between 20 and 7E, inclusive, or ASCII decimal values between 32 and 126), except the defined escape characters and defined delimiter characters. Maximum Length: 199.

```
Example:

    |almost any data at all|
```

To include any HL7 delimiter character (except the segment terminator) within a string data field, use the appropriate HL7 escape sequence (see Section 2.7.1, "Formatting Codes").

Usage note: The ST data type is intended for short strings (e.g., less than 200 characters). For longer strings the TX or FT data types should be used.

Alternate character set note: ST - string data may also be used to express other character sets. See Section 2.15.9.18, "Character set," and Section 2.15.9.20, "Alternate character set handling" for details."[26]

TS - Time Stamp

HL7 Component Table - TS – Time Stamp

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	24	DTM	R		Time	
2	1	ID	B	0529	Degree of Precision	Not supported

Definition: "Specifies a point in time. Maximum Length: 26

```
Format: YYYY[MM[DD[HH[MM[SS[.S[S[S[S]]]]]]]]][+/-ZZZZ]^<degree of
        precision>"[27]
```

TX - Text Data

HL7 Component Table - TX – Text Data

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS	SEC.REF.
					Text Data		

Definition: "String data meant for user display (on a terminal or printer). Such data would not necessarily be left justified since leading spaces may contribute greatly to the clarity of the presentation to the user. Because this type of data is intended for display, it may contain certain escape character sequences designed to control the display. Escape sequence formatting is defined in Section 2.7 "Use of escape

sequences in text fields". Leading spaces should be included. Trailing spaces should be removed. Maximum Length: 65536.

```
Example:
|  leading spaces are allowed.|
```

Since TX data is intended for display purposes, the repeat delimiter, when used with a TX data field, implies a series of repeating lines to be displayed on a printer or terminal. Therefore, the repeat delimiters are regarded as paragraph terminators or hard carriage returns (e.g., they would display as though a CR/LF were inserted in the text (DOS type system) or as though a LF were inserted into the text (UNIX style system)).”[28]

“A receiving system would word-wrap the text between repeat delimiters in order to fit it into an arbitrarily sized display window but start any line beginning with a repeat delimiter on a new line.”[29]

VID – Version Identifier

HL7 Component Table - VID – Version Identifier

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	5	ID	O	0104	Version ID	
2	483	CE	O	0399	Internationalization Code	
3	483	CE	O		International Version ID	

XAD - Extended Address

HL7 Component Table - XAD – Extended Address

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	184	SAD	O		Street Address	
2	120	ST	O		Other Designation	
3	50	ST	O		City	
4	50	ST	O		State or Province	
5	12	ST	O		Zip or Postal Code	
6	3	ID	O	0399	Country	
7	3	ID	O	0190	Address Type	
8	50	ST	O		Other Geographic Designation	
9	20	IS	O	289	County/Parish Code	
10	20	IS	O	288	Census Tract	

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
11	1	ID	O	465	Address Representation Code	
12	53	DR	B		Address Validity Range	Not supported
13	26	TS	O		Effective Date	
14	26	TS	O		Expiration Date	

Definition: "This data type specifies the address of a person, place or organization plus associated information. Maximum Length: 631.

```
Example of usage for US:  |1234 Easy St.^Ste. 123^San
Francisco^CA^95123^USA^B^^SF^|

This would be formatted for postal purposes as

          1234 Easy St.
          Ste. 123
          San Francisco CA 95123"[30]
```

XCN - Extended Composite ID Number and Name for Persons

HL7 Component Table - XCN – Extended Composite ID Number and Name for Persons

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	15	ST	O		ID Number	
2	194	FN	O		Family Name	
3	30	ST	O		Given Name	
4	30	ST	O		Second and Further Given Names or Initials Thereof	
5	20	ST	O		Suffix (e.g., JR or III)	
6	20	ST	O		Prefix (e.g., DR)	
7	5	IS	B	0360	Degree (e.g., MD)	Not supported
8	4	IS	C	0297	Source Table	
9	227	HD	O	0363	Assigning Authority	
10	1	ID	O	0200	Name Type Code	
11	1	ST	O		Identifier Check Digit	
12	3	ID	C	0061	Check Digit Scheme	
13	5	ID	O	0203	Identifier Type Code	
14	227	HD	O		Assigning Facility	

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
15	1	ID	O	0465	Name Representation Code	
16	483	CE	O	0448	Name Context	
17	53	DR	B		Name Validity Range	Not supported
18	1	ID	O	0444	Name Assembly Order	
19	26	TS	O		Effective Date	
20	26	TS	O		Expiration Date	
21	199	ST	O		Professional Suffix	
22	705	CWE	O		Assigning Jurisdiction	
23	705	CWE	O		Assigning Agency or Department	

Definition: "This data type is used extensively appearing in the PV1, ORC, RXO, RXE, OBR and SCH segments, as well as others, where there is a need to specify the ID number and name of a person. Maximum Length: 3002.

Example without assigning authority and assigning facility:

```
|1234567^Smith^John^J^III^DR^PHD^ADT01^^L^4^M11^MR|
```

Examples with assigning authority and assigning facility:

Dr. Samuel Semmelweiss's provider ID was assigned by the Provider Master and was first issued at Fairview Hospital within the University Hospitals System. Since IS table values (first component of the HD) were not used for assigning authority and assigning facility, components 2 and 3 of the HD data type are populated and demoted to sub-components as follows:

```
12188^Semmelweiss^Samuel^S^IV^Dr^MD^^&Provider
   Master.University Hospitals&L^L^9^M10^DN^&Fairview
   Hospital.University Hospitals&L^A
```

Ludwig van Beethoven's medical record number was assigned by the Master Patient Index and was first issued at Fairview Hospital within the University Hospitals System.

```
10535^van Beethoven&van^Ludwig^A^III^Dr^PHD^^&MPI.University
Hospitals&L^L^3^M10^MR^&Fairview Hospital.University
Hospitals&L^A"[31]
```

XON - Extended Composite Name and Identification Number for Organizations

HL7 Component Table - XON – Extended Composite Name and Identification Number for Organizations

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	50	ST	O		Organization Name	

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
2	20	IS	O	0204	Organization Name Type Code	
3	4	NM	B		ID Number	Not supported
4	1	NM	O		Check Digit	
5	3	ID	O	0061	Check Digit Scheme	
6	227	HD	O	0363	Assigning Authority	
7	5	ID	O	0203	Identifier Type Code	
8	227	HD	O		Assigning Facility	
9	1	ID	O	0465	Name Representation Code	
10	20	ST	O		Organization Identifier	

Definition: "This data type is used in fields (e.g., PV2-23, NK1-13, PD1-3, OBR-44) to specify the name and ID number of an organization. Maximum Length: 567.

Example 1:

The ID for Fairview Hospital was assigned by the University Hospital enterprise's Hospital Master and was first issued at the Central Offices.

```
Fairview Hospital^L^716^9^M10^&Hospital Master.University
   Hositals&L^XX^&Central Offices.University Hospitals&L^A
```

Example 2:

Fairview Hospital has another ID that was issued by CMS. Assigning Authority, CMS, values only the first HD component, an IS data type and assigning facility is not relevant. This information might be transmitted accordingly:

```
Fairview Hospital^L^4544^3^M10^CMS^XX^^A"[32]
```

XPN - Extended Person Name

HL7 Component Table - XPN– Extended Person Name

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	194	FN	O		Family Name	
2	30	ST	O		Given Name	
3	30	ST	O		Second and Further Given Names or Initials Thereof	
4	20	ST	O		Suffix (e.g., JR or III)	
5	20	ST	O		Prefix (e.g., DR)	

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
6	6	IS	B	0360	Degree (e.g., MD)	Not supported
7	1	ID	O	0200	Name Type Code	
8	1	ID	O	0465	Name Representation Code	
9	483	CE	O	0448	Name Context	
10	53	DR	B		Name Validity Range	Not supported
11	1	ID	O	0444	Name Assembly Order	
12	26	TS	O		Effective Date	
13	26	TS	O		Expiration Date	
14	199	ST	O		Professional Suffix	

Definition: "Maximum Length: 1103."[33]

XTN - Extended Telecommunication Number

HL7 Component Table - XTN – Extended Telecommunication Number

SEQ	LEN	DT	OPT	TBL#	COMPONENT NAME	COMMENTS
1	199	ST	B		Telephone Number	Not supported
2	3	ID	O	0201	Telecommunication Use Code	
3	8	ID	O	0202	Telecommunication Equipment Type	
4	199	ST	O		Email Address	
5	3	NM	O		Country Code	
6	5	NM	O		Area/City Code	
7	9	NM	O		Local Number	
8	5	NM	O		Extension	
9	199	ST	O		Any Text	
10	4	ST	O		Extension Prefix	
11	6	ST	O		Speed Dial Code	
12	199	ST	C		Unformatted Telephone number	

Definition: "Maximum Length: 850.

Example: A fax number: ^ORN^FX^^^734^6777777”[34]

Communications

The use of Accept and Application Acknowledgment messages are not expected with the use of PHIN-MS as the transport system. Encryption and the mechanism for transmitting messages are described in the PHIN-MS ELR Guide that can be found on the PHIN Web site: www.cdc.gov/phin.

Unsolicited Observation Message (OUL)/ Event R22

Specimen centric laboratory information is reported through the standard OUL^R22 message to the CDC and other data receivers.

- ✓ "This message was designed to accommodate specimen oriented testing. It should be applicable to container-less testing (e.g., elephant on a table) and laboratory automation systems requiring container.
- ✓ Generally this construct allows transfer of multiple results related to a specimen from a patient, where this specimen has been in none, one, or multiple containers.
- ✓ In addition to the patient results themselves it permits the communication of the following kinds of information:
- ✓ Analysis results of a non patient related sample (e.g., environmental) – patient related segments (e.g., PID, PD1, PV1, PV2) are optional.
- ✓ Analysis results to a particular container with QC sample and the lot and manufacturer information about this sample (SAC-INV segments) – however for this purpose the 'Unsolicited Specimen Container Oriented Observation Message' (OUL^R23) is recommended due to explicit relation between the observation and the container.
- ✓ Basic identification data (lot, manufacturer, etc.) of the reagents and other substances involved in the generation of analysis results (TCD-SID segments)."[35]

Abstract Message Structure

	Unsolicited Specimen Oriented Observation Message OUL^R22	Chapter
Segment	Description	
	Header Begin	
MSH	Message Header	2.15.9
[{SFT}]	Software Segment	2.15.12
[NTE]	Notes and Comments for SFT	2.15.10
	Header End	
[	*Patient Begin*	
PID	Patient Identification	3.4.2
[{NTE}]	Notes and Comments for PID	2.15.10
]	*Patient End*	
{	*Specimen Begin*	

	Unsolicited Specimen Oriented Observation Message OUL^R22	Chapter
SPM	Specimen Information	7.4.3
[{OBX}]	Field Observation Result for specimen	9.6.2
[{	*Container Begin*	
SAC	Container Information	13.4.3
[INV]	Detailed Substance Information	13.4.4
}]	*Container End*	
{	*Order Begin*	
OBR	Observation Order	7.4.1
[ORC]	Common Order Segment	4.5.1
[{NTE}]	Notes and Comments for OBR	2.15.10
[{	*Result Begin*	
OBX	Test Observation Result	9.6.2
[TCD]	Test Code Detail	13.4.10
[{SID}]	Substance Identifier	13.4.11
[{NTE}]	Notes and Comments for OBX	2.15.10
}]	*Result End*	
}	*Order End*	
}	*Specimen End*	

Segment Processing Rules

Header Begin

MSH - required; it does not repeat

SFT - optional; it may repeat

NTE - optional, it does not repeat. *Use of the NTE in the Header section is discouraged.*

Header End

Patient Begin – Patient section is optional; it does not repeat.

PID - required if the Patient section is used; it does not repeat

NTE – optional; it may repeat. *Use of the NTE in the Patient section is discouraged.*

Patient End

Specimen Begin – Specimen section is required; it may repeat

SPM – required; it does not repeat

OBX – optional; it may repeat

Container Begin – Container section is optional; it does repeat

SAC – required if the Container section is used; it does not repeat

INV – optional; it does not repeat

Container End

Order Begin – Order Section is required; it may repeat

OBR – one per message is required; it may repeat as part of the order group. The OUL^R22 message can contain multiple orders in which a tree structure is maintained by providing links between an OBR and it's parent test (OBR) and result (OBX).

ORC – optional; grouped with NTE

NTE – optional; may be repeated. *Use of the NTE in the Order section is discouraged.*

Result Begin – Result Section is optional; it may repeat

OBX – required if Result section is used; it may repeat as part of the result group.

TCD – optional; it does not repeat

SIT – optional; it may repeat

NTE – optional; it may repeat. The NTE segments after an OBX are the only NTE segments where *use is not discouraged*.

Result End

Order End

Specimen End

HL7 Standard Segment Usage

The following format is used in this document for listing and defining message segments and fields. First, the message segment's use is defined, and a segment attribute table listing all fields defined in the segment is shown. In the segment attribute table, the following attributes are given for each field: sequence number within the segment, length of field, data type, optionality, the applicable table number for values, the field item number, and the field name.

Following the table, select fields are listed and defined. For each field, the HL7 segment code and reference number are listed, followed by the field name. Items in parentheses after the field name show respectively data type and length of field, whether the field is required or optional, and lists "repeating" if the field is allowed to repeat. The HL7 item number follows the parenthesis and is given for reference convenience. As part of the definitions, usage notes for laboratory-based reporting are provided, a description of the data type is given in small font, and a statement about how the fields are valued in the example is given. Fields that we do not anticipate physicians using are not defined. Users interested in learning more about fields not discussed here should refer to the full text of Version 2.5 of the HL7 standard.

The reader should take note of the following points, which discuss specifics of how the OUL is being used and constrained in this context:

The SPM carries specimen information and is newly defined for HL7 V2.5.

The SAC segment will be treated as optional and accommodate information pertaining to specimen containers. It is also a newly defined segment for HL7 V2.5

In some cases, a lab will report on testing that is carried out on specimens which have been previously tested, or which have been split off (aliquot) from a parent specimen at the same Lab or at another Lab. When this happens, and it is important to track information linking the tested specimen back to the original specimen source, information about the parent specimen and any previous testing or processing is captured in an OBR, SPM, and OBX group of segments that are linked to the current test information.

3. Message Segments

Segment Attribute Table Abbreviations

The abbreviated terms and their definitions used in the segment table headings are as follows:

ABBREVIATION	DEFINITION
SEQ	The sequence of the elements as they are numbered in the segment.
LEN	The length of the element.
DT	The data type of the element.
OPT	Whether the field is required, optional, or conditional in a segment. Required fields are defined by HL7 2.5 and do not refer to requirements for reporting laboratory findings to public health agencies. Refer to section 2.1 HL7 Definitions for the designations.
RP/#	Indicates if element repeats. IF the number of repetitions is limited, the number of allowed repetitions is given.
TBL#	Specific table reference. Tables used in public health messages are listed in *[Location to be determined]*.
ITEM#	HL7 unique item number for each element.
Element Name	Descriptive name of element in the segment.

Note: Legend of Table
Gray = The PHIN Messaging Standard does not support the use of this field.

MSH - Message Header Segment

This segment is necessary to support the functionality described in the Control/Query chapter of the HL7 standard. MSH is used to define the intent, source, destination, and some specifics of the syntax of a message.

MSH Attributes

Seq.	Len.	DT	Opt	Rpt#	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	1	ST	R				Field Separator	
2	4	ST	R				Encoding Characters	
3	227	HD	O		0361		Sending Application	
4	227	HD	R		0362		Sending Facility	
5	227	HD	O		0361		Receiving Application	
6	227	HD	R		0362		Receiving Facility	
7	26	TS	R				Date/Time Of Message	
8	40	ST	O				Security	Not Supported
9	15	MSG	R				Message Type	OUL^R22
10	20	ST	R				Message Control ID	

Seq.	Len.	DT	Opt	Rpt#	Tbl #	PHIN Code System / Value Set	Element Name	Comments
11	3	PT	R				Processing ID	
12	60	VID	R				Version ID	2.5
13	15	NM	O				Sequence Number	Not Supported
14	180	ST	O				Continuation Pointer	Not Supported
15	2	ID	O		0155		Accept Acknowledgment Type	Not Supported
16	2	ID	O		0155		Application Acknowledgment Type	Not Supported
17	3	ID	O		0399		Country Code	
18	16	ID	O	Y	0211		Character Set	Not Supported
19	250	CE	O				Principal Language Of Message	Not Supported
20	20	ID	O		0356		Alternate Character Set Handling Scheme	Not Supported
21	427	EI	O	Y			Message Profile Identifier	Version of specification to which this message conforms

Example segment of MSH:

```
MSH|^~\&|^2.16.840.1.114222.4.3.2.1..^ISO|^2.16.840.1.114222.4.1.^ISO
|^2.16.840.1.114222.4.3.2.3^ISO|^2.16.840.1.114222.4.1.1^ISO|20030527
1131||OUL^R22^OUL_R22|200305271131|P^T|2.5|||||||||1.4
```

MSH field definitions

MSH-1 Field separator (ST-1, Required) 00001

Definition: The character to be used as the field separator for the rest of the message.

The field separator always appears in the 4th character position of MSH segment and is used to separate adjacent data fields within a segment. The recommended value is |, ASCII (124), as shown in the examples.

MSH-2 Encoding characters (ST-4, Required) 00002

Definition: The four characters in the following order are designated in the Message Header to be used for the following purposes when they appear in the message:

Component separator	^	ASCII (94)
Repetition Separator	~	ASCII (126)
Escape character	\	ASCII (92)
Subcomponent separator	&	ASCII (38)

Note that the characters in MSH-2 appear between two field separators as:

```
|^~\&|
```

The component separator (^) separates adjacent components of a data field and the subcomponent separator (&) separates the adjacent subcomponents of a data field. An example of a compound element using components and subcomponents from PID-2, described below in another section of this document, would appear as:

```
|10543^^^^^Columbia Valley Memorial
Hospital&01D0355944&CLIA|
```

And not as:

```
|10543^^^^^Columbia Valley Memorial Hospital~01D0355944~CLIA|
```

The tilde (~) should not be used as a separator but rather should be used to identify when a repeating field or component occurs.

MSH-3 Sending application (HD-180, Optional) 00003

Definition: "This field uniquely identifies the sending application among all other applications within the network enterprise. The network enterprise consists of all those applications that participate in the exchange of HL7 messages within the enterprise. Entirely site-defined. *User-defined Table 0361- Application* is used as the user-defined table of values for the first component."[36]

```
Example of MSH-3:  |^2.16.840.1.114222.4.3.2.1..^ISO|
```

MSH-4 Sending facility (HD-227, Required) 00004

Definition: "This field uniquely identifies the receiving application among all other applications within the network enterprise. The network enterprise consists of all those applications that participate in the exchange of HL7 messages within the enterprise. Entirely site-defined User-defined Table 0361- Application is used as the HL7 identifier for the user-defined table of values for the first component."[37]

The originator of HL7 message will place the text name and address of the sending laboratory or reporting site, followed by the unique Clinical Laboratory Improvement Act (CLIA) identifier of the originating institution. Information about CLIA can be found at: http://www.phppo.cdc.gov/clia/default.asp on the World Wide Web. For laboratories that do not have a CLIA identifier an OID should be sent.

```
Example:  |^2.16.840.1.114222.4.1.^ISO|
Example:  |labcorp_KC_2.16.340.114222.1.317^ISO|
```

MSH-5 Receiving application (HD-227, Optional) 00005

Definition: "This field identifies the receiving application among multiple identical instances of the application running on behalf of different organizations. User-defined Table 0362 - Facility is used as the HL7 identifier for the user-defined table of values for the first component. Entirely site defined. By site agreement, implementers may continue to use User-defined Table 0300 – Namespace ID for the first component."[38]

This field may be blank.

```
For example:  |^2.16.840.1.114222.4.3.2.3^ISO|
```

MSH-6 Receiving facility (HD-227, Required) 00006

Definition: "This field identifies the receiving application among multiple identical instances of the application running on behalf of different organizations."[39] This may be used identify the receiving state health department systems.

```
For example:  |OH-DOH^2.16.840.1.114222.4.1.1^ISO|
```

MSH-7 Date/time of message (TS-26, Required) 00007

Definition: "This field contains the date/time that the sending system created the message. If the time zone is

specified, it will be used throughout the message as the default time zone."[40]

```
Time stamp (TS) data type must be in the format:
YYYY[MM[DD[HHMM[SS[.S[S[S[S]]]]]]]][ ]
```

The user values the field only as far as needed. When a system has only a partial date, e.g., month and year, but not day, the missing values may be interpreted as zeros. The time zone is assumed to be that of the sender.

```
For example: 6:30 pm, February 17, 2001, would appear as:
|200102171830|
```

MSH-8 Security (ST-40, Optional) 00008

The PHIN Messaging Standard does not support the use of this field.

MSH-9 Message type (MSG-15, Required) 00009

Definition: "This field contains the message type, trigger event, and the message structure ID for the message."[41]

"The receiving system uses this field to recognize the data segments, and possibly, the application to which

to route this message."[42]

```
The unsolicited transmission of an observation message would
appear as: |OUL^R22|
```

MSH-10 Message control ID (ST-20, Required) 00010

Definition: "This field contains a number or other identifier that uniquely identifies the message. The

receiving system echoes this ID back to the sending system in the Message acknowledgment segment

(MSA)."[43]

For electronic laboratory reporting, it is recommend to use the date/time stamp followed by the sequence number as: `YYYYLLDDHHMMSS#### (# = counter number).`

```
Example: The date of this message is February 14, 2004, and the
sequence number is 0042: |200402140042|
```

Note: This field must be unique within a sending laboratory. The receiving system can use this number as well as a combination of other data elements (like sending facility, observation identifier, etc) to uniquely identify this result in their systems.

MSH-11 Processing ID (PT-3, Required) 00011

Definition: "This field is used to decide whether to process the message as defined in HL7 Application (level 7) Processing rules."[44] Field appears as P for production, T for training, or D for debugging.

```
In the example, the use is production |P|.  The second component
is not specified, indicating current processing as the default.
```

MSH-12 Version ID (VID-60, Required) 00012

Definition: "This field is matched by the receiving system to its own version to be sure the message will be interpreted correctly."[45]

MSH-13 Sequence number (NM-15, Optional) 00013

The PHIN Messaging Standard does not support the use of this field.

MSH-14 Continuation pointer (ST-180, Optional) 00014

The PHIN Messaging Standard does not support the use of this field..

MSH-15 Accept acknowledgment type (ID-2, Optional) 00015

The PHIN Messaging Standard does not support the use of this field.

MSH-16 Application acknowledgment type (ID-2, Optional) 00016

The PHIN Messaging Standard does not support the use of this field.

MSH-17 Country Code (ID - 3, Optional) 00017

Definition: "This field contains the country of origin for the message. It will be used primarily to specify default elements, such as currency denominations. The values to be used are those of ISO 3166. The ISO 3166 table has three separate forms of the country code: HL7 specifies that the 3-character (alphabetic) form be used for the country code."[46]

MSH-18 Character Set (ID - Optional) 00692

The PHIN Messaging Standard does not support the use of this field.

MSH-19 Principal Language of Message (CE - Optional) 00693

The PHIN Messaging Standard does not support the use of this field.

MSH-20 Alternate Character Set Handling Scheme (ID - Optional) 01317

The PHIN Messaging Standard does not support the use of this field.

MSH-21 Message Profile Identifier (EI - Optional) 01598

Definition: “Sites may use this field to assert adherence to, or reference, a message profile. Message profiles contain detailed explanations of grammar, syntax, and usage for a particular message or set of messages.”[47]

Repetition of this field allows more flexibility in creating and naming message profiles. Using repetition, this field can identify a set of message profiles that the message conforms to. For example, the first repetition could reference a vendor's message profile. The second could reference another compatible provider's profile or a later version of the first vendor profile.”[48]

“As of v2.5, the HL7 message profile identifiers might be used for conformance claims and/or publish/subscribe systems.”[49]

“Prior to v2.5, the field was called Conformance Statement ID. For backward compatibility, the Conformance Statement ID can be used here. Examples of the use of Conformance Statements appear in Chapter 5, ‘Query.’”[50]

```
Example: the version of the specification to which this message
conforms. |1.6|
```

SFT – Software segment

"This segment provides additional information about the software product(s) used as a Sending Application. The primary purpose of this segment is for diagnostic use. There may be additional uses per site-specific agreements."[51]

"For example, if software product A has versions 9 and 10 deployed in different Enterprise locations, the fact that they use different message types, segments, or fields should be reflected via their message profiles. If there is an upgrade from version 10 to 10.1, this would be reflected in the SFT segment, but changes to the message contents should be reflected via a new/different conformance profile.

Use Case: An external application has been customized to communicate with a centralized patient drug history system. However, due to certain, known characteristics of the external software package, the centralized system must modify its behavior in order to process transactions correctly. In one example, the external application may have multiple versions in production. As such, the centralized application will need to know the name of the Software Vendor Organization, the Software Release Number, the Software Product Name, and the Software Binary ID so that it can correctly identify the software submitting the transaction and modify its behavior appropriately.

While preparing a transaction for submission to a centralized system the sending application specifies its Software Install Date and its configuration settings (Software Product Information). While processing the transaction, the centralized system encounters an error. Upon examination of the error, install date and configuration of the software that sent the message, helpdesk staff are able to determine the sending application has not been updated to reflect recent application changes.

Use Case: In circumstances where a message is manipulated or modified by multiple systems, a repetition of this segment may be appended by each system.

```
Example from Abstract Message:
      MSH
      [{ SFT }]"[52]
```

SFT – Software Segment Attributes

Seq.	Len.	DT	Opt	Rpt#	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	567	XON	R				Software Vendor Organization	
2	15	ST	R				Software Certified Version or Release Number	
3	20	ST	R				Software Product Name	
4	20	ST	R				Software Binary ID	
5	1024	TX	O				Software Product Information	
6	26	TS	O				Software Install Date	

SFT field definitions

The SFT segment is optional and may repeat. In general, the SFT segment is used when debugging issues. The information provided in the SFT segment can be used to identify specific software involved in a particular communication setting. Information in this segment generally does

not get stored separate from the message by the receiving application.

SFT-1 Software Vendor Organization (XON - Required) 01834

Definition: “Organization identification information for the software vendor that created this transaction. The purpose of this field, along with the remaining fields in this segment, is to provide a more complete picture of applications that are sending HL7 messages. The Software Vendor Organization field would allow the identification of the vendor who is responsible for maintaining the application.”[53]

SFT-2 Software Certified Version or Release Number (ST - Required) 01835

Definition: “Latest software version number of the sending system that has been compliance tested and accepted. Software Certified Version or Release Number helps to provide a complete picture of the application that is sending/receiving HL7 messages. Versions are important in identifying a specific ‘release’ of an application. In some situations, the receiving application validates the Software Certified Version or Release Number against a list of "certified" versions/releases of the particular software to determine if the sending application adheres to specific business rules required by the receiving application.

Alternatively, the software may perform different processing depending on the version of the sending software.”[54]

SFT-3 Software Product Name (ST - Required) 01836

Definition: “The name of the software product that submitted the transaction. A key component in the identification of an application is its Software Product Name. This is a key piece of information in identifying an application.”[55]

SFT-4 Software Binary ID (ST - Required) 01837

Definition: “Issued by a vendor for each unique software version instance to distinguish between like versions of the same software e.g., a checksum.

Software Binary Ids are issued for each unique software version instance. As such, this information helps to differentiate between differing versions of the same software. Identical Primary IDs indicate that the software is identical at the binary level (configuration settings may differ).”[56]

SFT-5 Software Product Information (TX – Optional) 01838

Definition: “Software identification information that can be supplied by a software vendor with their transaction. This field would contain any additional information an application provides with the transaction it has submitted. This information could be used for diagnostic purposes and provides greater flexibility in identifying a piece of software. Possibilities include setup or configuration parameter information. This field should not be sent unless performing diagnostics.”[57]

SFT-6 Software Install Date (TS - Optional) 01839

Definition: “Date the submitting software was installed at the sending site.

A Software Install Date on its own can often provide key information about the behavior of the application, and is necessary to provide a complete picture of the sending application."[58]

PID - Patient Identification Segment

"The PID segment is used by all applications as the primary means of communicating patient identification information. This segment contains permanent patient identifying and demographic information that, for the most part, is not likely to change frequently.

The assigning authority, the fourth component of the patient identifiers, is a HD data type that is uniquely associated with the assigning authority that originally assigned the number. A given institution, or group of intercommunicating institutions, should establish a list of assigning authorities that may be potential assignors of patient identification (and other important identification) numbers. The list will be one of the institution's master dictionary lists. Since third parties (other than the assignors of patient identification numbers) may send or receive HL7 messages containing patient identification numbers, the assigning authority in the patient identification numbers may not be the same as the sending and receiving systems identified in the MSH. The assigning authority must be unique across applications at a given site. This field is required in HL7 implementations that have more than a single Patient Administration application assigning such numbers. The assigning authority and identifier type codes are strongly recommended for all CX data types."[59]

PID Attributes

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	4	SI	C				Set ID - PID	Required for living subjects (human and animal)
2	20	CX	B				Patient ID	Deprecated – Do Not Use
3	250	CX	R	Y		PHVS_EI_TYPE	Patient Identifier List	
4	20	CX	B	Y			Alternate Patient ID - PID	Not Supported
5	250	XPN	R	Y			Patient Name	Multiple sub-components
6	250	XPN	O	Y			Mother's Maiden Name	Not Supported
7	26	TS	O				Date/Time of Birth	
8	1	IS	O		0001	PHVS_SEX	Administrative Sex	
9	250	XPN	B	Y			Patient Alias	Not Supported
10	250	CE	O	Y	0005	P_RACE_CAT	Race	
11	250	XAD	O	Y			Patient Address	
12	4	IS	B		0289		County Code	Not Supported
13	250	XTN	O	Y			Phone Number - Home	
14	250	XTN	O	Y			Phone Number - Business	
15	250	CE	O		0296		Primary Language	Not Supported
16	250	CE	O		0002		Marital Status	
17	250	CE	O		0006		Religion	Not Supported
18	250	CX	O				Patient Account Number	Not Supported
19	16	ST	B				SSN Number - Patient	Not Supported
20	25	DLN	B				Driver's License Number - Patient	Not Supported
21	250	CX	O	Y		PHVS_EI_TYPE	Mother's Identifier	
22	250	CE	O	Y	0189	PHVS_P_ETHN_GRP	Ethnic Group	
23	250	ST	O				Birth Place	
24	1	ID	O		0136		Multiple Birth Indicator	

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
25	2	NM	O				Birth Order	
26	250	CE	O	Y	0171	PH_COUNTRY_NM	Citizenship	
27	250	CE	O		0172		Veterans Military Status	Not Supported
28	250	CE	B		0212		Nationality	Not Supported
29	26	TS	O				Patient Death Date and Time	
30	1	ID	O		0136		Patient Death Indicator	
31	1	ID	O		0136		Identity Unknown Indicator	
32	20	IS	O	Y	0445	HL70445	Identity Reliability Code	
33	26	TS	O				Last Update Date/Time	Not Supported
34	241	HD	O				Last Update Facility	Not Supported
35	250	CE	C		0446	PH_SPECIES	Species Code	
36	250	CE	C		0447		Breed Code	
37	80	ST	O				Strain	
38	250	CE	O	2	0429		Production Class Code	
39	250	CWE	O	Y	0171		Tribal Citizenship	

PID field definitions

Usage notes: The PID segment will be left optional for electronic laboratory reporting purposes.

PID-1 Set ID - PID (SI) Conditional 00104

Definition: "This field contains the number that identifies this transaction. For the first occurrence of the segment, the sequence number shall be one, for the second occurrence, the sequence number shall be two, etc."[60] The field is required for living subjects (human and animal).

Example: |1|.

PID-2 Patient ID (CX) 00105

This field has been deprecated – Do Not Use.

PID-3 Patient Identifier List (CX) 00106

Definition: "This field contains the list of identifiers (one or more) used by the healthcare facility to uniquely identify a patient (e.g., medical record number, billing number, birth registry, national unique individual identifier, etc.). In Canada, the Canadian Provincial Healthcare Number should be sent in this field. The arbitrary term of "internal ID" has been removed from the name of this field for clarity."[61]

Usage Note: If an OID is not used in PID-3.4 you may need to complete PID-3.6, PID-3.9, and PID-3.10. Usage examples will be supplied at a later date.

The fifth subcomponent of each patient identifier entry is an Identifier Type List drawn from the table PHVS_EI_TYPE.

PID-4 Alternate Patient ID - PID (CX) 00107

The PHIN Messaging Standard does not make use of this field.

PID-5 Patient Name (XPN) 00108

Definition: "This field contains the name(s) of the patient, the primary or legal name of the patient is reported first. Therefore, the name type code in this field should be "L - Legal". Refer to the HL7 Standard and Table 0200 - Name Type for valid values. Repetition of this field is allowed for representing the same name in different character sets. Note that "last name prefix" is synonymous to "own family name prefix" of previous versions of HL7, as is "second and further given names or initials thereof" to "middle initial or name". Multiple given names and/or initials are separated by spaces."[62]

Usage Note: For PID-5.7: Always "L" for Legal. For animals if a Name Type of "R" is used, use "Name Context" (PID-5.9) to identify the authority with which the animal's name is registered.

PID-6 Mother's Maiden Name (XPN) 00109

The PHIN Messaging Standard does not make use of this field.

PID-7 Date/Time of Birth (TS) 00110

Definition: "This field contains the patient's date and time of birth."[63]

PID-8 Administrative Sex (IS) 00111

Definition: "This field contains the patient's sex."[64]

Usage Note: The supported coding system/value set being supported is PHVS_SEX. This includes the NEDSS sex codes, which are a subset of HL7 Table 0001.

PID-9 Patient Alias (XPN) 00112

This field has been deprecated – Do Not Use.

PID-10 Race (CE) 00113

Definition: "This field refers to the patient's race. The second triplet of the CE data type for race (alternate identifier, alternate text, and name of alternate coding system) is reserved for governmentally assigned codes."[65]

Usage Note: This will be drawn from the PHIN value set for Race, PH_P_RACE_CAT, which is based on HL7 Table 0005 - Race.

PID-11 Patient Address (XAD) 00114

Definition: "This field contains the mailing address of the patient. Address type codes are defined by the HL7 Standard and table 0190 – Address Type. Multiple addresses for the same person may

be sent in the following sequence: The primary mailing address must be sent first in the sequence (for backward compatibility); if the mailing address is not sent, then a repeat delimiter must be sent in the first sequence.""[66]

PID-12 County Code (IS) 00115

This field has been deprecated – Do Not Use.

PID-13 Phone Number - Home (XTN) 00116

Definition: "This field contains the patient's personal phone numbers. All personal phone numbers for the patient are sent in the following sequence. The first sequence is considered the primary number (for backward compatibility). If the primary number is not sent, then a repeat delimiter is sent in the first sequence. Refer to the HL7 Standard and table 0201 – Telecommunication Use Code and table 0202 – Telecommunication Equipment Type for valid values."[67]

Usage Notes: PID-13.1 Telephone Number (ST) – this format is not supported by PHIN. Use is discouraged.

PID-14 Phone Number - Business (XTN) 00117

Definition: "This field contains the patient's business telephone numbers. All business numbers for the patient are sent in the following sequence. The first sequence is considered the patient's primary business phone number (for backward compatibility). If the primary business phone number is not sent, then a repeat delimiter must be sent in the first sequence. Refer to the HL7 Standard and table 0201 – Telecommunication Use Code and the HL7 Standard and table 0202 – Telecommunication Equipment Type for valid values. "[68]

PID-15 Primary Language (CE) 00118

The PHIN Messaging Standard does not make use of this field.

PID-16 Marital Status (CE) 00119

Definition: "This field contains the patient's marital (civil) status. Refer to user-defined table 0002 – Marital Status for suggested values."[69]

PID-17 Religion (CE) 00120

The PHIN Messaging Standard does not make use of this field.

PID-18 Patient Account Number (CX) 00121

The PHIN Messaging Standard does not make use of this field.

PID-19 SSN Number - Patient (ST) 00122

The PHIN Messaging Standard does not make use of this field.

PID-20 Driver's License Number - Patient (DLN) 00123

The PHIN Messaging Standard does not make use of this field.

PID-21 Mother's Identifier (CX) 00124

Definition: "This field is used, for example, as a link field for newborns. Typically a patient ID or account number may be used. This field can contain multiple identifiers for the same mother. Refer to the HL7 Standard and table 0061 – Check Digit Scheme for valid values. "[70] See PID-3 Patient Identifier List for the CX data type field format.

The fifth subcomponent of each patient identifier entry is an Identifier Type List drawn from the table PHVS_EI_TYPE.

PID-22 Ethnic Group (CE) 00125

Definition: "This field further defines the patient's ancestry. The second triplet of the CE data type for ethnic group (alternate identifier, alternate text, and name of alternate coding system) is reserved for governmentally assigned codes. In the US, a current use is to report ethnicity in line with US federal standards for Hispanic origin."[71]

Usage Note: This field further defines the patient's ancestry. The list of valid ethnic groups is captured as PHVS_P_ETHNIC_GRP.

PID-23 Birth Place (ST) 00126

Definition: "This field indicates the location of the patient's birth, for example 'St. Francis Community Hospital of Lower South Side'. The actual address is reported in PID-11 with an identifier of 'N'."[72]

PID-24 Multiple Birth Indicator (ID) 00127

Definition: "This field indicates whether the patient was part of a multiple birth. Refer to the HL7 Standard and table 0136 – Yes/No Indicator for valid values."[73]

PID-25 Birth Order (NM) 00128

Definition: "When a patient was part of a multiple birth, a value (number) indicating the patient's birth order is entered in this field."[74]

PID-26 Citizenship (CE) 00129

Definition: "This field contains the information related to a person's country citizenship."[75]

Usage Note: The list of valid countries for citizenship is captured as PH_COUNTRY_NM.

PID-27 Veterans Military Status (CE) 00130

The PHIN Messaging Standard does not make use of this field.

PID-28 Nationality (CE) 00739

The PHIN Messaging Standard does not make use of this field.

PID-29 Patient Death Date and Time (TS) 00740

Definition: "This field contains the date and time at which the patient death occurred."[76]

PID-30 Patient Death Indicator (ID) 00741

Definition: "This field indicates whether the patient is deceased. Refer to the HL7 Standard and table 0136 – Yes/No Indicator for valid values."[77]

PID-31 Identity Unknown Indicator (ID) 01535

Definition: "This field indicates whether or not the patient's/person's identity is known. Refer to the HL7 Standard and table 0136 – Yes/No Indicator for valid values."[78]

PID-32 Identity Reliability Code (IS) 01536

Definition: "This field contains a coded value used to communicate information regarding the reliability of patient/person identifying data transmitted via a transaction. Values could indicate that certain fields on a PID segment for a given patient/person are known to be false (e.g., use of default or system-generated values for Date of Birth or Social Security Number."[79]

Usage Note: HL7 Table 0445 (HL70445) is being used as the list of valid values.

PID-33 Last Update Date/Time (TS) 01537

The PHIN Messaging Standard does not make use of this field.

PID-34 Last Update Facility (HD) 01538

The PHIN Messaging Standard does not make use of this field.

PID-35 Species Code (CE) 01539

Definition: "The species of living organism. This may include the common or scientific name, based on the coding system(s) used. SNOMED is the recommended coding system. If this field is

not valued, a human is assumed. Refer to user-defined table 0446 – Species Code for suggested values.

Conditionality Rule: This field must be valued if *PID-36 - Breed Code* or *PID-38 - Production Class Code* is valued.

```
For example:
          ...|L-80700^Canine, NOS^SNM3|...
          ...|L-80100^Bovine^SNM3|...
          ...|L-80A00^Feline^SNM3|..."[80]
```

Usage Note: The list of valid species are captured in PH_SPECIES.

PID-36 Breed Code (CE) 01540

Definition: "The specific breed of animal. This field, unlike Species and Strain is specific to animals and cannot be generally used for all living organisms. SNOMED is the recommended coding system. Refer to user-defined table 0447 – Breed Code for suggested values.

Conditionality Rule: This field must be valued if *PID-37 - Strain* is valued.

```
For example, (showing primary and alternative coding systems,
using locally defined "American Kennel Club" nomenclature):
    ...|L-80733^ Staffordshire bull terrier^SNM3^^American
   Staffordshire Terrier^99AKC|...
    ...|L-80900^Weimaraner^SNM3|...
    ...|L-80439^Peruvian Paso Horse^SNM3|..."[81]
```

PID-37 Strain (ST) 01541

Definition: "This field contains the specific strain of animal. It can also be expanded to include strain of any living organism and is not restricted to animals.

```
Example:
    ...|DeKalb|...
    ...|Balb/c|...
    ...|DXL|..."[82]
```

PID-38 Production Class Code (CE) 01542

Definition: "This field contains the code and/or text indicating the primary use for which the living subject was bred or grown. Refer to user-defined table 0429 – Production Class Code for suggested values.

```
For example:
    ...|DA^Dairy^L|...
    ...|MT^Meat^L|...
    ...|RA^Racing^L|..."[83]
```

PID-39 Tribal Citizenship (CWE) 01840

Definition: "This field contains the information related to a person's tribal citizenship. For tribal citizenship, in the United States, HL7 recommends using the Bureau of Indian Affairs (BIA) Tribal Identity List. For a local definition, user-defined table 0171 - Citizenship should be used.

This field repeats since persons can have tribal membership(s) and can be members of more than one tribe. The Name of Coding System component(s) of the CWE datatype should be used to identify the table from which tribal membership is drawn."[84]

SPM – Specimen Segment

"The intent of this segment is to describe the characteristics of a specimen. It differs from the intent of the OBR in that the OBR addresses order-specific information. It differs from the SAC segment in that the SAC addresses specimen container attributes. An advantage afforded by a separate specimen segment is that it generalizes the multiple relationships among order(s), results, specimen(s) and specimen container(s).

A specimen is defined as "A physical entity that is an individual, a group, an item, or a part representative of a larger group, class or whole that is the target of an observation or analysis for the purpose of drawing conclusions about the group, class, or whole." Note that any physical entity in the universe has the potential to become a specimen.

A specimen is collected or obtained from a source and may be representative of the source, or may represent a deviation within the source. A specimen may be wholly or partially consumed during an observation and any remaining portion of the specimen is persistent and can be stored.

This segment may also be used in limited cases to describe a "virtual" specimen. In particular, to identify the characteristics required for a specimen in the context of a specific observation or test.

In summary, SPM represents the attributes specific and unique to a specimen."[85]

SPM Attributes

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	4	SI	O				Set ID – SPM	
2	80	EIP	R				Specimen ID	
3	80	EIP	O	Y			Specimen Parent IDs	
4	250	CWE	R		0487	PHVS_BTSpecimen_type, HL70487	Specimen Type	
5	250	CWE	O	Y	0541		Specimen Type Modifier	Not supported
6	250	CWE	O	Y	0371	HL70371	Specimen Additives	
7	250	CWE	O		0488	HL70488	Specimen Collection Method	
8	250	CWE	O				Specimen Source Site	Not supported
9	250	CWE	O	Y	0542		Specimen Source Site Modifier	Not supported
10	250	CWE	O		0543		Specimen Collection Site	
11	250	CWE	O	Y	0369	HL70369	Specimen Role	
12	20	CQ	O				Specimen Collection Amount	
13	6	NM	C				Grouped Specimen Count	
14	250	ST	O	Y			Specimen Description	
15	250	CWE	O	Y	0376	HL70376	Specimen Handling Code	
16	250	CWE	O	Y	0489		Specimen Risk Code	
17	26	DR	O				Specimen Collection	

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
							Date/Time	
18	26	TS	O				Specimen Received Date/Time	
19	26	TS	O				Specimen Expiration Date/Time	
20	1	ID	O		0136		Specimen Availability	
21	250	CWE	O	Y	0490		Specimen Reject Reason	
22	250	CWE	O		0491	HL70491	Specimen Quality	
23	250	CWE	O		0492		Specimen Appropriateness	
24	250	CWE	O	Y	0493	PHVS_BT_SPECCOND	Specimen Condition	
25	20	CQ	O				Specimen Current Quantity	
26	4	NM	O				Number of Specimen Containers	
27	250	CWE	O				Container Type	
28	250	CWE	O		0544		Container Condition	
29	250	CWE	O		0494		Specimen Child Role	

SPM field definitions

Usage Notes: The SPM segment is required.

SPM -1 Set ID - SPM (SI - 4, Optional) 01754

Definition: "This field contains the sequence number. This field is used to identify SPM segment instances in message structures where the SPM segment repeats."[86]

SPM-2 Specimen ID (EIP -80, Optional) 01755

Definition: "This field contains a unique identifier for the specimen as referenced by the Placer application, the Filler application, or both.

This field is required, as there are use cases in which a unique specimen identifier may not exist. In the first scenario, a placer application may initiate an observation request against an existing specimen without uniquely identifying the specimen. Additionally, in the case of the TCU_U10 message structure, used in automated equipment test code settings messages, the SPM segment is used to define required characteristics of the specimen. As such, TCU_U10 uses SPM to define a virtual specimen, and a specific specimen ID would not exist. Filler applications would be expected to assign a Specimen ID and populate this field accordingly."[87]

SPM-3 Specimen Parent IDs (EIP - 30, Optional) 01756

Definition: "This field contains the identifiers for the specimen or specimens that contributed to the specimen that is described by the segment instance.

If this field repeats, then *SPM-11-Specimen Role* should be valued with "L" (pooled). The repetitions of this field then carry the specimen IDs of the parent specimens contributing to the pool."[88]

SPM-4 Specimen Type (CWE – 250, Required) 01900

Definition: "This field describes the precise nature of the entity that will be the source material for the observation.

Any physical entity that may have observations made about it may qualify as a specimen. The entry in this attribute describes the specific entity as precisely as possible, whether that is a complex organism (e.g., an ostrich) or a specific cellular mass (e.g., a specific muscle biopsy).

This attribute corresponds to the first component of *OBR.15 – Specimen Source* and *SAC.6 – Specimen Source* component 1 – *Specimen source name or code.* These components, and the SPS data type, were deprecated upon the development of this segment."[89]

Usage Note: The code system/value set PHVS_ BTSpecimen_type is being used to define the allowed specimen types. Alternately HL7 table 0487, Specimen Type may be used.

SPM-5 Specimen Type Modifier (CWE – 250, Optional) 01757

The PHIN Messaging Standard does not make use of this field.

SPM-6 Specimen Additives (CWE – 250, Optional) 01758

Definition: "This field identifies any additives introduced to the specimen before or at the time of collection. These additives may be introduced in order to preserve, maintain or enhance the particular nature or component of the specimen."[90]

Usage Note: The code system/value set HL70371 is being used to define the allowed additive types.

SPM-7 Specimen Collection Method (CWE – 250, Optional) 01759

Definition: "Describes the procedure or process by which the specimen was collected.

Any nationally recognized coding system might be used for this field including SNOMED; alternatively the HL7 defined table 0488 may be used. Veterinary medicine may choose the tables supported for the components of this field as decided by their industry."[91]

Usage Note: The code system/value set HL70488 is being used to define the allowed specimen collection method types.

SPM-8 Specimen Source Site (CWE – 250, Optional) 01901

The PHIN Messaging Standard does not make use of this field.

SPM-9 Specimen Source Site Modifier (CWE – 250, Optional) 01760

The PHIN Messaging Standard does not make use of this field.

SPM-10 Specimen Collection Site (CWE – 250, Optional) 01761

Definition: "This field differs from *SPM-8-Specimen Source Site* in those cases where the source site must be approached via a particular site (e.g., anatomic location). For example, in the case where a liver biopsy is obtained via a percutaneous needle, the collection site would be the point of entry of the needle. For venous blood collected from the left radial vein, the collection site could be "antecubital fossa".

Veterinary medicine may choose the tables supported for the components of this field as decided by their industry.

User-defined table 0543 – Specimen Collection Site has no suggested values."[92]

SPM-11 Specimen Role (CWE – 250, Optional) 01762 -

"This field indicates the role of the sample. Refer to user-defined table 0369 – Specimen Role for suggested values. Each of these values is normally identifiable by the systems and its components and can influence processing and data management related to the specimen.

If this field is not populated, then the specimen described has no special, or specific, role other than serving as the focus of the observation. Such specimens include patient, environmental and other specimens that are intended for analysis.

A grouped specimen consists of identical specimen types from multiple individuals that do not have individual identifiers and upon which the same services will be performed. If the specimen role value is 'G' then the Grouped Specimen Count (*SPM-13*) must be valued with the total number of specimens contained in the group.

If the specimen role is 'L', the repetitions of Parent Specimen ID (SPM-4) represent the individual parent specimens that contribute to the pooled specimen."[93]

SPM-12 Specimen Collection Amount (CQ – 20, Optional) 01902

Definition: "This field specifies the volume or mass of the collected specimen. For laboratory tests, the collection volume is the volume of a specimen. Specifically, units should be expressed in the ISO Standard unit abbreviations (ISO-2955, 1977). This is a results-only field except when the placer or a party has already drawn the specimen. (See Chapter 7 for full details about units.)"[94]

SPM-13 Grouped Specimen Count (NM - Conditional) 01763

Definition: "This field refers to the number of individual specimens of a particular type represented by this instance of a specimen. The use of this field is restricted to specimens upon which all specimen related attributes are identical. This field would only be valued if the specimen role attribute has the value 'G'."[95]

SPM-14 Specimen Description (ST – 250, Optional) 01764

Definition: "This is a text field that allows additional information specifically about the specimen to be sent in the message."[96]

SPM-15 Specimen Handling Code (CWE – 250, Optional) 01908

Definition: "This describes how the specimen and/or container need to be handled from the time of collection through the initiation of testing. As this field is not required, no assumptions can be made as to meaning when this field is not populated."[97]

SPM-16 Specimen Risk Code (CWE – 250, Optional) 01903

Definition: "This field contains any known or suspected specimen hazards, e.g., exceptionally infectious agent or blood from a hepatitis patient. Either code and/or text may be absent. However, the code is always placed in the first component position and any free text in the second component. Thus, a component delimiter must precede free text without a code."[98]

Usage Note: The code system/value set HL70491 is being used to define the supported specimen quality types.

SPM-17 Specimen Collection Date/Time (DR – 26, Optional) 01765

Definition: "The date and time when the specimen was acquired from the source. The use of the Date Range data type allows for description of specimens collected over a period of time, for example, 24-hour urine collection. For specimens collected at a point in time, only the first component (start date/time) will be populated."[99]

SPM-18 Specimen Received Date/Time (TS – 26. Optional) 00248

Definition: "The specimen-received date/time is the time that the specimen is received at the diagnostic service. The actual time that is recorded is based on how specimen receipt is managed and may correspond to the time the sample is logged in. This is fundamentally different from *SPM-xx Specimen Collection date/time*."[100]

SPM-19 Specimen Expiration Date/Time (TS – 26. Optional) 01904

Definition: "This field is the date and time the specimen can no longer be used for the purpose implied by the order. For example, in the Blood Banking environment the specimen can no longer be used for pre-transfusion compatibility testing. The specimen segment will include an SPM-21-Specimen Reject Reason of 'EX' indicating 'Expired' for message instances created after this date and time."[101]

SPM-20 Specimen Availability (ID – 1, Optional) 01766

Definition: "This describes whether the specimen, as it exists, is currently available to use in an analysis. Refer to the HL7 Standard and table 0136 Yes/No Indicator for valid values."[102]

SPM-21 Specimen Reject Reason (CWE – 250, Optional) 01767

Definition: "This describes one or more reasons the specimen is rejected for the specified observation/result/analysis. Refer to the HL7 Standard and table 0490 – Specimen Reject Reason for valid values."[103]

SPM-22 Specimen Quality (CWE – 250, Optional) 01768

Definition: "The degree or grade of excellence of the specimen at receipt. The filler populates this attribute. Refer to user-defined table 0491 – Specimen Quality for suggested entries."[104]

SPM-23 Specimen Appropriateness (CWE – 250, Optional) 01769

Definition: "The suitability of the specimen for the particular planned use as determined by the filler."[105]

SPM-24 Specimen Condition (CWE – 250, Optional) 01770

Definition: "A mode or state of being that describes the nature of the specimen."[106]

Usage Note: The code system/value set PHVS_BT_SPECCOND is being used to define the supported specimen condition types.

SPM-25 Specimen Current Quantity (CQ – 20, Optional) 01771

Definition: "This attributes contains the amount of specimen that currently exists or is available for use in further testing."[107]

SPM-26 Number of Specimen Containers (NM – 4, Optional)

Definition: "This field identifies the number of containers for a given sample. For sample receipt verification purposes; may be different from the total number of samples that accompany the order."[108]

SPM-27 Container Type (CWE – 250, Optional) 01773

Definition: "The container in or on which a specimen is transported."[109]

SPM-28 Container Condition (CWE – 250, Optional) 01774

Definition: "In chain of custody cases where specimens are moved from lab to lab, the status of the container that the specimen is shipped in must be recorded at each receipt. If the container is compromised in any way (seal broken, container cracked or leaking, etc) then this needs to be recorded for legal reasons."[110]

SPM-29 Specimen Child Role (CWE – 250, Optional) 01775

Definition: "For child specimens, this field identifies the relationship between this specimen and the parent specimen. If this field is populated, then *SPM-3-Specimen Parent ID* must be populated. This field differs from *SPM-15-Specimen Role* in that this field refers to the role of this specimen relative to a parent role rather than the role of this specimen to the ordered service.

Refer to the HL7 Standard and table 0494 – Specimen Child Role for valid values."[111]

OBX Segment

This is a Standard Segment with no special requirements. This segment may have some potential use in the Specimen Section of the PHIN Laboratory Messaging Standard. Specific usage will be determined within individual implementation guides.

OBX – Observation/Result Attribute Table (for the Specimen Section)

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	4	SI	O				Set ID – OBX	
2	2	ID	R		0125	HL70125	Value Type	
3	250	CE	R				Observation Identifier	
4	20	ST	R				Observation Sub-ID	
5	26	TS	R				Observation Value	
6	250	CE	X				Units	
7	60	ST	X				References Range	
8	5	IS	X	Y	0078	PHVS_OBS_INTRP	Abnormal Flags	
9	5	NM	X				Probability	
10	2	ID	X	Y	0080		Nature of Abnormal Test	
11	1	ID	R		0085		Observation Result Status	
12	26	TS	X				Effective Date of Reference Range Values	
13	20	ST	X				User Defined Access Checks	
14	26	TS	X				Date/Time of the Observation	
15	250	CE	X				Producer's ID	
16	250	XCN	X	Y			Responsible Observer	
17	250	CE	X	Y			Observation Method	
18	22	EI	O	Y			Equipment Instance Identifier	
19	26	TS	O				Date/Time of the Analysis	

SAC– Specimen Container Detail (Container Section)

"The container detail segment is the data necessary to maintain the containers that are being used throughout the Laboratory Automation System."[112]

The proposed use of the SAC segment is limited to the container ID that was sent to the lab (for ID of the primary shipping container). The segment is used to ascertain that a box sent to a laboratory has arrived. SAC-4 should identify the shipping box that arrived in the laboratory.

"The specimens in many laboratories are transported and processed in containers (e.g., sample tubes). When SPM and SAC are used in the same message, then the conceptually duplicate attributes will be valued only in the SPM. This applies to SAC-6 (Specimen Source), SAC-27 (Additives), and SAC-43 (Special Handling Considerations).HL7 Attribute Table – SAC – Specimen Container detail (for the Container Section."[113]

SAC – Specimen Container Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	80	EI	O				External Accession Identifier	
2	80	EI	O				Accession Identifier	
3	80	EI	C				Container Identifier	
4	80	EI	C				Primary (parent) Container Identifier	
5	80	EI	O				Equipment Container Identifier	
6	300	SPS	D				Specimen Source	Deprecated – Use the SPM segment.
7	26	TS	O				Registration Date/Time	
8	250	CE	O		0370		Container Status	
9	250	CE	O		0378		Carrier Type	
10	80	EI	O				Carrier Identifier	
11	80	NA	O				Position in Carrier	
12	250	CE	O		0379		Tray Type - SAC	
13	80	EI	O				Tray Identifier	
14	80	NA	O				Position in Tray	
15	250	CE	O	Y			Location	
16	20	NM	O				Container Height	
17	20	NM	O				Container Diameter	
18	20	NM	O				Barrier Delta	
19	20	NM	O				Bottom Delta	
20	250	CE	O				Container Height/Diameter/Delta Units	
21	20	NM	O				Container Volume	
22	20	NM	O				Available Specimen Volume	
23	20	NM	O				Initial Specimen Volume	
24	250	CE	O				Volume Units	
25	250	CE	O		0380		Separator Type	
26	250	CE	O		0381		Cap Type	
27	250	CWE	O	Y	0371		Additive	
28	250	CE	O				Specimen Component	
29	20	SN	O				Dilution Factor	
30	250	CE	O		0373		Treatment	
31	20	SN	O				Temperature	
32	20	NM	O				Hemolysis Index	
33	250	CE	O				Hemolysis Index Units	
34	20	NM	O				Lipemia Index	
35	250	CE	O				Lipemia Index Units	
36	20	NM	O				Icterus Index	
37	250	CE	O				Icterus Index Units	
38	20	NM	O				Fibrin Index	
39	250	CE	O				Fibrin Index Units	
40	250	CE	O	Y	0374		System Induced Contaminants	
41	250	CE	O	Y	0382		Drug Interference	
42	250	CE	O		0375		Artificial Blood	
43	250	CWE	O	Y	0376		Special Handling Code	Not supported
44	250	CE	O	Y	0377		Other Environmental Factors	

SAC Field Definitions for the Container Section

SAC-1 External Accession Identifier (EI, Required) 01329

Definition: "This field identifies the laboratory accession (see section *Glossary*). This identifier is assigned by the external laboratory information system.

Example: If laboratory A sends a specimen to laboratory B, then within laboratory B this field contains accession identifier of lab A."[114]

SAC-2 Accession Identifier (EI, Optional) 01330

Definition: "This field identifies the laboratory accession (see section *Glossary*). This identifier is assigned by the information system of the laboratory performing the tests.

An accession identifier can refer to more than one container. A Container Identifier (see below) is a Unique Identifier for that container."[115]

SAC-3 Container Identifier (EI, Conditional) 01331

Definition: "This field identifies the container. This field is the container's unique identifier assigned by the corresponding equipment. A container may contain the primary (original) specimen or an aliquot (secondary sample) of that specimen. For primary sample this field contains Primary Container ID; for bar-coded aliquot samples this field contains Aliquot Container ID; for non-bar-coded aliquot samples (e.g., microtiter plate) this field is empty1

The NCCLS standard requires a unique identifier for each container introduced into the Laboratory Automation System. The combination of the fields: Primary Container ID, Container ID, Carrier ID / Position, Tray ID / Position must identify the container uniquely within the LAS. The naturally best solution is unique machine-readable id attached to the container (which of course is sufficient to ensure the uniqueness of the fields' combination). A bar code that symbolizes this ID should meet the proposed standard NCCLS AUTO2 (*Laboratory Automation: Bar Codes for Specimen Container Identification).*"[116]

SAC-4 Primary (Parent) Container Identifier (EI, Conditional) 01332

Definition: "If this field is filled in, it identifies the primary container from which this specimen came. For primary samples this field is empty; for aliquot samples this field should contain the identifier of primary container."[117]

Usage Note: SAC-4 should identify the shipping box that arrived in the laboratory.

SAC-5 Equipment Container Identifier (EI, Optional) 01333

Definition: "This field identifies the container in a particular device (e.g., one container in a carousel or rack of containers within an analyzer, analyzer specific bar code mapping, etc.)."[118]

SAC-6 Specimen Source (SPS, Deprecated) 00249

The PHIN Messaging Standard does not make use of this field.

SAC-7 Registration Date/Time (TS, Optional) 01334

Definition: "This field is the date/time that the container was last registered with the "automated system.", e.g., reading of a container bar code by a device."[119]

SAC-8 Container Status (CE, Optional) 01335

Definition: "This field identifies the status of the unique container in which the specimen resides at the time that the transaction was initiated. Refer to *HL7 Table 0370 - Container status* for valid values. The equipment specific container status should be sent as <*alternate identifier*> as needed.

The container states are relevant for the exchange of information among devices (within the LAS). Not all of them are relevant for information transfer between the LAS and the LIS.
In the explanations below the system means the LAS or any equipment interfaced to it or to another equipment."[120]

SAC-9 Carrier Type (CE, Optional) 01336

Definition: "This field identifies the type of the carrier (see section Glossary). Refer to *User-defined Table 0378 – Carrier type* for suggested values. Because the geometry can be different, the carrier type should, if possible, express the number of positions in the carrier.

The definition assumes hierarchical nesting using the following phrases: container is located in a carrier, carrier is located in a tray.

Examples of values: R01 (one position carrier), R05 (five position carrier)"[121]

SAC-10 Carrier Identifier (EI, Optional) 01337

Definition: "This field identifies the carrier. It is the ID (e.g., number or bar code) of the carrier where the container (e.g., tube) is located.

Example: A carrier could be a rack with single or multiple specimen containers. A carrier is usually used for automated specimen transport. Multiple carriers can be stacked in a tray, which is then used for manual or automatic transport."[122]

SAC-11 Position in Carrier (NA, Optional) 01338

Definition: "This field identifies the position of the container in the carrier (e.g., 1…3…). The sub-components allow, if necessary, to transfer multiple axis information, e.g., 2-dimensional carrier (X^Y)."[123]

SAC-12 Tray Type - SAC (CE, Optional) 01339

Definition: "This field identifies the type of the tray (see section Glossary). Refer to User-defined Table
0379 – Tray type for suggested values. Because the geometry can be different, the tray type should if
possible express the number of positions in the tray.
The definition assumes hierarchical nesting using the following phrases: container is located in a carrier,
carrier is located in a tray."[124]

SAC-13 Tray Identifier (EI, Optional) 01340

Definition: "This field identifies the tray identifier (e.g., a number of a tray or a bar code on the tray), where the container carrier is located."[125]

SAC-14 Position in Tray (NA, Optional) 01341

Definition: "This field identifies the position of the carrier in the tray. The sub-components allow, if necessary, to transfer multiple axis information, e.g., 2-dimensional tray (X^Y)."[126]

SAC-15 Location (CE, Optional) 01342

Definition: "This field is the physical location that the specimen was at the time that the transaction was initiated. The location description can vary with the LAS. For example, it can be an X,Y,Z coordinate in a storage system; a refrigerator number and drawer number where the container-carrier-tray is located; or it can be the name of the institution and the laboratory which owns the container currently. The repeating of this field allows for hierarchical representation of location (lowest level first), e.g., shelf number, refrigerator storage id, lab name, institution name, etc."[127]

SAC-16 Container Height (NM, Optional) 01343

Definition: "This field identifies the height of the container in units specified below. "[128]

SAC-17 Container Diameter (NM, Optional) 01344

Definition: "This field identifies the outside diameter of the container in units specified below." [129]

SAC-18 Barrier Delta (NM, Optional) 01345

Definition: "This field identifies the distance from the Point of Reference to the separator material (barrier) within the container in units specified below. This distance may be provided by the LAS to the instrument and/or specimen processing/handling device to facilitate the insertion of a sampling probe into the specimen without touching the separator. Refer to Point Of Reference definition in section *Glossary* or in NCCLS standard AUTO5 *Laboratory Automation: Electromechanical Interfaces*."[130]

SAC-19 Bottom Delta (NM, Optional) 01346

Definition: "This field identifies the distance from the Point of Reference to the outside bottom of the container in units specified below. Refer to Point Of Reference definition in section *Glossary* or in NCCLS standard AUTO5 *Laboratory Automation: Electromechanical Interfaces*."[131]

SAC-20 Container Diameter/Height/Delta Units (CE, Optional) 01347

Definition: "This field is the unit identifier that is being used to describe the diameter, height and deltas of the container. If the units are ISO+ units, they should be recorded as single case abbreviations. If the units are ANS+ or L (local), the units and the source code table must be recorded, except that in this case, component delimiters should be replaced by subcomponent delimiters. The default unit is millimeters (mm), which should be assumed if no units are reported."[132]

SAC-21 Container Volume (NM, Optional) 00644

Definition: "This field indicates the capacity of the container in the units specified below."[133]

SAC-22 Available Specimen Volume (NM, Optional) 01349

Definition: "This field identifies the current specimen volume available for use in this container in the units specified below."[134]

SAC-23 Initial Specimen Volume (NM, Optional) 01350

Definition: "This field identifies the volume of the specimen initially filled in this container in the units specified below."[135]

SAC-24 Volume Units (CE, Optional) 01351

Definition: "This field is the unit identifier that is being used to describe the volume of the container. If the units are ISO+ units, they should be recorded as single case abbreviations. The default unit is milliliters (ml), which should be assumed if no units are reported."[136]

SAC-25 Separator Type (CE, Optional) 01352

Definition: "This field identifies the type of the separator that is being used (e.g., gel separator in the container – not to be confused with the communication separators). Refer to *User-defined Table 0380 – Separator type* for suggested values. It is recommended that the first table entry be "NO" meaning "No Separator".

Examples of values: NO (no separator), GEL (gel separator), M01 (manufacturer specific)"[137]

SAC-26 Cap Type (CE, Optional) 01353

Definition: "This field indicates the type of cap that is to be used with this container for decapping, piercing or other mechanisms. Refer to *User-defined Table 0381 – Cap type* for suggested values.

```
Examples of values: SCR (screw cap), PSH (push cap), FOIL (foil)"[138]
```

SAC-27 Additive (CWE, Optional) 00647

Definition: "This field identifies any additives introduced to the specimen before or at the time of collection. These additives may be introduced in order to preserve, maintain or enhance the particular nature or component of the specimen. It is a repetitive field. Refer to *HL7 Table 0371 – Additive* for valid values. 'The value set can be extended with user specific values."[139]
"When the SPM (Specimen) segment is sent together with the SAC segment the additive attribute value from the SPM segment can be included in the repeat field of the SAC additive attribute."[140]

SAC-28 Specimen Component (CE, Optional) 01355

Definition: "This field identifies the specimen component, e.g., supernatant, sediment, etc. Refer to *User-defined Table 0372 – Specimen component* for valid values. This table's values are taken from *NCCLS AUTO4*. The value set can be extended with user specific values."[141]

SAC-29 Dilution Factor (SN, Optional) 01356

Definition: "This field identifies the factor of dilution already performed on the specimen. The equipment entity that changes the dilution is responsible for sending this information to other equipment. If the endogenous content of the test (analyte) in the diluent is required for the calculation of the test (analyte) concentration, then the test (analyte) specific values should be exchanged between the systems via Master Files or other means.

```
Examples of use:
      |^1^:^5|    - means dilution 1 to 5, i.e., 1 part sample, 4
      parts diluent

      |^1^+|      - sample is diluted, but the factor is unknown
      |^1^:^1|    - not diluted sample

      ||    - dilution not changed"[142]
```

SAC-30 Treatment (CE, Optional) 01357

Definition: "This field identifies the specimen treatment performed during lab processing. Refer to *User-defined Table 0373 – Treatment* for valid values. This table's values are taken from *NCCLS AUTO4*. The value set can be extended with user specific values."[143]

SAC-31 Temperature (SN, Optional) 01358

Definition: "This field identifies the specimen temperature in degrees Celsius [°C] at the time of the

transaction specified in the EQU segment."[144]

SAC-32 Hemolysis Index (NM, Optional) 01359

Definition: "This field is the index identifier that is being used to describe the Hemolysis Index of the specimen."[145]

SAC-33 Hemolysis Index Units (CE, Optional) 01360

Definition: "This field is the unit's identifier that is being used to describe the Hemolysis Index of the specimen. It is recommended to use g/L. (The transmission of the index values is added here instead of the original use of the OBX segments, because the frequency of the transfer of the specimen details justifies use of more efficient mechanism.)

If this field is null, the recommended value is assumed."[146]

SAC-34 Lipemia Index (NM, Optional) 01361

Definition: "This field is the index identifier that is being used to describe the Lipemia Index of the specimen. It is recommended to use the optical turbidity at 600 nm (in absorbance units)."[147]

SAC-35 Lipemia Index Units (CE, Optional) 01362

Definition: "This field is the unit's identifier that is being used to describe the Lipemia Index of the specimen.

If this field is null, the recommended value is assumed."[148]

SAC-36 Icterus Index (NM, Optional) 01363

Definition: "This field is the index identifier that is being used to describe the Icterus Index of the specimen."[149]

SAC-37 Icterus Index Units (CE, Optional) 01364

Definition: "This field is the unit's identifier that is being used to describe the Icterus Index of the specimen. It is recommended to use mMol/L of bilirubin.

If this field is null, the recommended value is assumed."[150]

SAC-38 Fibrin Index (NM, Optional) 01365

Definition: "This field is the index identifier that is being used to describe the Fibrin Index of the specimen. In the case of only differentiating between Absent and Present, we recommend using 0 and 1 respectively and send the field Fibrin Index Units null."[151]

SAC-39 Fibrin Index Units (CE, Optional) 01366

Definition: "This field is the unit's identifier that is being used to describe the Fibrin Index of the specimen. "[152]

SAC-40 System Induced Contaminants (CE, Optional) 01367

Definition: "This field describes the specimen contaminant identifier that is associated with the specimen in this container. Refer to *User-defined Table 0374 – System induced contaminants* for valid values. This table's values are taken from *NCCLS AUTO4*. The value set can be extended with user specific values."[153]

SAC-41 Drug Interference (CE, Optional) 01368

Definition: "This field describes the drug interference identifier that is associated with the specimen. Refer to *User-defined Table 0382 – Drug interference* for suggested values."[154]

SAC-42 Artificial Blood (CE, Otpional) 01369

Definition: "This field describes the artificial blood identifier that is associated with the specimen. Refer to *User-defined Table 0375 – Artificial blood* for valid values. This table's values are taken from *NCCLS AUTO4*. The value set can be extended with user specific values."[155]

SAC-43 Special Handling Code (CWE) 01370

The PHIN Messaging Standard does not make use of this field.

SAC-44 Other Environmental Factors (CE) 01371

Definition: "This field describes other environmental factors that are associated with the specimen in a specific container, e.g., atmospheric exposure. Refer to *User-defined Table 0377 – Other environmental factors* for valid values. This table's values are taken from *NCCLS AUTO4*. The value set can be extended with user specific values."[156]

INV – Inventory Detail Segment

"The inventory detail segment is the data necessary to track the inventory of substances (e.g. reagent, tips, waste) on equipment."[157]

INV – Inventory Detail Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	250	CE	R		0451		Substance Identifier	
2	250	CE	R	Y	0383		Substance Status	
3	250	CE	O		0384		Substance Type	
4	250	CE	O				Inventory Container Identifier	
5	250	CE	O				Container Carrier Identifier	
6	250	CE	O				Position on Carrier	
7	20	NM	O				Initial Quantity	
8	20	NM	O				Current Quantity	
9	20	NM	O				Available Quantity	
10	20	NM	O				Consumption Quantity	
11	250	CE	O				Quantity Units	
12	26	TS	O				Expiration Date/Time	
13	26	TS	O				First Used Date/Time	
14	200	TQ	D				On Board Stability Duration	Deprecated; Do Not Use
15	250	CE	O	Y			Test/Fluid Identifier(s)	
16	200	ST	O				Manufacturer Lot Number	
17	250	CE	O		0385		Manufacturer Identifier	
18	250	CE	O		0386		Supplier Identifier	
19	20	CQ	O				On Board Stability Time	
20	20	CQ	O				Target Value	

INV Field Definitions

Usage Notes: This is a standard segment for FDA. Specific program implementation guides will determine use.

INV-1 Substance Identifier (CE) 01372

Definition: "Unique identifier for the substance that is in inventory. This is a manufacturer-specific identifier." [158]

INV-2 Substance Status (CE) 01373

Definition: "The status of the inventoried item. The status indicates the current status of the substance. Refer to *HL7 Table 0383 – Substance status* for suggested values."[159]

INV-3 Substance Type (CE) 01374

Definition: "The type of substance. Refer to *HL7 Table 0384 – Substance type* for suggested values."[160]

INV-4 Inventory Container Identifier (CE) 01532

Definition: " Identifies the inventory container, e.g., unique identifier of a specific package instance of a specific substance. This is a manufacturer-specific identifier." [161]

INV-5 Container Carrier Identifier (CE) 01376

Definition: "This is the carrier used to transport the substance containers, (e.g., a removable rotor with reagent bottles)."[162]

INV-6 Position on Carrier (CE) 01377

Definition: "Identifies the position (e.g., index) on the carrier."[163]

INV-7 Initial Quantity (NM) 01378

Definition: "This field identifies the initial quantity of the substance in inventory."[164]

INV-8 Current Quantity (NM) 01379

Definition: "This field is the current quantity, i.e., initial quantity minus what has been actually used."[165]

INV-9 Available Quantity (NM) 01380

Definition: "This field is the available quantity of substance. This is the current quantity minus any planned consumption (e.g., tests that are planned)."[166]

INV-10 Consumption Quantity (NM) 01381

Definition: "This field is the consumption that is used each time the equipment uses this substance."[167]

INV-11 Quantity Units (CE) 01382

Definition: "This field is the units of measure of the available quantity. If the units are ISO+ units, they should be recorded as single case abbreviations. If the units are ANS+ or L (local), the units and the source code table must be recorded, except that in this case, component delimiters should be replaced by sub-component delimiters. For example, "l" indicates liters, whereas pt&&ANS+ indicates pints (ANSI units). The default unit is milliliters (ml), which should be assumed if no units are reported."[168]

INV-12 Expiration Date/Time (TS) 01383

Definition: "This field is the expiration date/time of the substance."[169]

INV-13 First Used Date/Time (TS) 01384

Definition: "This field is the time and date when the substance was first used. This date and time can be necessary to determine the stability of the substance. The meaning of the "first used"

element depends on the substance. In certain cases it means the time when the substance was put on board of the instrument or prepared (mixed), without actually using it in the analysis."[170]

INV-14 On Board Stability Duration (TQ) 01385

The PHIN Messaging Standard does not make use of this field.

INV-15 Test/Fluid Identifier(s) (CE) 01386

Definition: "This field is the list of tests and body fluid that apply to this substance. This is a repeating field. An empty field means that this substance is not test specific, i.e., it applies to all tests."[171]

INV-16 Manufacturer Lot Number (ST) 01387

Definition: "This field specifies the lot number assigned by the manufacturer during production of the substance."[172]

INV-17 Manufacturer Identifier (CE) 00286

Definition: "This field identifies the manufacturer of this substance. Refer to *User-defined Table 0385 – Manufacturer identifier* for suggested values. Relevant external code systems may be used, e.g., HIBCC Manufacturers Labeler ID Code (LIC), UPC, NDC, etc."[173]

INV-18 Supplier Identifier (CE) 01389

Definition: "This field identifies the supplier of this substance. Refer to *User-defined Table 0386 – Supplier identifier* for suggested values."[174]

INV-19 On Board Stability Time (CQ) 01626

Definition: "This field is the duration of time that the calibration / usability of the substance is stable. The duration is used to calculate the date / time when this calibration is no longer valid by adding this "On board stability time" (INV-19) to the "First used date / time" (INV-13).

The 1st component defines the time quantity and the 2nd component the time units (see HL7 Table 0255 – Duration categories). Recommended accuracy is "minutes", "hours" and "days"."[175]

INV-20 Target Value (CQ) 01896

Definition: "This field is the target analytical value for a particular test for a specific lot of a manufactured material. Target values for QC purposes are usually selected for their relevance to a reference (normal) range or to a clinically significant decision level.

The 1st component defines the value and the 2nd component the measurement units."[176]

OBR - Observation Request Segment

"In the reporting of clinical data, the OBR serves as the report header. It identifies the observation set represented by the following atomic observations. It includes the relevant ordering information when that applies. It contains many of the attributes that usually apply to all of the included observations."[177]

OBR – Observation Request Segment Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	4	SI	R				Set ID - OBR	
2	22	EI	C				Placer Order Number	
3	22	EI	R				Filler Order Number	
4	250	CE	R				Universal Service Identifier	
5	2	ID	X				Priority – OBR	Not supported
6	26	TS	X				Requested Date/Time	Retained to be backward compatible with BT message.
7	26	TS	C				Observation Date/Time	
8	26	TS	O				Observation End Date/Time	
9	20	CQ	O				Collection Volume	
10	250	XCN	O	Y			Collector Identifier	
11	1	ID	O		0065		Specimen Action Code	Not supported
12	250	CE	O				Danger Code	Not supported
13	300	ST	O				Relevant Clinical Information	
14	26	TS	B				Specimen Received Date/Time	Not supported ; part of SPM
15	300	SPS	B				Specimen Source	Not supported ; part of SPM
16	250	XCN	O	Y			Ordering Provider	
17	250	XTN	O	Y/2			Order Callback Phone Number	
18	60	ST	O				Placer Field 1	Not supported
19	60	ST	O				Placer Field 2	Not supported
20	60	ST	O				Filler Field 1	Not supported
21	60	ST	O				Filler Field 2	Not supported
22	26	TS	C				Results Rpt/Status Chng - Date/Time	
23	40	MOC	O				Charge to Practice	Not supported
24	10	ID	O		0074		Diagnostic Serv Sect ID	Not supported
25	1	ID	C		0123		Result Status	
26	400	PRL	O				Parent Result	
27	200	TQ	B	Y			Quantity/Timing	Deprecated
28	250	XCN	O	Y			Result Copies To	
29	200	EIP	O				Parent	
30	20	ID	O		0124		Transportation Mode	Not supported
31	250	CE	O	Y		PH_Reason For Study	Reason for Study	
32	200	NDL	O				Principal Result Interpreter	
33	200	NDL	O	Y			Assistant Result	

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
							Interpreter	
34	200	NDL	O	Y			Technician	
35	200	NDL	O	Y			Transcriptionist	
36	26	TS	O				Scheduled Date/Time	Not supported
37	4	NM	O				Number of Sample Containers *	Not supported
38	250	CE	O	Y			Transport Logistics of Collected Sample	Not supported
39	250	CE	O	Y			Collector's Comment *	
40	250	CE	O				Transport Arrangement Responsibility	
41	30	ID	O		0224		Transport Arranged	Not Supported
42	1	ID	O		0225		Escort Required	Not Supported
43	250	CE	O	Y			Planned Patient Transport Comment	Not Supported
44	250	CE	O	N	0088		Procedure Code	Not Supported
45	250	CE	O	Y	0340		Procedure Code Modifier	Not Supported
46	250	CE	O	Y	0411		Placer Supplemental Service Information	Not Supported
47	250	CE	O	Y	0411		Filler Supplemental Service Information	Not Supported
48	250	CWE	C	N	0476		Medically Necessary Duplicate Procedure Reason.	Not Supported
49	2	IS	O	N			Result Handling.	

OBR - Field Definitions

OBR-1 Set ID (SI-4, Required)

Definition: This field identifies the sequence number of one of multiple OBR's under one PID. "For the first order transmitted, the sequence number shall be 1; for the second order, it shall be 2; and so on."[178]

```
For example, the second OBR under a single MSH (message header)
would appear as:  |2|
```

OBR-2 Placer Order Number (EI-22, Optional)

Definition: "This field is a case of the Entity Identifier data type (Section 2.16.28). The first component is a string that identifies an individual order (e.g., OBR). A limit of fifteen (15) characters is suggested but not required. It is assigned by the place (ordering application). It identifies an order uniquely among all orders from a particular ordering application. The second through fourth components contain the application ID of the placing application in the same form as the HD data type (Section 2.16.36, 'HD – Hierarchic designator')."[179]

This field should not contain the accession number for a specimen. Instead the specimen number should be placed in SAC-1 or SAC-2.

OBR-3 Filler Order Number (EI-22, Required)

Definition: "This field is the order number associated with the filling application. This is the number assigned to the test by the organization performing the test. This string must uniquely identify the order (as specified in the order detail segment) from other orders in a particular filling application (e.g., public health laboratory). This uniqueness must persist over time. "[180]

This field should not contain the accession number for a specimen. Instead the specimen number should be placed in SAC-1 or SAC-2.

"The second through fourth components contain the filler application ID. The second component of the filler order number always identifies the actual filler of an order. A given institution or group of intercommunicating institutions should establish a list of applications that may be potential placers and fillers of orders and assign each a unique application ID. The application ID list becomes part of the institution's master dictionary, as documented in HL7's Chapter 8. Since third-party applications (those other than the placer and filler of an order) can send and receive ORM and ORR messages, the filler application ID in this field may not be the same as any other sending and receiving application on the network (as identified in the MSH segment).

ORC-3-filler order number is the same as *OBR-3-filler order number*. If the filler order number is not present in the ORC, it must be present in the associated OBR. (This rule is the same for other identical fields in the ORC and OBR and promotes upward and ASTM compatibility.) This is particularly important when results are transmitted in an ORU message. In this case, the ORC is not required and the identifying filler order number must be present in the OBR segments. The *filler order number (OBR-3 or ORC-3)* uniquely identifies an order and its associated observations."[181]

OBR-4 Universal Service ID (CE-250, Required)

Definition: "This field is the identifier code for the requested observation/test/battery. This can be based on local and/or "universal" codes."[182]

An example valuing all of the CE data type components for a report of antimicrobial susceptibility would appear as:

```
|625-4^MICROORGANISM IDENTIFIED^LN^15555^ORGANISM^L|
```

No coding recommendation for laboratory-based reporting has been made for OBR-4 since the field describes the originally requested order (e.g., a hepatitis panel or anti-microbial susceptibility testing battery). The value of OBR-4 will be continued from the original order, since this is a required field, but the information in OBR-4 will not be used routinely. The "informative field" for laboratory-based reporting is OBX-3, described below. OBX-3 should be used to provide an unambiguous, specific test name and OBX-5 should provide the result to the test. Examples of messages for different laboratory-reportable findings are given in Appendix A.

An example for a report of a locally-defined hepatitis panel would appear as:

```
|^^^78334^Hepatitis Panel, Measurement^L|      (in that,
sub-components 1 through 3 reserved for standard coding
systems are blank)
```

Here the code is a user-defined "local" code, as indicated by the <L> in the sixth component. Note that the "Universal Service ID" is a code that often represents the battery or collection of tests that make up a routine laboratory panel. The individual results of the different components of the hepatitis panel are reported in the OBX segments described below. For most laboratory tests that are reportable to public health officials, the description of the test and result is sufficiently given in OBX and does not need repetition here. Information in OBR-4 will not be used routinely in public health reporting. An example of this is given in Appendix A for blood lead reporting.

OBR-5 Priority (ID-2, Optional)

The PHIN Messaging Standard does not make use of this field.

OBR-6 Requested Date Time (TS-26, Optional)

Definition: Although HL7 has deprecated use of this field, it is retained to be backward compatible with BT message. The date/time on which the test was requested to be performed by the filler organization, i.e., the performing laboratory.

OBR-7 Observation Date Time (TS-26, Optional)

Definition: "This field is the clinically relevant date/time of the observation. In the case of observations taken directly from a subject, it is the actual date and time the observation was obtained or started. In the case of a specimen-associated study, this field shall represent the date and time the specimen was collected or obtained."[183]

```
Time stamp (TS) data type must be in the format:
YYYY[MM[DD[HHMM[SS[.S[S[S[S]]]]]]]][ ]
```

The user values the field only as far as needed. When a system has only a partial date, e.g., month and year, but not day, the missing values may be interpreted as zeros. The time zone is assumed to be that of the sender.

```
For example: |200011270930|.
This field will mirror the value in SPM-17 if used.
```

OBR-8 Observation End Date Time (TS-26, Optional)

Definition: "This field is the end date and time of a study or timed specimen collection. If an observation takes place over a substantial period of time, it will indicate when the observation period ended. For observations made at a point in time, it will be null."[184]

```
Time stamp (TS) data type must be in the format:
YYYY[MM[DD[HHMM[SS[.S[S[S[S]]]]]]]][ ]
```

The user values the field only as far as needed. When a system has only a partial date, e.g., month and year, but not day, the missing values may be interpreted as zeros. The time zone is assumed to be that of the sender.

```
For example: |200011271030|
```

For FDA, this field may be applicable for some tests. The SPM segment does not contain a collection end time field.

OBR-9 Collection Volume (CQ-20, Optional)

The PHIN Messaging Standard does not make use of this field

OBR-10 Collector identifier (XCN-250, Optional) 00244

Definition: "When a specimen is required for the study, this field will identify the person, department, or facility that collected the specimen. Either name or ID code, or both, may be present."[185]

OBR-11 Specimen action code (ID-1, Optional) 00245

The PHIN Messaging Standard does not make use of this field

OBR-12 Danger code (CE-250, Optional) 00246

The PHIN Messaging Standard does not make use of this field

OBR-13 Relevant clinical information (ST-300, Optional) 00247

Definition: "This field contains any additional clinical information about the patient or specimen. This field is used to report the suspected diagnosis and clinical findings on requests for interpreted diagnostic studies. Examples include reporting the amount of inspired carbon dioxide for blood gasses, the point in the menstrual cycle for cervical pap tests, and other conditions that influence test interpretations. For some orders this information may be sent on a more structured form as a series of OBX segments (see Chapter 7) that immediately follow the order segment."[186]

OBR-14 Specimen received date/time (TS-26, Optional) 00248

The PHIN Messaging Standard does not make use of this field; refer to SPM segment.

OBR-15 Specimen source (SPS-300, Optional) 00249

The PHIN Messaging Standard does not make use of this field.

OBR.16 Ordering Provider (XCN-250, Optional)

Definition: "This field identifies the provider who ordered the test. The value passed here currently duplicates the value passed in ORC.12 – Ordering Provider."[187]

OBR-17 Order callback phone number (XTN-250, Optional) 00250

Definition: "This field is the telephone number for reporting a status or a result using the standard format with extension and/or beeper number when applicable."[188]

OBR-18 Placer field 1 (ST-60, Optional) 00251

The PHIN Messaging Standard does not make use of this field

OBR-19 Placer field (ST-60, Optional) 00252

The PHIN Messaging Standard does not make use of this field

OBR-20 Filler field 1 (ST-60, Optional) 00253

The PHIN Messaging Standard does not make use of this field

OBR-21 Filler field 2 (ST-60, Optional) 00254

The PHIN Messaging Standard does not make use of this field

OBR-22 Results rpt/status chng - date/time (TS-26, Optional) 00255

Definition: "This field specifies the date/time results reported or status changed. This field is used to indicate the date and time that the results are composed into a report and released, or that a status, as defined in *ORC-5-order status*, is entered or changed. (This is a results field only.) When other applications (such as office or clinical database applications) query the laboratory application for un-transmitted results, the information in this field may be used to control processing on the communications link. Usually, the ordering service would want only those results for which the reporting date/time is greater than the date/time the inquiring application last received results."[189]

OBR-23 Charge to practice (MOC-40, Optional) 00256

The PHIN Messaging Standard does not make use of this field

OBR-24 Diagnostic serv sect ID (ID-10, Optional) 00257

The PHIN Messaging Standard does not make use of this field

OBR-25 Result status (ID-1, Optional) 00258

Definition: "This field is the status of results for this order. This conditional field is required whenever the OBR is contained in a report message. It is not required as part of an initial order.

There are two methods of sending status information. If the status is that of the entire order, use *ORC-15-order effective date/time* and *ORC-5-order status*. If the status pertains to the order detail segment, use *OBR-25-result status* and *OBR-22-results report/status change - date/time*. If both are present, the OBR values override the ORC values.

This field would typically be used in a response to an order status query where the level of detail requested does not include the OBX segments. When the individual status of each result is necessary, *OBX-11-observ result status* may be used. Refer to the HL7 Standard and table 0123 – Result Status for valid entries."[190]

OBR-26 Parent Result (PRL-400) 00259

Definition: "This field is defined to make it available for other types of linkages (e.g., toxicology). This important information, together with the information in *OBR-29-parent,* uniquely identifies the parent result's OBX segment related to this order. The value of this OBX segment in the parent result is the organism or chemical species about which this battery reports. For example, if the current battery is an antimicrobial susceptibility, the parent result's identified OBX contains a result which identifies the organism on which the susceptibility were run. This indirect linkage is preferred because the name of the organism in the parent result may undergo several preliminary values prior to finalization.

The third component may be used to record the name of the microorganism identified by the parent result directly. The organism in this case should be identified exactly as it is in the parent culture.

We emphasize that this field does not take the entire result field from the parent. It is meant only for the text name of the organism or chemical subspecies identified. This field is included only to provide a method for linking back to the parent result for those systems which could not generate unambiguous Observation IDs and sub-IDs.

This field is present only when the parent result is identified by *OBR-29-parent* and the parent spawn child orders for each of many results. (See Chapter 7 for more details about this linkage.)

A second mode of conveying this information is to use a standard observation result segment (OBX). If more than one organism is present, *OBX-4-observation subID* is used to distinguish them. In this case, the first OBX with subID N will contain a value identifying the Nth microorganism, and each additional OBX with subID N will contain susceptibility values for a given antimicrobial test on this organism."[191]

An example is:

```
|600-7&Microorganism identified&LN^^L-25116&Streptococcus
pneumoniae&SNM|
```

In this example, <600-7> is the code for a microbial culture that appeared in a previous OBX-3:

<Microorganism identified> is the text describing the code; and <LN> represents the name of the coding system, LOINC®. The second component of this field is not used in this message and remains blank. The third component has the code for *Streptococcus pneumonia*e, the text name of the organism, and the code representing the name of the coding system, SNOMED®. The third component was the OBX-5 that appeared in the parent result. The report of the antimicrobial susceptibility testing performed on the previously identified *Streptococcus pneumoniae* will be given in the OBX segment described below. Most laboratory findings that will be reported will not require the "parent result" field to be populated. A notable exception is the reporting of antimicrobial susceptibility testing results.

For laboratories that develop an HL7 message for laboratory-based reporting only and do not use HL7 within their institution, the parent result field should be used to report the name of the

organism on which sensitivities were performed. OBR-26 would therefore appear as:

```
|^^L-25116&Streptococcus pneumoniae&SNM|
```

OBR-27 Quantity/timing (TQ-200, Optional) 00221

The PHIN Messaging Standard does not make use of this field;

OBR-28 Result Copies To (XCN-250, Optional) 00260

Definition: "This field is the people who are to receive copies of the results. By local convention, either the ID number or the name may be absent."[192]

OBR-29 Parent (EIP-200, Optional) 00261

Definition: "This field relates a child to its parent when a parent/child relationship exists. For example, observations that are spawned by previous observations, e.g., antimicrobial susceptibilities spawned by blood cultures, need to record the parent (blood culture) filler order number here. The parent/child mechanism is described under the order control field notes (see Segment ORC field notes in Section 4.3.1.1.1, "Table notes for order control codes of ORC." It is required when the order is a child."[193]

OBR-30 Transportation Mode (ID-20, Optional) 00262

The PHIN Messaging Standard does not make use of this field

OBR-31 Reason for Study (CE-250, Optional) 00263

Definition: "This field is the code or text using the conventions for coded fields given in Chapter 2, Control."[194]

Usage Note: The valid values for the field are carried in the PH_StudyReason coding system/value set.

OBR-32 Principal Result Interpreter (NDL-200, Optional) 00264

Definition: "This field identifies the physician or other clinician who interpreted the observation and is responsible for the report content."[195]

OBR-33 Assistant Result Interpreter (NDL-200, Optional) 00265

Definition: "This field identifies the clinical observer who assisted with the interpretation of this study."[196]

OBR-34 Technician (NDL-200, Optional) 00266

Definition: "This field identifies the performing technician."[197]

OBR-35 Transcriptionist (NDL-200, Optional) 00267

Definition: "This field identifies the report transcriber."[198]

OBR-36 Scheduled - Date/Time (TS-26, Optional) 00268

The PHIN Messaging Standard does not make use of this field for results.

OBR-37 Number of Sample Containers (NM-4, Optional) 01028

The PHIN Messaging Standard does not make use of this field

OBR-38Transport Logistics of Collected Sample (CE-250, Optional) 01029

The PHIN Messaging Standard does not make use of this field

OBR-39 Collector's Comment (CE-250, Optional) 01030

Definition: "This field is for reporting additional comments related to the sample. If coded, requires a user-defined table. If only free text is reported, it is placed in the second component with a null in the first component, e.g., ^difficult clotting after venipuncture and ecchymosis."[199]

OBR-40 Transport Arrangement Responsibility (CE-250, Optional) 01031

Definition: "This field is an indicator of who is responsible for arranging transport to the planned diagnostic service. Examples: Requester, Provider, Patient. If coded, requires a user-defined table."[200]

OBR-41 Transport Arranged (ID-30, Optional) 01032

The PHIN Messaging Standard does not make use of this field

OBR-42 Escort Required (ID-1, Optional) 01033

The PHIN Messaging Standard does not make use of this field

OBR-43 Planned Patient Transport Comment (CE-250, Optional) 01034

The PHIN Messaging Standard does not make use of this field

OBR-44 Procedure Code (CE-250, Optional) 00393

The PHIN Messaging Standard does not make use of this field

OBR-45 Procedure Code Modifier (CE-250, Optional) 01316

The PHIN Messaging Standard does not make use of this field

OBR-46 Placer Supplemental Service Information (CE-250, Optional) 01474

The PHIN Messaging Standard does not make use of this field

OBR-47 Filler Supplemental Service Information (CE-250, Optional) 01475

The PHIN Messaging Standard does not make use of this field

OBR-48 Medically Necessary Duplicate Procedure Reason (CWE-250, Optional) 01646

The PHIN Messaging Standard does not make use of this field

OBR-49 Result Handling (IS-2, Optional) 01647

Definition: "Transmits information regarding the handling of the result. For example, an order may specify that the result (e.g., an x-ray film) should be given to the patient for return to the requestor. Refer to user-defined table 0507 – Observation Result Handling in Chapter 4, Section 4.5.3.49 for suggested values. If this field is not populated then routine handling is implied."[201]

ORC - Common Order Segment

"The Common Order segment (ORC) is used to transmit fields that are common to all orders (all types of services that are requested). The ORC segment is required in the Order (ORM) message. ORC is mandatory in Order Acknowledgment (ORR) messages if an order detail segment is present, but is not required otherwise."[202]

"Observations can be transmitted in an ORU message without using an ORC. There are times when it is necessary to transmit information not included in the OBR segments of the ORU message. In this case, it is recommended that the ORC be included in the ORU message."[203]

The ORC will be an optional segment for FDA purposes. The Order Status and Order Effective Date/Time elements may be used in place of OBR 22 and 25 when reporting complete and final orders. The ORC will also be used for reporting Ordering Facility and Provider information when available.

Usage notes: The ORC segment will be left optional for electronic laboratory reporting purposes.

ORC – Common Order Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	2	ID	R		0119	HL70119	Order Control	
2	22	EI	C				Placer Order Number	
3	22	EI	C				Filler Order Number	
4	22	EI	O				Placer Group Number	Not supported
5	2	ID	O		0038		Order Status	Not supported
6	1	ID	O		0121		Response Flag	Not supported
7	200	TQ	B	Y			Quantity/Timing	Not supported
8	200	EIP	O				Parent	Not supported
9	26	TS	O				Date/Time of Transaction	Not supported
10	250	XCN	O	Y			Entered By	Not supported
11	250	XCN	O	Y			Verified By	Not supported
12	250	XCN	O	Y			Ordering Provider	Not supported
13	80	PL	O				Enterer's Location	Not supported
14	250	XTN	O	Y/2			Call Back Phone Number	Not supported
15	26	TS	O				Order Effective Date/Time	Not supported
16	250	CE	O				Order Control Code Reason	Not supported
17	250	CE	O				Entering Organization	Not supported
18	250	CE	O				Entering Device	Not supported
19	250	XCN	O	Y			Action By	Not supported
20	250	CE	O		0339		Advanced Beneficiary Notice Code	Not supported
21	250	XON	O	Y			Ordering Facility Name	
22	250	XAD	O	Y			Ordering Facility Address	
23	250	XTN	O	Y			Ordering Facility Phone Number	
24	250	XAD	O	Y			Ordering Provider Address	
25	250	CWE	O				Order Status Modifier	Not Supported
26	60	CWE	C		0552		Advanced Beneficiary Notice Override Reason	Not Supported
27	26	TS	O				Filler's Expected Availability Date/Time	Not Supported
28	250	CWE	O		0177		Confidentiality Code	Not Supported
29	250	CWE	O		0482		Order Type	Not Supported
30	250	CNE	O		0483		Enterer Authorization Mode	Not Supported

ORC Field Definitions

ORC-1 Order Control (ID) 00215

Definition: "Determines the function of the order segment. Refer to the HL7 Standard and table 0119 – Order Control Codes and Their Meaning for valid entries. Depending on the message, the action of the control code may refer to an order or an individual service. For example, the code CA in an OMP message cancels the order. The same code in an RDS message, cancels the dispense."[204]

For the PHIN OUL^R22 result messages, the values are constrained to "RE" (results to follow) or "CN" (combined results). Very detailed explanatory notes are given in the HL7 2.5 Standard.

ORC-2 Placer Order Number (EI) 00216

Definition: "This field is the placer application's order number."[205]

Note: This must be the same identifier as that reported in OBR-2 (Placer Order Number).

ORC-3 Filler Order Number (EI) 00217

Definition: "This field is the order number associated with the filling application. It is a case of the Entity Identifier data type (Section 2.A.28). Its first component is a string that identifies an order detail segment (e.g., OBR). A limit of fifteen (15) characters is suggested but not required. An implementation is HL7 compliant when the number of characters for this field is increased to accommodate applications that require a greater number of characters for the Filler order number. It is assigned by the order filler (receiving) application. This string must uniquely identify the order (as specified in the order detail segment) from other orders in a particular filling application (e.g., clinical laboratory). This uniqueness must persist over time."[206]

Note: This must be the same identifier as that reported in OBR-3 (Filler Order Number).

ORC-4 Placer Group Number (EI) 00218

The PHIN Messaging Standard does not make use of this field.

ORC-5 Order Status (ID) 00219

The PHIN Messaging Standard does not make use of this field.

ORC-6 Response Flag (ID) 00220

The PHIN Messaging Standard does not make use of this field.

ORC-7 Quantity/Timing (TQ) 00221

The PHIN Messaging Standard does not make use of this field.

ORC-8 Parent (EIP) 00222

The PHIN Messaging Standard does not make use of this field.

ORC-9 Date/Time of Transaction (TS) 00223

The PHIN Messaging Standard does not make use of this field.

ORC-10 Entered By (XCN) 00224

The PHIN Messaging Standard does not make use of this field.

ORC-11 Verified By (XCN) 00225

The PHIN Messaging Standard does not make use of this field.

ORC-12 Ordering Provider (XCN) 00226

The PHIN Messaging Standard does not make use of this field.

ORC-13 Enterer's Location (PL) 00227

The PHIN Messaging Standard does not make use of this field.

ORC-14 Call Back Phone Number (XTN) 00228

The PHIN Messaging Standard does not make use of this field.

ORC-15 Order Effective Date/Time (TS) 00229

The PHIN Messaging Standard does not make use of this field.

ORC-16 Order Control Code Reason (CE) 00230

The PHIN Messaging Standard does not make use of this field.

ORC-17 Entering Organization (CE) 00231

The PHIN Messaging Standard does not make use of this field.

ORC-18 Entering Device (CE) 00232

The PHIN Messaging Standard does not make use of this field.

ORC-19 Action By (XCN) 00233

The PHIN Messaging Standard does not make use of this field.

ORC-20 Advanced Beneficiary Notice Code (CE) 01310

The PHIN Messaging Standard does not make use of this field.

ORC-21 Ordering Facility Name (XON) 01311

Definition: "This field contains the name of the facility placing the order."[207]

ORC-22 Ordering Facility Address (XAD) 01312

Definition: "This field contains the address of the facility placing the order."[208]

ORC-23 Ordering Facility Phone Number (XTN) 01313

Definition: "This field contains the telephone number of the facility placing the order."[209]

ORC-24 Ordering Provider Address (XAD) 01314

Definition: "This field contains the address of the care provider requesting the order."[210]

ORC-25 Order Status Modifier (CWE) 01473

The PHIN Messaging Standard does not make use of this field.

ORC-26 Advanced Beneficiary Notice Override Reason (CWE) 01641

The PHIN Messaging Standard does not make use of this field.

ORC-27 Filler's Expected Availability Date/Time (TS) 01642

The PHIN Messaging Standard does not make use of this field.

ORC –28 Confidentiality Code (CWE) 00615

The PHIN Messaging Standard does not make use of this field.

ORC –29 Order Type (CWE) 01643

The PHIN Messaging Standard does not make use of this field.

ORC-30 Enterer Authorization Mode (CNE) 01644

The PHIN Messaging Standard does not make use of this field.

OBX - Observation/Result

"The OBX segment is used to transmit a single observation or observation fragment. It represents the smallest indivisible unit of a report. The OBX segment can also contain encapsulated data, e.g., a CDA document or a DICOM image.

Its principal mission is to carry information about observations in report messages."[211]

OBX – Observation/Result Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	4	SI	O				Set ID – OBX	
2	2	ID	C		0125	HL70125	Value Type	Generally, CE, SN, TX, ST supported
3	250	CE	R				Observation Identifier	
4	20	ST	C				Observation Sub-ID	
5	99999	Var	C	Y			Observation Value	
6	250	CE	O				Units	
7	60	ST	O				References Range	
8	5	IS	O	Y	0078	PHVS_OBS_INTRP	Abnormal Flags	
9	5	NM	O				Probability	Not Supported
10	2	ID	O	Y	0080		Nature of Abnormal Test	
11	1	ID	R		0085		Observation Result Status	
12	26	TS	O				Effective Date of Reference Range	
13	20	ST	O				User Defined Access Checks	
14	26	TS	O				Date/Time of the Observation	
15	250	CE	O				Producer's ID	
16	250	XCN	O	Y			Responsible Observer	
17	250	CE	O	Y			Observation Method	
18	22	EI	O	Y			Equipment Instance Identifier	
19	26	TS	O				Date/Time of the Analysis	Not Supported

OBX field definitions

OBX-1 Set ID - OBX (SI) 00569

Definition: This field contains the sequence number of the OBX in relation to the OBR Observation segment to which it refers.

OBX-2 Value Type (ID) 00570

Definition: "This field contains the format of the observation value in OBX. It must be valued if *OBX-11-Observ result status* is not valued with an 'X'. If the value is CE then the result must be a coded entry. When the value type is TX or FT then the results are bulk text. The valid values for the value type of an observation are listed in HL7 Table 0125 - Value Type.

The observation value must be represented according to the format for the data type defined in Chapter 2, Section 2.9, "Data Types." For example, a PN consists of 6 components, separated by

component delimiters.

Although NM is a valid type, observations which are usually reported as numbers will sometimes have the string (ST) data type because non-numeric characters are often reported as part of the result, e.g., >300 to indicate the result was off-scale for the instrument. In the example, '>300', '>' is a symbol and the digits are considered a numeric value. However, this usage of the ST type should be discouraged since the SN (structured numeric) data type now accommodates such reporting and, in addition, permits the receiving system to interpret the magnitude.

All HL7 data types are valid, and are included in Table 0125 except CM, CQ, SI, and ID. For a CM definition to have meaning, the specifics about the CM must be included in the field definition. *OBX-5-observation value* is a general field definition that is influenced by the data type *OBX-3*, so CMs are undefined in this context. CQ is invalid because units for *OBX-5-observation value* are always specified explicitly in an OBX segment with *OBX-6 units*. SI is invalid because it only applied to HL7 message segments, and ID because it requires a constant field definition.

The RP value (reference pointer) must be used if the actual observation value is not sent in OBX but exists somewhere else. For example, if the observation consists of an image (document or medical), the image itself cannot be sent in OBX. The sending system may in that case opt to send a reference pointer. The receiving system can use this reference pointer whenever it needs access to the actual image through other interface standards, e.g., DICOM, or through appropriate data base servers.

A list of data types and their full descriptions is given in the HL7 2.5 Standard Chapter 2, Section 2.9, 'Data Types.' The structured numeric (SN) data type, new with version 2.3, provides for reporting ranges (e.g., 3-5 or 10-20), titers (e.g., 1:10), and out-of-range indicators (e.g., >50) in a structured and computer interpretable way.

The FT data type in the OBX segment is allowed but its use is discouraged. Formatted text usually implies a meaningful structure e.g., a list of three independent diagnoses reported on different lines. But ideally, the structure in three independent diagnostic statements would be reported as three separate OBX segments.

TX should not be used except to send large amounts of text. In the TX data type, the repeat delimiter can only be used to identify paragraph breaks. Use ST to send short, and possibly encodable, text strings.

CDA documents are to be exchanged in the OBX segment in any message that can exchange documents (such as MDM or ORU). Within the OBX segment, the MIME package is encoded as an encapsulated (ED) data type."[212]

OBX-3 Observation Identifier (CE) 00571

Definition: "This field contains a unique identifier for the observation. The format is that of the Coded Element (CE). Example: 8625-6^P-R interval^LN.

In most systems the identifier will point to a master observation table that will provide other attributes of the observation that may be used by the receiving system to process the observations it receives. A set of message segments for transmitting such master observation tables is described in Chapter 8. The relation of an observation ID to a master observation table is analogous to the relationship between a charge code (in a billing record) and the charge master.

When local codes are used as the first identifier in this field we strongly encourage sending a universal identifier as well to permit receivers to equivalence results from different providers of the same service (e.g., a hospital lab and commercial lab that provides serum potassium to a nursing home). LOINC® is an HL7 approved code system for the Observation identifier. It covers observations and measurements, such as laboratory tests, physical findings, radiology studies, and claims attachments and can be obtained from www.regenstrief.org/loinc/loinc.htm. One possible universal identifier is LOINC® codes for laboratory and clinical measurements (see the HL7 standard, table 0396 and the HL7 www list server) and Appendix X2 of ASTM E1467 for neurophysiology tests."[213]

OBX-4 Observation Sub-ID (ST) 00572

Definition: "This field is used to distinguish between multiple OBX segments with the same observation ID organized under one OBR. For example, a chest X-ray report might include three separate diagnostic impressions. The standard requires three OBX segments, one for each impression. By putting a 1 in the Sub-ID of the first of these OBX segments, 2 in the second, and 3 in the third, we can uniquely identify each OBX segment for editing or replacement.

The sub-identifier is also used to group related components in reports such as surgical pathology. It is traditional for surgical pathology reports to include all the tissues taken from one surgical procedure in one report. Consider, for example, a single surgical pathology report that describes the examination of gallbladder and appendix tissue. This report would be transmitted roughly as shown in Figure 7-2.

Figure 7-2. Example of sub-identifier usage

```
OBR|1||1234^LAB|88304&SURG PATH REPORT|...<cr>
OBX|1|CE|88304&ANT|1|T57000^GALLBLADDER^SNM|...<cr>
OBX|2|TX|88304&GDT|1|THIS IS A NORMAL GALLBLADDER|...<cr>
OBX|3|TX|88304&MDT|1|MICROSCOPIC EXAM SHOWS HISTOLOGICALLY
  NORMAL GALLBLADDER TISSUE|...<cr>
OBX|4|CE|88304&IMP|1|M-00100^NML^SNM|...<cr>
OBX|5|CE|88304&ANT|2|T66000^APPENDIX^SNM|...<cr>
OBX|6|TX|88304&GDT|2|THIS IS A RED, INFLAMED, SWOLLEN, BOGGY
APPENDIX|...<cr>
OBX|7|TX|88304&MDT|2|INFILTRATION WITH MANY PMN's - INDICATING
INFLAMATORY CHANGE|...<cr>
OBX|8|CE|88304&IMP|2|M-40000^INFLAMMATION NOS^SNM|...<cr>
```

The example in Figure 7-2 has two segments for each component of the report, one for each of the two tissues. Thus, there are two 88304&ANT segments; there are two 88304&GDT segments, and there are two 88304&MDT segments. Segments that apply to the gallbladder all have the sub-identifier 1. Segments that apply to the appendix all have sub-identifier 2.

The observation sub ID has other grouping uses. It can be used to organize the reporting of some kinds of fluid intakes and outputs. For example, when intake occurs through multiple intravenous lines, a number of separate observations (OBX segments), the intake volume, the type of intake (Blood, D5W, Plasma, etc.), the site of the IV line, etc. may be needed for each intravenous line, each requiring a separate OBX segment. If more than one IV line is running, we can logically link all of the OBX segments that pertain to the first IV line by assigning them an observation sub ID of 1. We can do the same with the second IV line by assigning them a sub ID 2 and so on. The same would apply to the outputs of surgical drains when there are multiple such drains.

The use of the sub ID to distinguish repeating OBXs for the same observation ID is really a special case of using the sub ID to group, as can be seen if we picture the OBX segments in Figure 7-2 as part of a table where the rows correspond to a particular species of observation and the cells correspond to the sub ID numbers that would be associated with each corresponding OBX.

Distinct Observations	88304&ANT	88304&GDT	80304&MDT	80304&IMP
Sub ID 1st Group	1	1	1	1
Sub ID 2nd Group	2	2	2	2

The use of Sub IDs to group results is equivalent to defining a table, and the use of sub IDs to distinguish repeats is just a special case, represented by one column in this table.

However, this approach introduces ambiguities if we have a set of repeating observations within a group, e.g., if the appendix observations include two impressions as in the 8th and 9th OBXs shown in Figure 7-3. This really represents the existence of a row nested within a single cell of the table given above.

Figure 7-3. Example of sub-identifier usage

```
OBX|1|CE|880304&ANT|1|T57000^GALLBLADDER^SNM|...<cr>
OBX|2|TX|880304&GDT|1|THIS IS A NORMAL GALL BLADDER|...<cr>
OBX|3|TX|880304&MDT|1|MICROSCOPIC EXAMINATION SHOWS
HISTOLOGICALLY
   NORMAL GALLBLADDER TISSUE|...<cr>
OBX|4|CE|880304&IMP|1|M-00100^NML^SNM|...<cr>
OBX|5|CE|880304&ANT|2|T57000^APPENDIX^SNM|...<cr>
OBX|6|TX|880304&GDT|2|THIS IS A RED, INFLAMED APPENDIX|...<cr>
OBX|7|TX|880304&MDT|2|INFLAMMATION WITH MANY PUS CELLS-ACUTE
INFLAMMATION|...<cr>
OBX|8|CE|880304&IMP|2|M-40000^INFLAMMATION NOS^SNM|...<cr>
OBX|9|CE|880304&IMP|2|M-30280^FECALITH^SNM|...<cr>
```

The text under *OBX-5-observation value* provides guidance about dealing with two OBXs with the same observation ID and observation sub IDs. They are sent and replaced as a unit. However, some systems will take this to mean that the set of OBXs is to be combined into one composite observation in the receiving system. We suggest the use of a dot and a string (similar to the Dewey Decimal system) when users wish to distinguish each of the repeats within one type, or results within a cell for editing and correction purposes. Using this system, Figure 7-3 would become 7-4. If there are cases where such nesting occurs at even deeper levels, this approach could be extended.

Figure 7-4. Example of sub-identifier usage

```
OBX|1|CE|880304&ANT|1|T57000^GALLBLADDER^SNM|...<cr>
OBX|2|TX|880304&GDT|1|THIS IS A NORMAL GALL BLADDER|...<cr>
OBX|3|TX|880304&MDT|1|MICROSCOPIC EXAMINATION SHOWS
HISTOLOGICALLY
   NORMAL GALLBLADDER TISSUE|...<cr>
OBX|4|CE|880304&IMP|1|M-00100^NML^SNM|...<cr>
OBX|5|CE|880304&ANT|2|T57000^APPENDIX^SNM|...<cr>
OBX|6|TX|880304&GDT|2|THIS IS A RED, INFLAMED APPENDIX|...<cr>
OBX|7|TX|880304&MDT|2|INFLAMMATION WITH MANY PUS CELLS-ACUTE
INFLAMMATION|...<cr>
OBX|8|CE|880304&IMP|2.1|M-40000^INFLAMMATION NOS^SNM|...<cr>
OBX|9|CE|880304&IMP|2.2|M-30280^FECALITH^SNM|...<cr>
```

Use a null or 1 when there is no need for multiples.

If the observation includes a number of OBXs with the same value for the observation ID OBX-3, then one must use different values for the sub-ID. This is in fact the case of the repeats depicted in Figure 7-4, but without any need to group sets of OBXs. Three such OBXs could be distinguished by using sub-IDs 1, 2 etc. alternatively, sub-IDs 1.1, 1.2, 1.3 could be used, as shown in Figure 7-4. Figure 7-5 shows and example of an electrocardiograph chest radiograph report with three diagnostic impressions, using 1,2,3 in the sub-ID field to distinguish the three separate results.

Figure 7-5. Example of Sub-ID used to distinguish three independent results with the same observation ID

```
OBX|1|CE|8601-7^EKG IMPRESSION ^LN|1|^atrial fibrillation|...<cr>
OBX|2|CE|8601-7^EKG IMPRESSION ^LN|2|^OLD SEPTAL MYOCARDIAL
INFARCT|...<cr>
OBX|3|CE|8601-7^EKG IMPRESSION ^LN|3|^poor R wave
progression|...<cr>"
```

[214]

OBX-5 Observation Value (varies) 00573

Definition: "This field contains the value observed by the observation producer. *OBX-2-value type* contains the data type for this field according to which observation value is formatted. It is not a required field because some systems will report only the normalcy/abnormalcy (*OBX-8*), especially in product experience reporting. The length of the observation field is variable, depending upon *OBX-3-value type*. This field may repeat (using a tilde ~) for multipart, single answer results with appropriate data types, e.g., CE, TX, ST and FT data types."[215]

Generally repeats are not supported and the data is split across more than one OBX, tying the segments together with the Obserations Sub-ID and the same value in OBX-3, Observation Identifier. It simplifies parsing to use a new OBX for each observation.

"Coded values

When an OBX segment contains values of CE data types, the observations are stored as a combination of codes and/or text. The observation may be an observation battery ID (for recommended studies), a diagnostic code or finding (for a diagnostic impression), or an anatomic site for a pathology report, or any of the other kinds of coded results.

It is not necessary to always encode the information stored within a coded observation. For example, a chest X-ray impression could be transmitted as pure text even though it has a CE data type. In this case, the test must be recorded as the second component of the result code, e.g.,

```
OBX|1|CE|71020&IMP|1|^CONGESTIVE HEART FAILURE.|...<cr>
```

However, separate impressions, recommendations, etc., even if recorded as pure text, should be recorded in separate result segments. That is, congestive heart failure and pneumonia should not be sent as:

```
OBX|1|CE|71020&IMP|1|^CONGESTIVE HEART FAILURE AND
PNEUMONIA|...<cr>
```

but as:

```
OBX|1|CE|71020&IMP|1|^CONGESTIVE HEART FAILURE|...<cr>
OBX|2|CE|71020&IMP|2|^PNEUMONIA|....<cr>
```

Even better would be fully-coded results that include computer understandable codes (component 1) instead of, or in addition to, the text description (component 2). One may include multiple values in a CE value and these can be mixtures of code and text, but only when they are needed to construct one diagnosis, impression, or concept. When text follows codes as an independent value it would be taken as a modifier or addenda to the codes. E.g.,

```
OBX|1|CE|710120&IMP^CXR|1|428.0^CONGESTIVE HEART
FAILURE^I9C~^MASSIVE HEART|...<cr>
```

The text in component 2 should be an accurate description of the code in component 1. Likewise, if used, the text in component 5 should be an accurate description of the code in component 4."[216]

OBX-6 Units (CE) 00574

Definition: "When an observation's value is measured on a continuous scale, one must report the measurement units within the units field of the OBX segment. Since HL7 Version 2.2 of the specification, all fields that contain units are of data type CE. The default coding system for the units codes consists of the ISO abbreviation for a single case unit (ISO 2955-83) plus extensions that do not collide with ISO abbreviations. We designate this coding system as ISO+ (see Figure 7-9). Both the ISO unit's abbreviations and the extensions are defined in Section 0, "ISO and ANSI customary units abbreviations." The ISO+ abbreviations *are* the codes for the default coding system. Consequently, when ISO+ units are being used, only ISO+ abbreviations need be sent, and the contents of the units field will be backward compatible to HL7 Version 2.1.

Components: <Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> ^ <Alternate Identifier (ST)> ^ <Alternate Text (ST)> ^ <Name of Alternate Coding System (ID)>

Identifying reporting units

HL7 strongly encourages observation producers to use ISO+ abbreviated units exclusively, but permit the use of other code systems, including US customary units (ANSI X3.50) and locally defined codes where necessary. Local units are designated L or 99zzz where z is an alphanumeric character (see Figures 7-2 and 73). ANSI X3.50 - 1986 provides an excellent description of these standards, as well as a table of single case abbreviations for US customary units such as foot or gallon.

HL7 had originally intended to include the ANSI X3.50 - 1986 US customary units in the default ISO+ coding system. However, there are overlaps between ISO's abbreviations and the abbreviations for US customary units. For example, ft is the abbreviation for foot in US customary units and for femtotesla in ISO; pt is the abbreviation for pint in US customary and for picotesla in ISO. (Be aware that the ANSI document also differs from the ISO document regarding the abbreviation of a few ISO units, as well.) In order to avoid potential ambiguity, we have defined another coding system, designated ANS+ (see Figure 7.7). It includes the U.S. customary units (e.g., feet, pounds) and ISO abbreviations defined in ANSI X3.50 - 1986, as well as other non-metric units listed in Figure 7-7 and the ISO combinations of these units. Be aware that a few of the ANSI ISO unit abbreviations differ from their abbreviations in ISO (see note at bottom of Figure 7-7).

Because the ANS+ specification includes both ISO and US customary units, as well as miscellaneous non-metric units, some of the abbreviations are ambiguous. Although there should be little confusion, in the context of a particular observation, this ambiguity is a good reason for avoiding ANS+ unit codes when possible.

When ANS+ units codes (abbreviations) are being transmitted, ANS+ must be included in the third (sixth) component of the field. If the units of distance were transmitted as meters (ISO+) it would be transmitted as m because ISO+ is the default coding system for units. However, if transmitted in the US customary units of feet, the units would be transmitted as ft^^ANS+. When required, the full text of the units can be sent as the second component in keeping with the CE data type conventions.

Both ISO and ANSI also provide a set of mixed case abbreviations, but these abbreviations cannot be translated to single case without loss of meaning, and should not be used in this specification whose content is required to be case insensitive.

ISO and ANSI customary units abbreviations

ISO builds its units from seven base dimensions measured as meters, kilograms, seconds, amperes, kelvins, moles and candelas (see Figure 7-6). Other units can be derived from these by adding a prefix to change the scale and/or by creating an algebraic combination of two or more base or derived units. However, some derived units have acquired their own abbreviations (see Figure 7-6). Abbreviations for U.S. customary units are given in Figure 7-6.

The ISO rules, well explained in ANSI X3.50, provide a way to create units of different scales by adding multiplier prefixes. These prefixes can be expressed as words or abbreviations. In this Standard we are only concerned with the abbreviations.

Figure 7-6. ISO single case units abbreviations

Units	Abbreviation	Units	Abbreviation	Units	Abbreviation
Base units code/abbreviations					
ampere	a	kelvin	k	meter	m
candela	cd	Kilogram	kg	mole	mol
				second	s
Derived units with specified name and abbreviation					
coulomb	c	hour	Hr	pascal	pal
day	d	joule	J	volt	v
degree Celsius	cel	minute (ti)	Min	watt	w
farad	f	newton	N	weber	wb
hertz	hz	ohm	Ohm	year	ann
Other units					
atomic mass unit	u	grey	gy	minute of arc	mnt
Bel	b	henry	h	radian	rad
Decibel	db	liter	l	siemens	sie
Degree	deg	lumen	Lm	steradian	sr
Gram	g	lux	Lx	tesla	t
See ISO 2955-1983 for full set					

The ISO abbreviations for multiplier prefixes are given in Figure 7-12. Prefixes ranging from 10^{-24} (1/billion billionth) to 10^{24} (a billion billion) are available. The single case abbreviation for kilo (x1000) is **k**. A unit consisting of 1000 seconds would be abbreviated as **ks**, 1000 grams as **kg**, 1000 meters as **km**, and so on. Some prefixes share the abbreviation of a base unit. Farad and femto, for example, (10^{-18}) both have the abbreviation of **f**. To avoid confusion, ISO forbids the use of solitary prefixes. It also deprecates the use of two prefixes in one complex unit. Thus, **f** always means farad, **ff** would mean 1 million billionth of a farad. Compound prefixes are not allowed.

A unit can be raised to an exponential power. Positive exponents are represented by a number immediately following a unit's abbreviation, i.e., a square meter would be denoted by m2. Negative exponents are signified by a negative number following the base unit, e.g., **1/m2** would be represented **as m-2**. Fractional exponents are expressed by a numeric fraction in parentheses: the square root of a meter would be expressed as m(1/2). The multiplication of units is signified by a period (.) between the units, e.g., meters X seconds would be denoted **m.s**. Notice that spaces are not permitted. Division is signified by a slash (/) between two units, e.g. meters per second would be denoted as **m/s**. Algebraic combinations of ISO unit abbreviations constructed by dividing, multiplying, or exponentiating base ISO units, are also valid ISO abbreviations units. Exponentiation has precedence over multiplication or division. For example, microvolts squared per hertz (a unit of spectral power) would be denoted **uv2/hz** and evaluated as uv ^{2}/hz while microvolts per square root of hertz (a unit of spectral amplitude) would be denoted uv/hz(1/2) and evaluated as uv/hz^{½}. If more than one division operator is included in the expression the associations should be parenthesized to avoid any ambiguity, but the best approach is to convert a/(b/c) to a.c/b or a.c.b-1 to simplify the expression.

The ISO code is a grammar for building units. The rules for building these units are found in Figures 7-6 and 7-8. Figure 7-7 should be used only with English units and should not be used in conjunction with Figure 7-8. The ISO+ table (Figure 7-9) includes the most common such units constructed from this grammar (as well as important non-ISO units). Other ISO units derived from the grammar are valid as well.

Figure 7-7. ANSI+ unit codes for some U.S. customary units

Units	Abbreviation	Units	Abbreviation	Units	Abbreviation
LENGTH		VOLUME		TIME	
inch	in	cubic foot	cft	year	yr
foot	ft	cubic inch	cin	month	mo
mile (statute)	mi	cubic yard	cyd	week	wk
nautical mile	nmi	tablespoon	tbs	day	d
rod	rod	teaspoon	tsp	hour	hr
yard	yd	pint	pt	minute	min
		quart	qt	second	sec
		gallon	gal		
		ounce (fluid)	foz		
AREA		MASS			
square foot	sqf	dram	dr		
square inch	sin	grain	gr (avoir)		
square yard	syd	ounce (weight)	oz		
		pound	lb		
Other ANSI units, derived units, and miscellaneous					
**British thermal unit	btu	**degrees Fahrenheit	degf	**millirad	mrad
cubic feet/minute	cft/min	**feet/minute	ft/min	**RAD	rad

Note: The abbreviations for conventional U.S. units of time are the same as ISO, except for year. ISO = ANN, AMSI = yr. The metric units in X3.50 are the same as ISO, except for: pascal ("pa" in ANSI, "pal" in ISO); ANSI uses "min" for both time and arc while ISO uses "mnt" for minutes of arc; and in ISA seconds are abbreviated "s", in ANSI, "sec".

Caution: Because the ANS+ specification includes both ISO and US customary units, as well as miscellaneous non-metric units, some of the abbreviations are ambiguous. Although there should be little confusion, in the context of a particular observation, this ambiguity is a good reason for a voiding ANS+ unit codes when possible.

This list is not exhaustive. Refer to ANSI X3.50-1986, Table 1, for other metric and standard U.S. units.

**Non-metric units not explicitly listed in ANSI

Figure 7-8. Single case ISO abbreviations for multiplier prefixes

Prefix		Code	Prefix		Code
yotta*	10^{24}	ya	yocto	10^{-24}	y
zetta*	10^{21}	za	zepto	10^{-21}	z
exa	10^{18}	ex	atto	10^{-18}	a

Prefix		Code	Prefix		Code
peta	10^{15}	pe	femto	10^{-15}	f
tera	10^{12}	t	pico	10^{-12}	p
giga	10^{9}	g	nano	10^{-9}	n
mega	10^{6}	ma	micro	10^{-6}	u
kilo	10^{3}	k	milli	10^{-3}	m
hecto	10^{2}	h	centi	10^{-2}	c
deca	10^{1}	da	deci	10^{-1}	d
*These abbreviations are not defined in the ISO specification for single case abbreviations.					

Figure 7-9 lists the abbreviations for common ISO derived units. It also includes standard unit abbreviations for common units, e.g., Milliequivalents, and international units, mm(Hg), and for counting per which we denote by a division sign, a denominator, but no numerator, e.g., /c, that are not part of the above referenced ISO standards. HL7 has extended the units table to better accommodate drug routes and physiologic measures, and otherwise fill in gaps in Version 2.2.

HL7 has generally followed the IUPAC 1995 Silver Book[2] in the definitions of units. However, IUPAC specifies standards for reporting or displaying units and employs 8-bit data sets to distinguish them. This Standard is concerned with the *transmission* of patient information. Therefore, we have restricted ourselves to case insensitive alphabetic characters and a few special characters (e.g., ".", "/", "(", ")", "*", and "_") to avoid any possible confusion in the transmission. Therefore, we use ISO 2955-1983 (Information processing -- representation of SI and other units in systems with limited character sets) and ANSI X3.50-1986 (Representations for U.S. customary, SI, and other units to be used in systems with limited character sets) case insensitive units abbreviations where they are defined. This means that in some cases, IUPAC abbreviations have different abbreviations in ISO+ even when the IUPAC abbreviations use only standard alphabetic characters. For example, Pascal is abbreviated Pa in IUPAC but PAL in ISO+ (following ISO 2955) because Pa in a case insensitive context also means Picoampere. However, the requirements for transmission do not preclude usage of IUPAC standards for presentation on paper or video display reports to end-users.

All unit abbreviations are case insensitive. One could write milliliters as ML, ml, or mL. In this table we have used lower case for all of the abbreviations except for the letter L which we represent in upper case so that readers will not confuse it with the numeral one (1). This is just a change in presentation, not a change in the Standard. Systems should continue to send the codes as upper or lower case as they always have.

Local unit codes

Local codes can be used for the units by indicating the code source of 99zzz in the third component (where 99zzz is an alpha-numeric string). In the case of local codes, the text name of the codes or the description of the units should also be transmitted (in the second component), so that the receiving system can compare the results with results for the same measurement sent by another service (refer to HL7 Standard 2.5 Chapter 2, Section 2.9, 'Data Types')."[217]

OBX-7 References Range (ST) 00575

Definition: "When the observation quantifies the amount of a substance, then the upper limit of the range identifies the toxic limit. If the observation quantifies a drug, the lower limits identify the lower therapeutic bounds and the upper limits represent the upper therapeutic bounds above which toxic side effects are common.

Components: for numeric values in the format:

```
lower limit-upper limit (when both lower and upper limits are
defined, e.g., for potassium 3.5 - 4.5)
> lower limit            (if no upper limit, e.g., >10)
< upper limit            (if no lower limit, e.g., <15)
```

Alphabetical values: the normal value may be reported in this location."[218]

OBX-8 Abnormal Flags (IS) 00576

Definition: "This field contains a table lookup indicating the normalcy status of the result. We strongly recommend sending this value when applicable. (See ASTM 1238 - review for more details).

When the laboratory can discern the normal status of a textual report, such as chest X-ray reports or microbiologic culture, these should be reported as N when normal and A when abnormal. Multiple codes, e.g., abnormal and worse, would be separated by a repeat delimiter, e.g., A~W.

Results may also be reported in shorthand by reporting the normalcy status without specifying the exact numeric value of the result. Such shorthand is quite common in clinical notes, where physicians will simply say that the glucose result was normal. Such shorthand reporting is also seen in drug experience reporting. In such cases, the result can be reported in the OBX by reporting the normalcy code in *OBX-8-abnormal flags* without specifying any value in *OBX-5-observation value.*"[219]

Usage Note: The NEDSS Base System code set – PHVS_OBS_INTRP – will be used. This code set is based on HL7 Table 0078.

OBX-9 Probability (NM) 00577

The PHIN Messaging Standard does not make use of this field.

OBX-10 Nature of abnormal test (ID) 00578

Definition: "This field contains the nature of the abnormal test. Refer to the HL7 Standard and table 0080 – Nature of Abnormal Testing for valid values. As many of the codes as apply may be

included, separated by repeat delimiters. For example, normal values based on age, sex, and race would be codes as A~S~R.

The constraints on the use of the codes in this table must be consistent with those defined in the PID segment, specifically *PID-35-Species Code, PID-36-Breed Code* and *PID-37-Strain*."[220]

OBX-11 Observation Result Status (ID) 00579

Definition: "This field contains the observation result status. Refer to the HL7 Standard and table 0085 – Observation Result Status Codes Interpretation for valid values. This field reflects the current completion status of the results for one Observation Identifier.

Observation Result Status is a required field. Previous versions of HL7 stated this implicitly by defining a default value of "F." Code F indicates that the result has been verified to be correct and final. Code W indicates that the result has been verified to be wrong (incorrect); a replacement (corrected) result may be transmitted later. Code C indicates that data contained in the *OBX-5-observation value* field are to replace previously transmitted (verified and) final result data with the same observation ID (including suffix, if applicable) and observation sub-ID usually because the previous results were wrong. Code D indicates that data previously transmitted in a result segment with the same observation ID (including suffix) and observation sub-ID should be deleted. When changing or deleting a result, multiple OBX segments with the same observation ID and observation sub-ID are replaced or deleted as a unit. Normal progression of results through intermediate (e.g., 'gram positive cocci') to final (e.g., 'staphylococcus aureus') should not be transmitted as C (correction); they should be transmitted as P or S (depending upon the specific case) until they are final."[221]

OBX-12 Effective Date of Reference Range (TS) 00580

Definition: "This field contains the date (and, optionally, the time) on which the values in *OBX-7-reference range* went into effect.

Usage Rule: This field can be valued only if *OBX-7-reference range* is populated.

When this field is present, it facilitates comparison between identical results with different reference ranges. Reference range values may vary because of changes in laboratory practice over time. Such variances could reflect updated practice in laboratory medicine, or the use of updated instrumentation."[222]

OBX-13 User Defined Access Checks (ST) 00581

Definition: "This field permits the producer to record results-dependent codes for classifying the observation at the receiving system. This field should be needed only rarely, because most classifications are fixed attributes of the observation ID and can be defined in the associated observation master file (see description in Chapter 8).

However, there are a few cases when such controls vary with the value of the observation in a complex way that the receiving system would not want to re-calculate. An example is an antimicrobial susceptibility result. Some systems prefer to display only the susceptibility results of inexpensive antimicrobials depending upon the organism, the source of the specimen and the patient's allergy status. The sending service wants to send all of the susceptibilities so that certain privileged users (e.g., Infectious Disease specialists) can review all of the results but nonprivileged users would see only the "preferred" antimicrobials to which the organism was susceptible. We expect that other cases also occur."[223]

OBX-14 Date/Time of the Observation (TS) 00582

Definition: "This field is required in two circumstances. The first is when the observations reported beneath one report header (OBR) have different dates/times. This could occur in the case of queries, timed test sequences, or clearance studies where one measurement within a battery may have a different time than another measurement.

It is also needed in the case of OBX segments that are being sent by the placer to the filler, in which case the date of the observation being transmitted is likely to have no relation to the date of the requested observation. In France, requesting services routinely send a set of the last observations along with the request for a new set of observations. The date of these observations is important to the filler laboratories.

In all cases, the observation date-time is the physiologically relevant date-time or the closest approximation to that date-time. In the case of tests performed on specimens, the relevant date-time is the specimen's collection date-time. In the case of observations taken directly on the patient (e.g., X-ray images, history and physical), the observation date-time is the date-time that the observation was performed."[224]

OBX-15 Producer's ID (CE) 00583

Definition: "This field contains a unique identifier of the responsible producing service. It should be reported explicitly when the test results are produced at outside laboratories, for example. When this field is null, the receiving system assumes that the observations were produced by the sending organization. This information supports CLIA regulations in the US. The code for producer ID is recorded as a CE data type. In the US, the Medicare number of the producing service is suggested as the identifier."[225]

For FDA, this field reflects the lab that performed the testing, if other than the Sending Laboratory in the Message Header.

OBX-16 Responsible Observer (XCN) 00584

Definition: "When required, this field contains the identifier of the individual directly responsible for the observation (i.e., the person who either performed or verified it). In a nursing service, the

observer is usually the professional who performed the observation (e.g., took the blood pressure). In a laboratory, the observer is the technician who performed or verified the analysis. The code for the observer is recorded as a CE data type. If the code is sent as a local code, it should be unique and unambiguous when combined with *OBX-15-producer ID*."[226]

OBX-17 Observation Method (CE) 00936

Definition: "This optional field can be used to transmit the method or procedure by which an observation was obtained when the sending system wishes to distinguish among one measurement obtained by different methods and the distinction is not implicit in the test ID. Chemistry laboratories do not usually distinguish between two different methods used to measure a given serum constituent (e.g., serum potassium) as part of the test name. See the LOINC® Users Manual for a more complete discussion of these distinctions. If an observation producing service wanted to report the method used to obtain a particular observation, and the method was NOT embedded in the test name, they can use this field."[227]

OBX-18 Equipment Instance Identifier (EI) 01479

Definition: "This field identifies the Equipment Instance (e.g., Analyzer, Analyzer module, group of Analyzers,) responsible for the production of the observation. This is the identifier from an institution's master list of equipment, where the institution is specified by the *namespace ID* or if it is blank, then by the "Producer's ID" (OBX-15). It should be possible to retrieve from this master list the equipment type, serial number, etc., however it is not planned to transfer this information with every OBX. The repeating of this field allows for the hierarchical representation of the equipment (lowest level first), e.g., module of an instrument, instrument consisting of modules, cluster of multiple instruments, etc."[228]

OBX-19 Date/Time of the Analysis (TS) 01480

The PHIN Messaging Standard does not make use of this field.

TCD - Test Code Detail Segment

Standard segment – use to be determined by individual programs.

"The test code detail segment contains the data necessary to perform operations or calculations, or execute decisions by the laboratory automation system, and which are not supported by the original HL7 segments related to orders (ORC, OBR). For detail of use see messages of laboratory orders and observations in chapters 4 and 7."[229]

TCD – Test Code Detail Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	250	CE	R				Universal Service Identifier	
2	20	SN	O				Auto-Dilution Factor	
3	20	SN	O				Rerun Dilution Factor	
4	20	SN	O				Pre-Dilution Factor	
5	20	SN	O				Endogenous Content of Pre-Dilution Diluent	
6	1	ID	O		0136		Automatic Repeat Allowed	
7	1	ID	O		0136		Reflex Allowed	
8	250	CE	O		0389		Analyte Repeat Status	

TCD Field Definitions

TCD-1 Universal Service Identifier (CE) 00238

Definition: "This field identifies the test code that information is being transmitted about."[230]

TCD-2 Auto-Dilution Factor (SN) 01420

Definition: "This field is the value that is to be used as the factor for automatically diluting a particular specimen by an instrument for this particular test code. (See examples in definition of SAC-29 "Dilution factor" in the "Specimen Container Detail Segment".)"[231]

TCD-3 Rerun Dilution Factor (SN) 01421

Definition: "This field is the value that is to be used as the factor for automatically diluting a particular specimen in case of rerun for this particular test code."[232]

TCD-4 Pre-Dilution Factor (SN) 01422

Definition: "This field is the value that is to be used as the factor for a particular specimen that is delivered to the automated system as pre-diluted for this particular test code."[233]

TCD-5 Endogenous Content of Pre-Dilution Diluent (SN) 01413

Definition: "This field represents the rest concentration of the measured test in the diluent. It is the value that is to be used for calculation of the concentration of pre-diluted specimens for this particular test code."[234]

TCD-6 Automatic Repeat Allowed (ID) 01416

Definition: "This field identifies whether or not automatic repeats are to be initiated for this particular specimen for this particular test code. Refer to *HL7 Table 0136 -Yes/no indicator* for valid values."[235]

TCD-7 Reflex Allowed (ID) 01424

Definition: "This field identifies whether or not automatic or manual reflex testing is to be initiated for this particular specimen. Refer to *HL7 Table 0136 -Yes/no indicator* for valid values."[236]

TCD-8 Analyte Repeat Status (CE) 01425

Definition: "This field identifies the repeat status for the analyte/result (e.g. original, rerun, repeat, reflex). Refer to *HL7 Table 0389 – Analyte repeat status* for valid values.
For purpose of this chapter we assume the following:

Repeated test without dilution — performed usually to confirm correctness of results (e.g., in case of results flagged as "Panic" or mechanical failures).

Repeated test with dilution — performed usually in the case the original result exceeded the measurement range (technical limits).

Reflex test — this test is performed as the consequence of rules triggered based on other test result(s)"[237]

SID – Substance Identifier Segment

Standard Segment – Use to be determined by individual programs

"The Substance Identifier segment contains data necessary to identify the substance (e.g., reagents) used in the production of analytical test results. The combination of these fields must uniquely identify the substance, i.e., depending on the manufacturer all or some fields are required (this is the reason the optionality is 'C' (conditional)). If the analysis requires multiple substances, this segment is repeated for each substance. The segment(s) should be attached to the TCD segment.

Another purpose of this segment is to transfer the control manufacturer, lot, etc. information for control specimens. In this case the SID segment should be attached to the SAC segment describing the container with the control specimen."[238]

SID – Substance Identifier Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	250	CE	C				Application / Method Identifier	
2	20	ST	C				Substance Lot Number	
3	200	ST	C				Substance Container Identifier	
4	250	CE	C		0385		Substance Manufacturer Identifier	

SID Field Definitions

SID-1 Application / Method Identifier (CE) 01426

Definition: "This field identifies the application / method used for the analysis.

Example: GLUCOSE is an orderable test. GLUCOSE can be analyzed using various applications / methods, which have manufacturer specific identifiers."[239]

SID-2 Substance Lot Number (ST) 01129

Definition: "This field specifies the lot number assigned by the manufacturer during production of the substance."[240]

SID-3 Substance Container Identifier (ST) 01428

Definition: "This field specifies the container assigned by the manufacturer during production of the substance. This identifier should be unique within specific lot of specific application / method."[241]

SID-4 Substance Manufacturer Identifier (CE) 01429

Definition: "This field identifies the manufacturer of this substance. Refer to *User-defined Table 0451 - Manufacturer identifier* for suggested values."[242]

NTE – Notes and Comments Segment

The NTE segment is a common format for sending notes and comments. For some laboratory results messages, notes are used to transmit notes and comments entered with an observation result. Refer to *user-defined table 0364-Comment Type* for suggested values.

In the message construct, the NTE segment is tied to the OBX segment directly above it. This is a standard segment. All NTE segments found in the different message sections are exactly coded in this manner.

NTE – Notes and Comments Attribute Table

Seq	Len	DT	Opt	Rep #	Tbl #	PHIN Code System / Value Set	Element Name	Comments
1	4	SI	O				Set ID - NTE	
2	8	ID	O		0105		Source of Comment	
3	64k	FT	O	Y			Comment	
4	60	CE	O				Comment Type	

NTE Field Attributes

NTE-1 Set ID - NTE (SI)

Definition: "This field is used where multiple NTE segments are included in a message."[243]

The numbering scheme is related to the OBX segment directly before it in that the Set ID begins again with '1' for each OBX that has one or more NTEs following it. The set ID is used to keep the text in proper order for storage and retrieval.

```
For example:        |1|
```

NTE-2 Source of Comment (ID)

Definition: "This field is used when source of comments must be identified. It is an optional field. Refer to the HL7 Standard and table 0105 – Source of Comment."[244]

```
For example:      |L| (typical for results reporting)
```

NTE-3 Comment (FT)

Definition: "This field contains the comment contained in the segment."[245]

NTE-4 Comment Type (CE)

Definition: "This field is contains a value to identify the type of comment text being sent in the specific comment record. Refer to the HL7 Standard and table 0364 – Comment Type for values."[246]

This field is optional and may be left blank.

```
For example – the following would represent a remark: |RE|
```

4. Code System/Value Set Tables

This section contains the vocabulary items to be used with the described message. Every field in a message that contains one or more coded values has its value constrained by the specific list of values that are permitted in that field. Over time, the "list of values" that is associated with a field will change. It is important, for message implementation, both to make sure that transmitted messages (message instances) contain valid values. It is also important to make sure that updates to the valid vocabularies are properly managed. The segment tables in the previous sections associate a Table to each of these coded fields; these tables are listed in this section below, and enumerate all of the code values that may be used for the specified field in this message.

Every code value that is passed in a message instance is drawn from a code system, which has an OID associated with it as a globally unique identifier of the code system. In the general case, a) the coded values allowed in a field may be drawn from more than one code system, and b) the coded values are a subset of the codes from a given coding system. Combining (a) and (b) makes it possible for the allowed code value to be a combination of multiple subsets drawn from multiple coding systems. In most cases, only some of the codes defined in a code system are legal for use in a particular message.

The subsets of the codes that are legal for a particular field are identified by an HL7 construct known as a Value Set. A value set is a collection of coded values drawn from code systems. Value Sets may be simple or compound. Simple Value Sets are an enumerated list of codes drawn from a single code system. Compound Value Sets are an enumerated list of simple value sets. Compound Value Sets may not contain other compound value sets, and may not directly reference coding systems. These value sets serve to identify the specific set of coded values for the message from the universe of coded values across all coding systems.

The segment tables in previous sections identify the vocabulary (identified with a Table) that is used for each field containing a coded value. For fields that use the datatype CE or CWE2, (these datatypes require that messages include the name of the code system as well as the code value), the message contains the OID that uniquely defines the coding system as well as the coded value itself.

The Value Sets are identified by an OID, but this OID does not get transmitted in any of the messages. However, the value set OID is useful and important when vocabulary items are modified or replaced. Each section below contains a header that describes the following items:

- table name,
- where the codes in the table come from, (i.e. the code system and its OID)
- the Value Sets and their OIDs (if any) that define the subsets of code from the code systems.,
- a description of how the codes in this table are to be used.

This header section is followed by a table in which lists each code value, and the Term associated with the code value. This Term is the text associated with the code, and is often used as the display text in user interfaces. For those tables where the code values are drawn from more than one code system, the OID for the code system is also listed in a column. The sections are in alphabetical order by table name.

Periodically, code values in code systems are updated to represent corrections or enhancements to the code system. A comprehensive table of code values, terms, and code system OIDs will be periodically made available so that implementers of messages using this Guide will be able to update their vocabulary. This new distribution will represent a wholesale replacement of the vocabulary listed in this document.

2 This contrasts with the ID datatype in which only the code value is passed. The distinction is based on the fact that ID data types are used only for fields in which only a single coding system can be used, and in which this coding system is always supplied by HL7. In such cases, it is superfluous to include the coding system OID in the message.

PH_P_RACE_CAT

Table Content Definition: Code System (CDC)
Code System Name: PH_P_RACE_CAT
Code System OID: 2.16.840.1.114222.4.5.3
Functional Description

These codes identify the Race of a Person using the codes for the categories defined by OMB and HL7 Version 2. These codes have been integrated, and imported by the CDC to form this internal Public Health Race Category code system.

PH_P_RACE_CAT Table Codes
Public Health Race Codes

Code	Term
1002-5	American Indian or Native Alaskan
2028-9	Asian
2054-5	Black
2076-8	Hawaiian or Pacific Islander
2106-3	White
2131-1	Other
U	Unknown

PH_PRTNERS

Table Content Definition: Code System (CDC)
Code System Name: PH_PRTNERS
Code System OID: 2.16.840.1.114222.4.5.11
Functional Description

This code system contains the coded values of messaging partners in the Public Health Information Network (PHIN). All of these code values are themselves OIDs, and consist of codes identifying State and Local Departments of Health, LRN Laboratories, and other entities. For national security reasons, the values of all the participants in the BioTerror Response network, enumerated in this table, are not published here, but are available to partners upon request.

PH_ PRTNERS Table Codes
Public Health Messaging Partners Identifiers

This value set will be distributed separately.

PH_SPECIES

Table Content Definition: Code System (CDC)
Code System Name: PH_SPECIES
Code System OID: 2.16.840.1.114222.4.5.13
Functional Description

This code system contains codes for the different species of organisms that are referred to in messages. At the current time, only two values are defined, but additional codes for species will be added to this table as surveillance and response expands to cover more non-human organisms as sources for specimen samples.

PH_SPECIES Table Codes
Public Health Species Codes

Code	Term
Human	Human
Other	Other

PH_Reason For Study

Table Content Definition: Code System (CDC)
Code System Name: PH_Reason For Study
Code System OID: 2.16.840.1.114222.4.5.8
Functional Description

This CDC code system contains codes used to describe the reason for a lab test or assay in the context of Public Health.

PH_Reason For StudyTable Codes
Public Health Reason For Study Codes

Code	Term
RFS-BWT	Bio-Watch
RFS-EMG	Emergency
RFS-OTH	Other
RFS-PT	Proficiency Testing

PHVS_BT_SPECCOND

Table Content Definition: Simple Value Set
Value Set Definition:

- Value Set Name: PHVS_BT_ SPECCOND
- OID: 2.16.840.1.114222.4.11.247
- Based on Code System: Specimen condition (HL7 Version 2.5 table 0493)
- Code System OID: 2.16.840.1.113883.12.493

Functional Description

This value set enumerates the subset of the HL7 version 2.5 Risk code values that are used in this type of message. It is a subset of the HL7 suggested code values from published table 0493. Note that these codes are introduced for HL7 v2.5 and this represents an extension for this implementation.

PHVS_BT_ SPECCOND Table Codes
Public Health Specimen Condition Values

Code	Term
AUT	Autolyzed
CLOT	Clotted
CON	Contaminated
COOL	Cool
FROZ	Frozen
HEM	Hemolyzed
ROOM	Room temperature
SNR	Sample not received

PHVS_BTSpecimen_type

Table Content Definition: Simple Value Set
Value Set Definition:

- Name: PHVS_ BTSpecimen_type
- OID: 2.16.840.1.114222.4.11.241
- Based on Code System: Specimen type (HL7 Version 2 table 487)
- Code System OID: 2.16.840.1.113883.12.487

Functional Description

This value set enumerates only those specimen types that are valid for the laboratory result message that this guide defines. These codes describe both the inherent type of the specimen as well as the type of sampling site it was taken from.

PHVS_ BTSpecimen_type Table Codes
Public Health Specimen Type Code Values

Code	Term
ABS	Abscess
AIRS	Air Sample
ASERU	Serum, Acute
ASP	Aspirate
BBL	Blood bag
BLIST	Blister
BPU	Blood product unit
BX	Biopsy
CSERU	Serum, Convalescent
CSITE	Catheter Insertion Site
EEYE	Environmental, Eye Wash
EFF	Environmental, Effluent
EFOD	Environmental, Food
EISO	Environmental, Isolette
ENVIR	Environmental, Unidentified Substance
EOTH	Environmental, Other Substance
ESOI	Environmental, Soil
ESOS	Environmental, Solution (Sterile)
ETA	Aspirate, Endotrach
FAW	Environmental, Water (Well)
FGA	Fluid, Abdomen
GASA	Aspirate, Gastric
ILLEG	Source of Specimen Is Illegible
LAVG	Lavage, Bronhial
ORH	Other
PUS	Pus
PUSFR	Pustule
SAL	Saliva
SER	Serum
SPS	Environmental, Spore Strip
SPT	Sputum
SPTC	Sputum - coughed
SPTT	Sputum - tracheal aspirate
TASP	Aspirate, Tracheal
VOM	Vomitus
WB	Blood, Whole
WND	Wound
WNDA	Wound abscess
WNDD	Wound drainage
WNDE	Wound exudate
WWA	Environmental, Water

PHVS_COUNTRY_NM

Table Content Definition: Simple Value Set

Value Set Definition:

- Name: PHVS_COUNTRY_NM
- OID: 2.16.840.1.114222.4.11.231
- Based on Code System: PH_COUNTRY_NM
- Code System OID: 2.16.840.1.114222.4.6.1

Functional Description

This Code System is a subset of ISO 3166 codes that is defined for, and maintained by, CDC for use in the Public Health Information Network. These are the two-digit ISO Country Codes, and this is the list of Countries in the world to be used in messages containing addresses that include Country as part of the postal address. It has been modified from ISO 3166 for use of the PHIN in the US.

PHVS_COUNTRY_NM Table Codes
Public Health Country Code Values

Code	Term
AD	ANDORRA
AE	UNITED ARAB EMIRATES

Code	Term
AF	AFGHANISTAN
AG	ANTIGUA AND BARBUDA
AI	ANGUILLA
AL	ALBANIA
AM	ARMENIA
AN	NETHERLANDS ANTILLES
AO	ANGOLA
AQ	ANTARCTICA
AR	ARGENTINA
AS	AMERICAN SAMOA
AT	AUSTRIA
AU	AUSTRALIA
AW	ARUBA
AZ	AZERBAIJAN
BA	BOSNIA AND HERZEGOVI
BB	BARBADOS
BD	BANGLADESH
BE	BELGIUM
BF	BURKINA FASO
BG	BULGARIA
BH	BAHRAIN
BI	BURUNDI
BJ	BENIN
BM	BERMUDA
BN	BRUNEI DARUSSALAM
BO	BOLIVIA
BR	BRAZIL
BS	BAHAMAS
BT	BHUTAN
BV	BOUVET ISLAND
BW	BOTSWANA
BY	BELARUS
BZ	BELIZE
CA	CANADA
CC	COCOS (KEELING) ISLA
CD	CONGO THE DEMOCRATIC REPUBLIC OF THE
CF	CENTRAL AFRICAN REPU
CG	CONGO
CH	SWITZERLAND
CI	CÔTE D'IVOIRE
CK	COOK ISLANDS
CL	CHILE
CM	CAMEROON
CN	CHINA
CO	COLOMBIA
CR	COSTA RICA
CU	CUBA
CV	CAPE VERDE
CX	CHRISTMAS ISLAND
CY	CYPRUS
CZ	CZECH REPUBLIC
DE	GERMANY
DJ	DJIBOUTI
DK	DENMARK
DM	DOMINICA
DO	DOMINICAN REPUBLIC
DZ	ALGERIA
EC	ECUADOR
EE	ESTONIA
EG	EGYPT
EH	WESTERN SAHARA
ER	ERITREA
ES	SPAIN
ET	ETHIOPIA

Code	Term
FI	FINLAND
FJ	FIJI
FK	FALKLAND ISLANDS (MA
FM	MICRONESIA FEDERATED STATES OF
FO	FAROE ISLANDS
FR	FRANCE
GA	GABON
GB	UNITED KINGDOM
GD	GRENADA
GE	GEORGIA
GF	FRENCH GUIANA
GH	GHANA
GI	GIBRALTAR
GL	GREENLAND
GM	GAMBIA
GN	GUINEA
GP	GUADELOUPE
GQ	EQUATORIAL GUINEA
GR	GREECE
GS	SOUTH GEORGIA AND TH
GT	GUATEMALA
GU	GUAM
GW	GUINEA-BISSAU
GY	GUYANA
HK	HONG KONG
HM	HEARD ISLAND AND MCD
HN	HONDURAS
HR	CROATIA
HT	HAITI
HU	HUNGARY
ID	INDONESIA
IE	IRELAND
IL	ISRAEL
IN	INDIA
IO	BRITISH INDIAN OCEAN
IQ	IRAQ
IR	IRAN ISLAMIC REPUBLIC OF
IS	ICELAND
IT	ITALY
JM	JAMAICA
JO	JORDAN
JP	JAPAN
KE	KENYA
KG	KYRGYZSTAN
KH	CAMBODIA
KI	KIRIBATI
KM	COMOROS
KN	SAINT KITTS AND NEVI
KP	KOREA DEMOCRATIC PEOPLE'S REPUBLIC OF
KR	KOREA REPUBLIC OF
KW	KUWAIT
KY	CAYMAN ISLANDS
KZ	KAZAKSTAN
LA	LAO PEOPLE'S DEMOCRATIC REPUBLIC
LB	LEBANON
LC	SAINT LUCIA
LI	LIECHTENSTEIN
LK	SRI LANKA
LR	LIBERIA
LS	LESOTHO
LT	LITHUANIA
LU	LUXEMBOURG
LV	LATVIA
LY	LIBYAN ARAB JAMAHIRI

Code	Term
MA	MOROCCO
MC	MONACO
MD	MOLDOVA REPUBLIC OF
MG	MADAGASCAR
MH	MARSHALL ISLANDS
MK	MACEDONIA THE FORMER YUGOSLAV REPUBLIC OF
ML	MALI
MM	MYANMAR
MN	MONGOLIA
MO	MACAU
MP	NORTHERN MARIANA ISL
MQ	MARTINIQUE
MR	MAURITANIA
MS	MONTSERRAT
MT	MALTA
MU	MAURITIUS
MV	MALDIVE
MW	MALAWI
MX	MEXICO
MY	MALAYSIA
MZ	MOZAMBIQUE
NA	NAMIBIA
NC	NEW CALEDONIA
NE	NIGER
NF	NORFOLK ISLAND
NG	NIGERIA
NI	NICARAGUA
NL	NETHERLANDS
NO	NORWAY
NP	NEPAL
NR	NAURU
NU	NIUE
NZ	NEW ZEALAND
OM	OMAN
PA	PANAMA
PE	PERU
PF	FRENCH POLYNESIA
PG	PAPUA NEW GUINEA
PH	PHILIPPINES
PK	PAKISTAN
PL	POLAND
PM	SAINT PIERRE AND MIQ
PN	PITCAIRN
PR	PUERTO RICO
PS	PALESTINIAN TERRITOR OCCUPIED
PT	PORTUGAL
PW	PALAU
PY	PARAGUAY
QA	QATAR
RE	RÉUNION
RO	ROMANIA
RU	RUSSIAN FEDERATION
RW	RWANDA
SA	SAUDI ARABIA
SB	SOLOMON ISLANDS
SC	SEYCHELLES
SD	SUDAN
SE	SWEDEN
SG	SINGAPORE
SH	SAINT HELENA
SI	SLOVENIA
SJ	SVALBARD AND JAN MAY
SK	SLOVAKIA
SL	SIERRA LEONE

Code	Term
SM	SAN MARINO
SN	SENEGAL
SO	SOMALIA
SR	SURINAME
ST	SAO TOME AND PRINCIP
SV	EL SALVADOR
SY	SYRIAN ARAB REPUBLIC
SZ	SWAZILAND
TC	TURKS AND CAICOS ISL
TD	CHAD
TF	FRENCH SOUTHERN TERR
TG	TOGO
TH	THAILAND
TJ	TAJIKISTAN
TK	TOKELAU
TM	TURKMENISTAN
TN	TUNISIA
TO	TONGA
TP	EAST TIMOR
TR	TURKEY
TT	TRINIDAD AND TOBAGO
TV	TUVALU
TW	TAIWAN PROVINCE OF CHINA
TZ	TANZANIA UNITED REPUBLIC OF
UA	UKRAINE
UG	UGANDA
UM	UNITED STATES MINOR
US	UNITED STATES
UY	URUGUAY
UZ	UZBEKISTAN
VA	HOLY SEE (VATICAN CI
VC	SAINT VINCENT AND TH
VE	VENEZUELA
VG	VIRGIN ISLANDS BRITISH
VI	VIRGIN ISLANDS U.S.
VN	VIET NAM
VU	VANUATU
WF	WALLIS AND FUTUNA
WS	SAMOA
YE	YEMEN
YT	MAYOTTE
YU	YUGOSLAVIA
ZA	SOUTH AFRICA
ZM	ZAMBIA
ZW	ZIMBABWE

PHVS_ EI_TYPE

Table Content Definition: Compound Value Set

Value Set Definition:

- Value Set Name: PHVS_EI_Type
- Value Set OID: 2.16.840.1.114222.4.11.228
- Component #1:
  - Value Set PHVS_EI_TYPE_HL7
  - Value Set OID: 2.16.840.1.114222.4.11.62
  - Based on Code System: EntityIDType (HL7 v2 table 148)
  - Code System OID: 2.16.840.1.113883.5.148
- Component #2:
  - Value Set PHVS_EI_TYPE_CDC
  - Value Set OID: 2.16.840.1.114222.4.11.61
  - Based on Code System: PH_EI_TYPE_CDC

- Code System OID: 2.16.840.1.114222.4.5.1

Functional Description:

This Value Set comprises all legal values for Entity Id Type codes; it is drawn from two coding system, a CDC coding system and an HL7 coding system. These values describe the semantic type of an identifier, such as Social Security Number or Account Number. Note that the codes in this table are drawn from two different coding systems, an internal CDC coding system and an HL7 Version 3 coding system, therefore the OID for the appropriate coding system is shown in the table.

PHVS_EI_Type Table Codes
Public Health Entity Identifier Type Values

CodeSystem	Code	Term
2.16.840.1.113883.5.148	AN	Account number
2.16.840.1.113883.5.148	AS	Alias social security number
2.16.840.1.113883.5.148	BR	Birth registry number
2.16.840.1.113883.5.148	CI	CHIP Identification number
2.16.840.1.113883.5.148	DL	Driver's license number
2.16.840.1.113883.5.148	DN	Doctor number
2.16.840.1.113883.5.148	EI	Employee number
2.16.840.1.113883.5.148	EN	Employer number
2.16.840.1.113883.5.148	FI	Facility ID
2.16.840.1.113883.5.148	GI	Guarantor internal identifier
2.16.840.1.113883.5.148	GN	Guarantor external identifier
2.16.840.1.114222.4.5.1	LID	Local/ NEDSS Identifier
2.16.840.1.113883.5.148	LN	License number
2.16.840.1.113883.5.148	LR	Local registry ID
2.16.840.1.113883.5.148	MA	Medicaid number
2.16.840.1.113883.5.148	MC	Medicare number
2.16.840.1.114222.4.5.1	MID	Manufacturer Identifier
2.16.840.1.114222.4.5.1	MLN	Manufacturer Lot Number
2.16.840.1.113883.5.148	MR	Medical record number
2.16.840.1.113883.5.148	MSSN	Mother's social security number
2.16.840.1.113883.5.148	NE	National employer identifier
2.16.840.1.113883.5.148	NH	National health plan identifier
2.16.840.1.113883.5.148	NI	National unique individual identifier
2.16.840.1.113883.5.148	NN	National person identifier xxx is ISO country code
2.16.840.1.113883.5.148	NPI	National provider identifier
2.16.840.1.114222.4.5.1	OTH	Other
2.16.840.1.113883.5.148	PI	Patient internal identifier
2.16.840.1.113883.5.148	PIN	Prison identification number
2.16.840.1.113883.5.148	PN	Person number
2.16.840.1.113883.5.148	PRN	Provider number
2.16.840.1.113883.5.148	PT	Patient external identifier
2.16.840.1.113883.5.148	RR	Railroad retirement number
2.16.840.1.113883.5.148	RRI	Regional registry ID
2.16.840.1.113883.5.148	RW	Ryan White identifier
2.16.840.1.113883.5.148	SL	State license
2.16.840.1.113883.5.148	SR	State registry ID
2.16.840.1.113883.5.148	SS	Social security number
2.16.840.1.113883.5.148	U	Unspecified
2.16.840.1.113883.5.148	UPIN	Medicare/HCFA's universal physician identifer No.
2.16.840.1.113883.5.148	VN	Visit number
2.16.840.1.113883.5.148	VS	VISA
2.16.840.1.113883.5.148	WC	WIC identifier
2.16.840.1.113883.5.148	XX	Organization identifier

PHVS_OBS_INTRP

Table Content Definition: Compound Value Set

Value Set Definition:

- Value Set Name: PHVS_OBS_INTRP
- Value Set OID: 2.16.840.1.114222.4.11.234
- Component #1:

    - Value Set PHVS_OBS_INTRP_HL7
    - Value Set OID: 2.16.840.1.114222.4.11.236
    - Based on Code System: HL7 v2 Table 0078
    - Code System OID: 2.16.840.1.113883.12.78
- Component #2:
    - Value Set PHVS_OBS_INTRP_CDC
    - Value Set OID: 2.16.840.1.114222.4.11.235
    - Based on Code System: PH_OBS_INTRP_CDC
    - Code System OID: 2.16.840.1.114222.4.5.12

Functional Description:

This table contains all the codes defined for abnormal flags and observation interpretations for version 2 table 78 plus NEDSS/CDC extension codes defined in coding system PH_OBS_INTRP_CDC.

PHVS_ OBS_INTRP Table Codes
Public Health Observation Interpretation Values

CodeSystem	Code	Term
2.16.840.1.113883.12.78	<	Below absolute low-off instrument scale
2.16.840.1.113883.12.78	>	Above absolute high-off instrument scale
2.16.840.1.113883.12.78	A	Abnormal; non-numeric results
2.16.840.1.113883.12.78	AA	Very abnormal; non-numeric units, panic
2.16.840.1.113883.12.78	B	Better--use when direction not relevant
2.16.840.1.113883.12.78	D	Significant change down
2.16.840.1.113883.12.78	H	Above high normal
2.16.840.1.113883.12.78	HH	Above upper panic limits
2.16.840.1.113883.12.78	I	Intermediate
2.16.840.1.113883.12.78	L	Below low normal
2.16.840.1.113883.12.78	LL	Below lower panic limits
2.16.840.1.113883.12.78	MS	Moderately susceptible
2.16.840.1.113883.12.78	N	Normal (applies to non-numeric results)
2.16.840.1.113883.12.78	null	No range defined, or normal ranges don't apply
2.16.840.1.114222.4.5.12	OTH	Other abnormal
2.16.840.1.113883.12.78	R	Resistant
2.16.840.1.113883.12.78	S	Susceptible
2.16.840.1.113883.12.78	U	Significant change up
2.16.840.1.113883.12.78	VS	Very susceptible*
2.16.840.1.113883.12.78	W	Worse--direction not relevant

PHVS_P_ETHN_GRP

Table Content Definition: Simple Value Set

Value Set Definition:

- Name: PHVS_P_ETHN_GRP
- OID: 2.16.840.1.114222.4.11.233
- Based on Code System: Ethnic group (HL7 Version 2 User Defined Table 189)
- Code System OID: 2.16.840.1.113883.12.189

Functional Description

This is a value set the currently encompasses all of the recommended codes in the published HL7 version 2 Ethnic group table. The codes used may change for public health and surveillance purposes, but the code system will remain the same since this is a User Defined table (but the codes included in the Value Set may change).

PHVS_ P_ETHN_GRP Table Codes
Public Health Ethnic Group Values

Code	Term
H	Hispanic or Latino
N	Not Hispanic or Latino
U	Unknown

PHVS_SEX

Table Content Definition: Simple Value Set

Value Set Definition:

- Name: PHVS_Sex
- OID: 2.16.840.1.114222.4.11.206
- Based on Code System: Administrative sex (HL7 v2 table 1)
- Code System OID: 2.16.840.1.113883.12.1

Functional Description

This is a Public Health Value set for NEDSS built on the set of codes defined by HL7 Version 2 Administrative Sex; note that these are not the same codes as are used in the HL7 Version 3 Administrative Gender code system. These codes are to indicate the apparent gender of a person from an administrative standpoint; any reason for ambiguity between Male and Female should be assigned the 'Unknown' code.

PHVS_SEX Table Codes
Public Health Gender Values

Code	Term
F	Female
M	Male
U	Unknown

HL70003 (Event Type)

Table Content Definition: Code System (HL7)

Code System Name: Event type

Code System OID: 2.16.840.1.113883.12.3

Functional Description

This table contains values defined by HL7; these are all of the legal codes for this field. Note that this is a table that is not user-modifiable, so it has all the entries that are legal. Only the value 'R22' is used in the messages covered by this guide.

The list of table values has been omitted.

HL70076 (Message Type)

Table Content Definition: Code System (HL7)

Code System Name: Message type

Code System OID: 2.16.840.1.113883.12.76

Functional Description

This table contains values defined by HL7; these are all of the legal codes for this field. Note that this is a table that is not user-modifiable, so it has all entries that are legal. Only the value 'OUL' is used in the messages covered by this guide.

The list of table values has been omitted.

HL70103 (Processing ID)

Table Content Definition: Code System (HL7)

Code System Name: Processing ID

Code System OID: 2.16.840.1.113883.12.103

Functional Description

This table contains values defined by HL7; these are all of the legal codes for this field. These codes permit the interface to be easily deployed and debugged without having to keep track of test messages in the back end.

HL70103 Table Codes - Processing ID

Code	Term
D	Debugging
P	Production
T	Training

HL70104 (Version ID)

Table Content Definition: Code System (HL7)
Code System Name: Version ID
Code System OID: 2.16.840.1.113883.12.104
Functional Description

This table contains values defined by HL7; these are all of the legal codes for this field. Note that this is a table that is not user-modifiable, so it has all entries that are legal for HL7. However, only messages that are V2.5 (HL7 Release 2.5) will be generated and processed.

HL70104 Table Codes - Version ID

Code	Term	Release Date
2.0 Release	2.0	September 1988
2.0D Demo	2.0	October 1988
2.1 Release	2. 1	March 1990
2.2 Release	2.2	December 1994
2.3 Release	2.3	March 1997
2.3.1 Release	2.3.1	May 1999
2.4 Release	2.4	November 2000
2.5 Release	2.5	May 2003

HL70119 (Order Control Code)

Table Content Definition: Code System (HL7)
Code System Name: Order control codes
Code System OID: 2.16.840.1.113883.12.119
Functional Description

This table contains values defined by HL7, and are all of the legal codes for this field. Note that this is a table that is not user-modifiable, so it has all entries that are legal for HL7. “NW” is the only code value that is currently supported.

The list of table values has been omitted.

HL70125 (Value Type)

Table Content Definition: Code System (HL7)
Code System Name: Value type
Code System OID: 2.16.840.1.113883.12.125
Functional Description

This table contains values defined by HL7, and are all of the legal codes for this field. Note that this is a table that is not user-modifiable, so it has all entries that are legal for HL7; only code values ‘CE’ (coded entry), ‘TX’ (text), ‘NM’ (numeric) are supported for this application.

HL70125 Table Codes - Value type

Code	Term
AD	Address
CE	Coded Entry
CF	Coded Element With Formatted Values
CK	Composite ID With Check Digit
CN	Composite ID And Name
CP	Composite Price
CX	Extended Composite ID With Check Digit
DT	Date
ED	Encapsulated Data

Code	Term
FT	Formatted Text (Display)
MO	Money
NM	Numeric
PN	Person Name
RP	Reference Pointer
SN	Structured Numeric
ST	String Data.
TM	Time
TN	Telephone Number
TS	Time Stamp (Date & Time)
TX	Text Data (Display)
XAD	Extended Address
XCN	Extended Composite Name And Number For Persons
XON	Extended Composite Name And Number For Organizations
XPN	Extended Person Name
XTN	Extended Telecommunications Number

HL70155 (Application Acknowledgement)

Table Content Definition: Code System (HL7)
Code System Name: Application acknowledgment
Code System OID: 2.16.840.1.113883.12.155
Functional Description

This table contains values defined by HL7, and are all of the legal codes for this field. Note that this is a table that is not user-modifiable, so it has all entries that are legal for HL7. Note also that this table is not used in the initial release of the messaging software, and the field is not valued.

HL70155 Table Codes - Application acknowledgment

Code	Term
AL	Always
ER	Error/reject conditions only
NE	Never
SU	Successful completion only

HL70207 (Processing Mode)

Table Content Definition: Code System (HL7)
Code System Name: Processing mode
Code System OID: 2.16.840.1.113883.12.207
Functional Description

This table contains values defined by HL7, and are all of the legal codes for this field. These codes permit the interface to be easily deployed and debugged without having to keep track of test messages in the back end. Note that this code is not placed in the field (the 'not present' value below) for normal production processing (the default).

HL70207 Table Codes - Processing mode

Code	Term
A	Archive
I	Initial load
Not present	Not present (the default, meaning current processing)
R	Restore from archive
T	Current processing, transmitted at intervals (scheduled or on demand)

HL70354 (Message Structure)

Table Content Definition: Code System (HL7)
Code System Name: Message structure
Code System OID: 2.16.840.1.113883.12.354
Functional Description

This table contains values defined by HL7, and are all of the legal codes for this field. Note that this is a table that is not user-modifiable, so it has all entries that are legal, although only the value 'OUL_R22' is used in the messages covered by this guide.

The list of table values has been omitted.

HL70369 (Specimen Role)

Table Content Definition: Code System (HL7 V2 User-Defined Table)
Code System Name: Specimen Role
Code System OID: 2.16.840.1.113883.12.369
Functional Description

This table contains values drawn from HL7 version 2 which identify what type of role the specimen plays in the test or assay. [Note: This HL7 table does not currently provide a code for Environmental samples.]

HL70369 Table Codes - Specimen Role

Code	Term
B	Blind Sample
C	Calibrator
P	Patient
Q	Control specimen
R	Replicate (of patient sample as a control)

HL70371 (Additive)

Table Content Definition: Code System (HL7 V2 User-Defined Table)
Code System Name: Additive
Code System OID: 2.16.840.1.113883.12.371
Functional Description

This table contains values drawn from HL7 version 2 which identify the additives in a specimen.

HL70371 Table Codes – Additive

Code	Term
BOR	Borate
C32	3.2% Citrate
C38	3.8% Citrate
EDTK	Potassium/K EDTA
EDTN	Sodium/Na EDTA
HCL6	6N HCL
HEPL	Lithium/Li Heparin
HEPN	Sodium/Na Heparin

HL70376 (Special Handling Considerations)

Table Content Definition: Code System (HL7 V2 User-Defined Table)
Code System Name: Special handling considerations
Code System OID: 2.16.840.1.113883.12.376
Functional Description

This table contains values drawn from HL7 version 2 which capture instructions for the handling of specimens.

HL70376 Table Codes - Special handling considerations

Code	Term
AMB	Ambient Temperature
C37	Body temperature
CAMB	Critical ambient temperature
CATM	Critical do not expose to atmosphere - Do not uncap
CFRZ	Critical Frozen
CREF	Critical refrigerated

Code	Term
DFRZ	Deep frozen
DRY	Dry
FRZ	Frozen temperature
MTLF	Metal Free
NTR	Liquid nitrogen
PRTL	Protect from light
PSA	Do not shake
PSO	No shock
REF	Refrigerated temperature
UFRZ	Ultra frozen
UPR	Upright

HL70445 (Identity Reliability)

Table Content Definition: Code System (HL7 V2 User-Defined Table)
Code System Name: Identity Reliability Code
Code System OID: 2.16.840.1.113883.12.445
Functional Description

This table contains values from HL7 version 2 which define the credibility of the Patient identity.

HL70445 Table Codes - Identity Reliability Code

Code	Term
AL	Patient/Person Name is an Alias
UA	Unknown/Default Address
UD	Unknown/Default Date of Birth
US	Unknown/Default Social Security Number

HL70488 (Specimen Collection Method)

Table Content Definition: Code System (HL7 version 2.5)
Code System Name: Specimen Collection Method
Code System OID: 2.16.840.1.113883.12.488
Functional Description

This table contains values used for the Specimen Collection Method.

HL70488 Table Codes - Specimen Collection Method

Code	Term
ANP	Plates, Anaerobic
BAP	Plates, Blood Agar
BCAE	Blood Culture, Aerobic Bottle
BCAN	Blood Culture, Anaerobic Bottle
BCPD	Blood Culture, Pediatric Bottle
BIO	Biopsy
CAP	Capillary Specimen
CATH	Catheterized
CVP	Line, CVP
EPLA	Environmental, Plate
ESWA	Environmental, Swab
FNA	Aspiration, Fine Needle
KOFFP	Plate, Cough
LNA	Line, Arterial
LNV	Line, Venous
MARTL	Martin-Lewis Agar
ML11	Mod. Martin-Lewis Agar
MLP	Plate, Martin-Lewis
NYP	Plate, New York City
PACE	Pace, Gen-Probe
PIN	Pinworm Prep
PNA	Aterial puncture
PRIME	Pump Prime
PUMP	Pump Specimen

Code	Term
QC5	Quality Control For Micro
SCLP	Scalp, Fetal Vein
SCRAPS	Scrapings
SHA	Shaving
SWA	Swab
SWD	Swab, Dacron tipped
TMAN	Transport Media, Anaerobic
TMCH	Transport Media, Chalamydia
TMM4	Transport Media, M4
TMMY	Transport Media, Mycoplasma
TMOT	Transport Media,
TMP	Plate, Thayer-Martin
TMPV	Transport Media, PVA
TMSC	Transport Media, Stool Culture
TMUP	Transport Media, Ureaplasma
TMVI	Transport Media, Viral
VENIP	Venipuncture
WOOD	Swab, Wooden Shaft

HL70491 (Specimen Quality)

Table Content Definition: Code System (HL7 V2 User-Defined Table)
Code System Name: Specimen quality
Code System OID: 2.16.840.1.113883.12.491
Functional Description

This table contains values drawn from HL7 version 2 which identify the quality of a specimen.

HL70491 Table Codes - Specimen quality

Code	Term
E	Excellent
F	Fair
G	Good
P	Poor

Other HL7 Tables

The following HL7 tables do not have PHIN vocabularies assigned at this point. These tables will be assigned vocabularies by specific programs. HL7 User defined tables may have some suggested vocabulary provide by HL7. HL7 Defined tables always have an HL7 supplied vocabulary.

Table Name	Source Segment	HL7 Table Type	Description
HL70002	PID	User Defined	Marital Status
HL70078	OBX	User Defined	Abnormal Flags
HL70080	OBX	HL7	Nature of Abnormal Testing
HL70085	OBX	HL7	Observation Result Status
HL70105	NTE	HL7	Source of Comment
HL70123	OBR	HL7	Result Status
HL70171	PID	User Defined	Citizenship
HL70361	MSH	User Defined	Application
HL70370	SAC	HL7	Container Status
HL70371	SAC	HL7	Additives/Preservatives
HL70374	SAC	User Defined	System Induced Contaminants
HL70375	SAC	User Defined	Artificial Blood
HL70377	SAC	User Defined	Other Environmental Factors.
HL70378	SAC	User Defined	Carrier Type
HL70379	SAC	User Defined	Tray Type
HL70380	SAC	User Defined	Separator Type
HL70381	SAC	User Defined	Cap Type
HL70382	SAC	User Defined	Drug Interference
HL70383	INV	HL7	Substance Status

HL70384	INV	HL7	Substance Type
HL70385	INV	User Defined	Manufacturer Identifier
HL70385	SID	User Defined	Manufacturer Identifier
HL70386	INV	User Defined	Supplier Identifier
HL70389	TCD	HL7	Analyte Repeat Status
HL70429	PID	User Defined	Production Class Code
HL70447	PID	User Defined	Breed Code
HL70451	INV	User Defined	Substance Identifier
HL70490	SPM	HL7	Specimen Reject Reason
HL70492	SPM	HL7	Specimen Appropriateness
HL70494	SPM	HL7	Specimen Child Role
HL70543	SPM	User Defined	Specimen Collection Site
HL70544	SPM	User Defined	Container Condition

5. Use of Object Identifiers (OIDs)

In order for computers to manipulate records about objects, the objects, and often the records about the objects, need to be uniquely identified in some way. There are many mechanisms for doing this, and two currently popular ones are UUIDs and OIDs. Health Level Seven has identified OIDs as the preferred mechanisms for the unambiguous global identity of coding systems. This document describes how OIDs are used by CDC to support the requirements of the PHIN (Public Health Information Network).

The International Standards Organization (ISO) has developed the OID mechanism for the assignment of globally unique identifiers to any type of object in a decentralized way that retains some traceability of the object so identified. The Internet Engineering Task Force (IETF) realized the utility of this mechanism, and formalized it in RFC 1778. This was further refined after comments and a desire for increased usability on the World Wide Web and released again in RFC 2252. The W3C supports the use of OIDs, and they are also consistent with the implementation of DNS out on the Web.

An OID is a character string made up of clauses that are concatenated together. The complete string is hierarchical in structure, and architected as a well-formed tree. Each node of the tree represents a namespace, where all branches under that node are unique. There are several representations of OIDs, but the one accepted by everyone is completely numeric with no embedded spaces or special characters. The different representations are fully isomorphic, but the non-numeric ones tend to be harder for machines to process efficiently. In the numeric representation, each node in the tree is given a unique numeric id, which is a non-zero positive integer (except for the zero at one root of the tree). The OID is constructed by putting a dot (decimal point, period, etc.) after the current node, then assigning a unique integer next. This process is repeated to construct a tree of arbitrary depth. At the top of the tree, there are three roots currently:

- 0 - ITU-T assigned
- 1 - ISO assigned
- 2 - Joint ISO/ITU-T assignment

Each of these three organizations maintains a namespace of the OIDs that they assign. Due to the hierarchical structure of OIDs, responsibility for maintenance and further assignment of any branch may be delegated to any organization that agrees to manage that branch. Therefore, the 2 root and the branches immediately below that are maintained by a joint ISO/ITU-T committee, and branch 2.16.840.1 is for US companies. A couple of important OIDs immediately below that, are managed by their respective organizations:

- 2.16.840.1.113883 – Health Level Seven, Inc.
- 2.16.840.1.114222 – Centers for Disease Control and Prevention (CDC)

Since an ISO OID is merely the globally unique identifier of an object, and any OID that is not a leaf on the OID tree is a namespace of objects, OIDs are very well suited to namespace management. HL7 has recommended that all coding systems used in message fields carrying coded data for Version 3 use HL7-registered OIDs to uniquely identify the coding system. HL7 also suggests that OIDs may be used for the namespace identifiers (the identifier ‘root’) in the fields that are of Instance Identifier data types in V3 messages.

Structure and Use at CDC

Laboratory Results Messaging will use OIDs for three primary purposes:

- Identification of Well Known Objects: These are organizations and places that are significant for messaging. Currently, the only parties who are assigned OIDS of this type are the parties who act as senders and receivers of messages.
- Identification of Namespaces used in Public Health: These are the namespaces within which identifiers are unique. The namespace OID indicates the organization assigning the identifier as

well as the type of identifier being assigned. This usage is shown within the EI, e.g., ORC.3 and CX data types, e.g., PID.3.

- Identification of Vocabulary items: These are the structures – coding system and value set - used to organize vocabulary concepts and the codes used to represent them. (Refer to Section 6 above for more discussion). This usage is shown within the CE, e.g., PID.22, CWE, e.g., SPM.4, and CQ data types, e.g., SPM.12.

All of the OIDs that are assigned by CDC to support Laboratory Results Messaging are based on the CDC OID with a suffix to indicate that the OID is assigned for use by the PHIN. This initial part of the OID is known as the PHIN root, and it is constructed by adding ".4" to CDC's OID. The PHIN root, therefore, is "2.16.840.1.114222.4". Except for HL7 defined coding systems, all the OIDs used in Laboratory Results Messaging will start with the PHIN root.

OIDs for Well Known Objects

These OIDs identify message senders and receivers. The OIDs that are assigned are created as follows.

1. Start with the PHIN root.
2. Add a suffix that indicates this OID represents a partner ID.
3. Add a suffix that identifies the messaging partner in question

The OID that emerges has the following structure: [PHIN_root] + [Info_artifact = Partner id] + [partner specific indicator].

Given that the current implementation includes cities participating in the BioWatch program as senders, there would be potential adverse consequences from including this set of OIDs in a widely distributed document. Therefore, implementers of Laboratory Results Messaging will be provided with a list of the OIDs they need to identify message senders and message receivers. This list will be provided using a different delivery vehicle than this document.

OIDs for Public Health Namespaces

The OID for public health namespaces are used to guarantee identifier uniqueness. It is important to note that namespace identifiers will only be used for identifiers that are locally assigned – that is to say – by the message sending organization, which for Laboratory Results Messaging, will be a LRN lab. The namespace OIDs are built under the assumption that identifier uniqueness is guaranteed by application creating the message; they include a component which identifies the software instance involved. The OIDs that are assigned for identifier namespaces are created as follows:

1. Start with the PHIN root.
2. Add a suffix (4.3.2.1) that indicates this is an instance of the Results Reporting application. Actually the suffix breaks down into (4-info artifacts) + (3.2 application software) + (1 LRN application)
3. Add a suffix that identifies the organization or site that is creating the message. As noted above, these partner ids will be issued separately.
4. Add a suffix that identifies the software instance that is creating or recording the identifier. These suffixes will be sequential integers. I.e., 1, 2, 3, …
5. Add a suffix that indicates the type of identifier being issued. The following list indicates the suffixes that are currently supported.

Identifier/Namespace Type	Suffix
Message Partner ID	3.1
Order (Placer/Filler) ID	3.5
Container ID	3.7
Accession (Specimen) ID	3.9

The OID that emerges has the following structure: [PHIN_root] + [Info_artifact = identifier namespace] + [partner specific indicator] + [software instance] + [namespace type indicator].

The reader may wonder why suffixes are not provided for provider IDs, or for the variety of identifiers assigned to patients, e.g., SSN, driver's license number. The reason is that these identifiers are currently handled as "external" identifiers. That is, they are treated as identifiers for which the name space specification is not rigorously possible.

OIDs for Vocabulary Items

Vocabulary items used in Laboratory Results Messaging are drawn from two sources: Health Level 7, and the CDC PHIN. Their OID assignment reflects this by using either the PHIN root, or the HL7 root as the starting point for OID construction. The OIDs that are assigned for identifier namespaces are created as follows:

1. Start with the appropriate root. This will either be the PHIN root or the HL7 one.
2. Add a suffix that indicates whether the vocabulary item is a coding system or a value set.
3. Add a suffix that identifies the particular vocabulary item.

The reader should note that it is the coding system OID, not the one for the value set that will appear in messages.

Refer to the section on vocabulary items to find the OIDs assigned to coding systems and values sets.

6. Appendix A. HL7 Examples of Report Messages

Example messages for laboratory-based reporting of findings of public health importance.

Example 1: Hepatitis A Virus

```
MSH|^~\&||MediLabCo-Seattle^45D0470381^CLIA|NPHSS|WA-DOH
   |199602171830||OUL^R22||P|2.5
PID|||95101100001^^^^^MediLabCo-Seattle&45D0470381&CLIA~423523049^^^^SS
   ~DOEJ34556057^^^^DL^^^19970801^WA||Doe^John^Q^Jr||19641004|M||W
   |100 Main St.^Apt
B^Seattle^WA^98109^USA^^^King||^^^^^206^9998888|||M|||
   |||N
SPM|1|38294521||BLDV
SAC||B96345||1ZE80A71124371^UPS
OBR|1||SER122145|^^^78334^Hepatitis Panel, Measurement^L|||199603210830
   |||||||||^Jones^M^J^Jr^Dr^MD|^^^^^206^9998888|||||199693241500|||F
ORC|RE||SER122145|||||||||||||||||Columbia Valley Memorial Hospital|211
W. 4TH
   ST.^^CRAWFORD^TN^37012|^^^^^308^8652141|211 W. 4TH
ST.^^CRAWFORD^TN^37012
OBX|1|CE|5182-1^Hepatitis A Virus, Serum Antibody EIA^LN|1|
   G-A200^Positive^SNM||||||F|||199603241500|45D0480381
```

Example 2: Bordetella pertussis

```
MSH|^~\&||MediLabCo-Seattle^45D0470381^CLIA|NPHSS|WA-DOH
   |199602171830||OUL^R22||P|2.5
PID|||95101100001^^^^^MediLabCo-Seattle&45D0470381&CLIA~423523049^^^^SS
   ~DOEJ34556057^^^^DL^^^19970801^WA||Doe^John^Q^Jr||19641004|M||W
   |100 Main St.^Apt
B^Seattle^WA^98109^USA^^^King||^^^^^206^9998888|||M|||
```

```
   |||N
SPM|1|38294522||THRT^Throat
SAC||B96346||1ZE80A71124372^UPS
OBR|1||MICR9700342|^^^78335^Throat Culture^L|||199603210830
   |||||||||^Jones^M^J^Jr^Dr^MD|^^^^^206^9998888|||||199693241500|||F
ORC|RE||MICR9700342|||||||||||||||||Columbia Valley Memorial
Hospital|211 W. 4TH
   ST.^^CRAWFORD^TN^37012|^^^^^308^8652141|211 W. 4TH
ST.^^CRAWFORD^TN^37012
OBX|1|CE|626-2^Microorganism identified, Throat Culture^LN|1|L-
12801^Bordetella pertussis^SNM||||||F|||199602161330|45D0470381
```

Example 3: Lead

```
MSH|^~\&||MediLabCo-Seattle^45D0470381^CLIA|NPHSS|WA-DOH
   |199602171830||OUL^R22||P|2.5
PID|||95101100001^^^^^MediLabCo-Seattle&45D0470381&CLIA~423523049^^^^SS
   ~DOEJ34556057^^^^DL^^^19970801^WA||Doe^John^Q^Jr||19641004|M||W
   |100 Main St.^Apt
B^Seattle^WA^98109^USA^^^King||^^^^^206^9998888|||M|||
   |||N
SPM|1|38294523|| BLDC^Blood capillary
SAC||B96346||1ZE80A71124373^UPS
OBR|1||CHEM9700122|^^^78339^Lead Test^L|||199603210830
   |||||||||^Jones^M^J^Jr^Dr^MD|^^^^^206^9998888|||||199693241500|||F
ORC|RE||CHEM9700122|||||||||||||||||Columbia Valley Memorial
Hospital|211 W. 4TH
   ST.^^CRAWFORD^TN^37012|^^^^^308^8652141|211 W. 4TH
ST.^^CRAWFORD^TN^37012
OBX|1|SN|10368-9^Quantitative Blood
   Lead^LN|1|^45|g/dL|||||F|||199601210800|45D0480381
```

Example 4: Drug-Resistant *Streptococcus pneumoniae*

```
MSH|^~\&||MediLabCo-Seattle^45D0470381^CLIA|NPHSS|WA-DOH
   |199602171830||OUL^R22||P|2.5
PID|||95101100001^^^^^MediLabCo-Seattle&45D0470381&CLIA~423523049^^^^SS
   ~DOEJ34556057^^^^DL^^^19970801^WA||Doe^John^Q^Jr||19641004|M||W
   |100 Main St.^Apt B^Seattle^WA^98109^USA^^^King
   ||^^^^^206^9998888|||M||||||N
SPM|1|38294526||BLDV^Blood venous
SAC||B96349||1ZE80A71124378^UPS
OBR|1||MB99012|06730^MIC susceptibility test^L|||199603210830
   |||||||||^Jones^M^J^Jr^Dr^MD|^^^^^206^9998888|||||199693241500|||F
   |600-7&Microorganism identified, Blood Culture&LN^
   ^L-25116&Streptococcus pneumoniae&SNM
ORC|RE||MB99012|||||||||||||||||Columbia Valley Memorial Hospital
   |211 W. 4TH ST.^^CRAWFORD^TN^37012|^^^^^308^8652141|211 W. 4TH
```

```
   ST.^^CRAWFORD^TN^37012
OBX|1|SN|524-9^Vancomycin Susceptibility,
   MIC^LN||<^1|g/mL^^ISO+||S|||F||199602161300|01D0301145
OBX|2|SN|384-8^Oxacillin Susceptibility, Agar Diffusion (Kirby
   Bauer)^LN||^16|mm^^ISO+||R|||F||199602161300|01D0301145
OBX|3|SN|141-2^Ceftriaxone Susceptibility,
   MIC^LN||^4|g/mL^^ISO+||R|||F||199602161300|01D0301145
```

7. Appendix B. HL7 Reporting of Culture and Susceptibilities

Introduction

Parent-child relationships such as culture and sensitivities can be reported using the Health Level Seven (HL7) electronic messaging standard. However, this is an area where many vendors and large laboratories have augmented the standard to account for variations in the systems with which they work. This usually does not present a problem until these messages need to be shared between systems, for instance between laboratories and sub-contracted laboratories or between laboratories and public health agencies.

Parent-child information such as culture and susceptibilities (e.g., reporting of multi-resistant tuberculosis or drug-resistant gonoccocus or pneumococcus) is a critical component of electronic laboratory-based public health reporting. The following supplemental guide provides a description and examples of the preferred approach as defined in HL7 Version 2.5 with editorial input from HL7 Chapter Chairpersons. The discussion is intended to supplement the description provided previously in the implementation guide "Health Level Seven Specifications for Electronic Laboratory-Based Reporting of Public Health Information, October 1, 1997":
http://www.cdc.gov/od/hissb/docs.htm . This supplemental guide is intended for individuals with a basic understanding of the HL7 messaging standard and the basics of reporting laboratory results.

The approach described here is the required approach that will be used for reporting microbiology results for PHIN messaging involving the OUL^R22 message.

Template for Culture Results

A template report for the initial identification of three organisms from a single stool culture is presented below. For each field (i.e., the space between the pipes, "|"), a description of what should appear in that particular field is given along with the segment-field number in parentheses (e.g., OBR-3) for some of the fields. Note that these examples use the OUL^R22 message type.

```
MSH|…
PID|…
SPM|1| Specimen identifier for the specimen being tested|_
SAC|| Accession number for the specimen being tested (SAC-2)|_
OBR|1|| Filler number | Identifier code for the requested test or
      panel of tests(OBR-4) |…
OBX|1|CE| Specific organism identifier (OBX-3)
      | Sub-id for the first organism (OBX-4)
      | Description of organism (OBX-5) |…
OBX|2|SN| Other identifier (OBX-3)
      | Sub-id for the first organism (OBX-4)
      | Observation on the organism (OBX-5) |…
OBX|3|CE| Specific organism identifier (OBX-3)
      | Sub-id for the second organism (OBX-4)
      | Description of organism (OBX-5) |…
OBX|4|SN| Other identifier (OBX-3)
      | Sub-id for the second organism (OBX-4)
      | Observation on the Organism (OBX-5) |…
OBX|5|CE| Specific organism identifier (OBX-3)
      | Sub-id for the third organism (OBX-4)
      | Description of organism (OBX-5) |…
OBX|6|SN| Other identifier (OBX-3)
```

```
| Sub-id for the third organism (OBX-4)
| Observation on the organism (OBX-5) |…
```

This report has the MSH (Message Header), the PID (Patient Identification Segment), a single SPM (Specimen Segment), a single SAC (Specimen Container Detail Segment), a single OBR (Observation Request Segment), and six OBX (Observation/Results) segments. Note that the "Set ID" in the first field of each OBX is sequential while the "Sub-ID" in the fourth field of each OBX is not sequential, but acts as a link for all the OBX segments that are reporting information for a related observation. The "Sub-ID" field in the template above has the words "first", "second", and "third" in bold. This is done to show that the identification of the first organism is the relating observation for the first two OBX segments (i.e., Set-ID numbers 1 and 2). The identification of the second organism is the relating observation for the second two segments (i.e., Set-ID numbers 3 and 4) and so on. An example using the template above is presented next.

Example of Culture Results

Using the template above, two examples for a patient with three pathogens identified from a stool specimen are provided. The first is a "bare bones" example OUL^R22 to show the basic structure of the report. The second example adds information in the appropriate format described in HL7 2.5 OUL^R22 and adds standard codes for results reporting.

Example 1

```
MSH|…
PID|…
SPM|1|12345||STL^Stool|…
SAC||W9087|…
OBR|1||MC127600 |Stool Culture|…
OBX|1||Microorganism identified|1|Campylobacter jejuni|…
OBX|2||Colony count|1|10,000-90,000|…
OBX|3||Microorganism identified|2|Salmonella Group B| …
OBX|4||Colony count|2|>100,000|…
OBX|5||Microorganism identified|3|Shigella Group D|…
OBX|6||Colony count|3|<1,000|…
```

Example 2

Using standard coding systems such as *Logical Observation Identifiers, Names, and Codes* (LOINC, http://www.mcis.duke.edu/standards/termcode/loinc.htm) and *Systematized Nomenclature for Human and Veterinary Medicine* (SNOMED, http:// www.mcis.duke.edu/ standards/termcode/snomed.htm), the above example would appear as:

```
MSH|…
PID|…
SPM|1|12345||STL^Stool|…
SAC||W9087|…
OBR|1||MC127600 |87045^Culture, Stool-Salm,Shig,Campy^C4^7014
      ^Culture, Stool-Salm, Shig,Campy^L |…
OBX|1|CE|625-4^Microorganism identified:Stool Culture^LN^9001
```

```
      ^Isolate 1^L|1|L-13505^Campylobacter jejuni^SNM
      ^CJEJUN^Campylobacter jejuni^L|…
OBX|2|SN|564-5^Colony count^LN^81015^Quantity^L|1|^10,000^-^90,000|…
OBX|3|CE|625-4^Microorganism identified:Stool Culture^LN
      ^9002^Isolate 2^L|2|L-17300^Salmonella Group B^SNM
      ^SALMD^Salmonella Group B^L| …
OBX|4|SN|564-5^Colony count^LN^81015^Quantity^L|2|>^100,000|…
OBX|5|CE|625-4^Microorganism identified:Stool Culture^LN
      ^9003^Isolate 3^L|3|L-1E100^Shigella Group D^SNM
      ^SHIGD^Shigella Group D^L|…
OBX|6|SN|564-5^Colony count^LN^81015^Quantity^L|3|<^1,000|…
```

Both examples show the use of the Sub-ID in OBX-4 to connect related observations. The Sub-ID is shown in bold letters as was presented in the template previously. In this example, numbers are used for the Sub-ID; however, a text identifier such as "isolate1" could be used. The HL7 standard has defined the Sub-ID (i.e., OBX-4) as a "string" data type, and thus, it can be either a number or text. Numbers are preferred for electronic laboratory-based reporting of public health data.

In this example, the information about colony counts in OBX segments with Set ID's 2, 4, and 6 is provided to show how the "Sub-ID" is used to relate the associated OBX segments to each other (i.e., 1 and 2, 3 and 4, 5 and 6). Some laboratories may not have this additional information and would therefore transmit only the identification of the organisms (i.e., OBX segments 1, 3, and 5).

The example above also shows that HL7 allows for the sending of both a universal standard code (e.g., LOINC) and a local code each for OBX-3. In other words, the standard code appears first in OBX-3, "625-4^Microorganism identified:Stool Culture^LN", followed by the local code for the same observation, "9001^Isolate 1^L". The "LN" is the code for LOINC, and "L" refers to the local non-standard code. This is possible because the data type is a "Coded Element" (CE). The CE data type is required for OBX-3. The CE data type is also preferred in OBX-5 when reporting organism names. When the CE data type is used for public health reporting, the standard code should appear first followed by the local code.

Template of Culture and Susceptibility Results

The template and example in sections 3 and 4 described a report for a culture. The following template shows how antimicrobial susceptibility results are reported for the culture described in sections 3 and 4. The connection of the culture to the susceptibilities is a "Parent-Child" relationship, where the culture is the parent result and the susceptibilities are the child results. This means that there can be many child results for a single parent result. In other words, there can be multiple OBR child segments for the single OBR parent segment presented in sections 3 and 4 above. The template for the report containing the culture and susceptibilities appears below. The titles in Italic are given to highlight the individual parent and child segments and are not found in an actual HL7 message transmission. It is important to note that in each of the OBR child segments, there is a pointer back to the parent result. This pointer is found in OBR-26 ("Parent Result") and in OBR-29 ("Parent Number"). All messages are OUL^R22 messages,

Message Header and Patient Identification Segment for the Parent-Child Message

```
MSH|…
```

PID|…

Parent SPM Segment

SPM|1| Specimen identifier for the specimen being tested|_
SAC|| Accession number for the specimen being tested (SAC-2) |_

Parent OBR Segment

OBR|1|| Filler order number (OBR-3) | Identifier code for the requested test or panel of tests (OBR-4) |…

Parent OBX Segments for First Organism Identified

OBX|1|CE| Specific organism identifier (OBX-3) | Sub-id for the **first** organism (OBX-4) | Description of organism (OBX-5) |…

OBX|2|SN| Other identifier (OBX-3) | Sub-id for the **first** organism (OBX-4) | Observation on the organism (OBX-5) |…

Parent OBX Segments for Second Organism Identified

OBX|3|CE| Specific organism identifier (OBX-3) | Sub-id for the **second** organism (OBX-4) | Description of organism (OBX-5) |…

OBX|4|SN| Other identifier (OBX-3) | Sub-id for the **second** organism (OBX-4) | Observation on the Organism (OBX-5) |…

Parent OBX Segments for Third Organism Identified

OBX|5|CE| Specific organism identifier (OBX-3) | Sub-id for the **third** organism (OBX-4) | Description of organism (OBX-5) |…

OBX|6|SN| Other identifier (OBX-3) | Sub-id for the **third** organism (OBX-4) | Observation on the organism (OBX-5) |…

Child OBR for First Organism identified

OBR|2|| Filler order number (OBR-3) | Identifier code for the requested test or panel of tests (OBR-4) ||||||||||||||||||||

A **pointer** back to the parent OBX segment which contained the identification of the **first** organism, see below for description of “Pointers” (OBR-26) ||| Parent Filler order number (OBR-29) |...

Child OBX Segments for Susceptibilities of First Organism Identified

OBX|1|CE|Specific susceptibility identifier for first antimicrobial (OBX-3) | Sub-ID for the **first** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

OBX|2|CE|Specific susceptibility identifier for second antimicrobial (OBX-3) | Sub-ID for the **first** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

OBX|3|CE|Specific susceptibility identifier for third antimicrobial (OBX-3) | Sub-ID for the **first** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

Child OBR Segment for Second Organism Identified

OBR|3|| Filler order number (OBR-3) | Identifier code for the requested test or panel of tests (OBR-4) ||||||||||||||||||||||

A **pointer** back to the parent OBX segment which contained the identification of the **second** organism, see below for description of "Pointers" (OBR-26) ||| Parent Filler order number (OBR-29) |...

Child OBX Segments for Susceptibilities of Second Organism Identified

OBX|1|CE|Specific susceptibility identifier for first antimicrobial (OBX-3) | Sub-ID for the **second** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

OBX|2|CE|Specific susceptibility identifier for second antimicrobial (OBX-3) | Sub-ID for the **Second** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

OBX|3|CE|Specific susceptibility identifier for third antimicrobial (OBX-3) | Sub-ID for the **second** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

Child OBR Segment for Susceptibilities of Third Organism Identified

OBR|3|| Filler order number (OBR-3) | Identifier code for the requested test or panel of tests (OBR-4)||||||||||||||||||||||

A **pointer** back to the parent OBX segment which contained the identification of the **third** organism, see below for description of "Pointers" (OBR-26) ||| Parent Filler order number (OBR-29) |...

Child OBX Segments for Susceptibilities of Third Organism Identified

OBX|1|CE|Specific susceptibility identifier for first antimicrobial (OBX-3) | Sub-ID for the **third** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

OBX|2|CE|Specific susceptibility identifier for second antimicrobial (OBX-3) | Sub-ID for the **third** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

OBX|3|CE|Specific susceptibility identifier for third antimicrobial (OBX-3) | Sub-ID for the **third** organism identified (OBX-4) | Susceptibility finding (OBX-5) ||| Susceptibility interpretation (OBX-8) |…

The use of the parent-child relationship for reporting culture and susceptibilities may appear to be cumbersome or over-complicated. However, a system for reporting the complex relationships inherent in microbiology requires a flexible messaging approach. The approach described above allows for a series of reports that can provide interim data in the way the tests are actually performed in the laboratory. For instance, a first report might show "Gram Negative Diplococci", followed by a report showing "Neisseria species, penicillin-sensitive", and with a final report of "Neisseria meningitidis, penicillin-sensitive". The use of the "pointers" in the child results allows information to be linked back to the parent result, even if the parent result is not yet identified. This means that the relationship to the parent remains, even if the parent itself is changing.

Example of Culture and Susceptibility Results

Using the template above, two examples are provided for a report of three pathogens identified from a stool specimen with their respective antimicrobial susceptibility tests. As in section 4 above, the first example is a "bare bones" example to show the basic structure of the report. The second example adds information in the appropriate format described in HL7 2.5 and adds standard codes for results reporting.

Example 1

```
MSH|…
PID|…
SPM|1|12345||STL^Stool|…
SAC||W9087|…
OBR|1||MC127600|Stool Culture|…
OBX|1||Microorganism identified|1|Campylobacter jejuni|…
OBX|2||Colony count|1|10,000-90,000|…
OBX|3||Microorganism identified|2|Salmonella Group B| …
OBX|4||Colony count|2|>100,000|…
OBX|5||Microorganism identified|3|Shigella Group D|…
OBX|6||Colony count|3|<1,000|…
OBR|2||MC127601|Stool Culture|…|Microorganism identified^1
      ^Campylobacter jejuni|||^MC127600|…
OBX|1||Ampicillin|1|<0.06|µg/mL||S|…
OBX|2||Gentamicin|1|0.05|µg/mL||S|…
OBX|3||Ciprofloxacin|1|0.05|µg/mL||S|…
OBR|3||MC127602|Stool Culture|…|Microorganism identified^2
      ^Salmonella B|||^MC127600|…
OBX|1||Ampicillin|2|<0.06|µg/mL||S|…
OBX|2||Gentamicin|2|0.05|µg/mL||S|…
OBX|3||Ciprofloxacin|2|0.05|µg/mL||S|…
OBR|4||MC127603|Stool Culture|…|Microorganism identified^3
      ^Shigella D|||^MC127600|…
OBX|1||Ampicillin|3|<0.06|µg/mL||S|…
OBX|2||Gentamicin|3|0.05|µg/mL||S|…
OBX|3||Ciprofloxacin|3|0.05|µg/mL||S|…
```

Example 2

Using standard universal coding systems such as LOINC and SNOMED, the above example would appear as:

```
MSH|…
PID|…
SPM|1|12345||STL^Stool|…
SAC||W9087|…
OBR|1||MC127600|87045^Culture, Stool-Salm,Shig,Campy^C4
   ^7014^Culture, Stool-Salm, Shig,Campy^L |…
OBX|1|CE|625-4^Microorganism identified:Stool Culture^LN
   ^9001^Isolate 1^L|1|L-13505^Campylobacter jejuni^SNM
   ^CJEJUN^Campylobacter jejuni^L|…
OBX|2|SN|564-5^Colony count^LN^81015^Quantity^L|1
   |^10,000^-^90,000|…
OBX|3|CE|625-4^Microorganism identified:Stool Culture^LN
   ^9002^Isolate 2^L|2|L-17300^Salmonella Group B^SNM
   ^SALMD^Salmonella Group B^L| …
OBX|4|SN|564-5^Colony count^LN^81015^Quantity^L|2|>^100,000|…
OBX|5|CE|625-4^Microorganism identified:Stool Culture^LN
   ^9003^Isolate 3^L|3|L-1E100^Shigella Group D^SNM
   ^SHIGD^Shigella Group D^L|…
OBX|6|SN|564-5^Colony count^LN^81015^Quantity^L|3|<^1,000|…
OBR|2||MC127601|87045^Culture, Stool-Salm,Shig,Campy^C4
   ^7014^Culture, Stool-Salm,Shig,Campy^L
   ||||||||||||||||||200502081402|||F
   |625-4&Microorganism identified:Stool Culture&LN
   &9001&Isolate 1&L^1^Campylobacter jejuni|||^MC127600|…
OBX|1|SN|6979-9^AMPICILLIN:SUSC:PT:ISLT:ORDQN:GRADIENT STRIP^LN
   ^AM^Amp^L|1|<^0.06|µg/mL||S|…
OBX|2|SN|7016-9^GENTAMICIN:SUSC:PT:ISLT:ORDQN:GRADIENT STRIP^LN
   ^GM^Gent^L|1|^0.05|µg/mL||S|…
OBX|3|SN|7002-9^CIPROFLOXACIN:SUSC:PT:ISLT:ORDQN
   :GRADIENT STRIP^LN^CIP^Cipro^L|1|^0.05|µg/mL||S|…
OBR|3||MC127602|87045^Culture, Stool-Salm,Shig,Campy^C4
   ^7014^Culture, Stool-Salm,Shig,Campy^L
   ||||||||||||||||||200502081402|||F
   |625-4&Microorganism identified:Stool Culture&LN
   &9002&Isolate 2&L^2^Salmonella Group B|||^MC127600|…
OBX|1|SN|6979-9^AMPICILLIN:SUSC:PT:ISLT:ORDQN:GRADIENT STRIP^LN
   ^AM^Amp^L|2|<^0.06|µg/mL||S|…
OBX|2|SN|7016-9^GENTAMICIN:SUSC:PT:ISLT:ORDQN:GRADIENT STRIP^LN
   ^GM^Gent^L|2|^0.05|µg/mL||S|…
OBX|3|SN|7002-9^CIPROFLOXACIN:SUSC:PT:ISLT:ORDQN
   :GRADIENT STRIP^LN^CIP^Cipro^L|2|^0.05|µg/mL||S|…
OBR|4||MC127603|87045^Culture, Stool-Salm,Shig,Campy^C4
```

```
   ^7014^Culture, Stool-Salm, Shig,Campy^L
   ||||||||||||||||||200502081402|||F
   |625-4&Microorganism identified:Stool Culture&LN
   &9003&Isolate 3&L^3^Shigella Group D|||^MC127600|…
OBX|1|SN|6979-9^AMPICILLIN:SUSC:PT:ISLT:ORDQN:GRADIENT STRIP^LN
   ^AM^Amp^L|3|<^0.06|µg/mL||S|…
OBX|2|SN|7016-9^GENTAMICIN:SUSC:PT:ISLT:ORDQN:GRADIENT STRIP^LN
   ^GM^Gent^L|3|^0.05|µg/mL||S|…
OBX|3|SN|7002-9^CIPROFLOXACIN:SUSC:PT:ISLT:ORDQN
   :GRADIENT STRIP^LN^CIP^Cipro^L|3|^0.05|µg/mL||S|…
```

Pointers

Both examples use the information in OBR-26 as a pointer back to the parent OBX where the culture result is reported. OBR-26 has three components. The three components of OBR-26 are essentially the OBX-3, OBX-4, and part of the OBX-5 from the parent OBX segment. The pointer back to the parent only requires the first two components. The third component is intended only to provide additional information which may be useful but which is not necessary. This allows a lengthy result in the parent OBX-5 (e.g., a paragraph describing pathology results) to be truncated or not sent at all.

```
MSH|…
PID|…
SPM|…
SAC|…
OBR|1||MC127600|Stool Culture|…
OBX|1||Microorganism identified|1|Campylobacter jejuni|…
OBX|2||Colony count|1|10,000-90,000|…
OBX|3||Microorganism identified|2|Salmonella Group B| …
OBX|4||Colony count|2|>100,000|…
OBX|5||Microorganism identified|3|Shigella Group D|…
OBX|6||Colony count|3|<1,000|…
OBR|2||MC127601|Stool Culture|…
      |Microorganism identified^1^Campylobacter jejuni|||^MC127600|…
OBX|1||Ampicillin|1|<0.06|µg/mL||S|…
OBX|2||Gentamicin|1|0.05|µg/mL||S|…
OBX|3||Ciprofloxacin|1|0.05|µg/mL||S|…
```

For the examples given here, each child OBR describing the susceptibility testing has a different filler order number than the parent OBR. This may not be the case in some laboratories. If a laboratory uses the same filler order number for the susceptibilities as it uses for the report of the original culture, then the same number should appear in both the parent OBR in OBR-3 and in the child OBR in OBR-29.

The use of the parent-child relationship will be consistent with how some laboratories handle the reporting of culture and sensitivities. However, this approach may impose a hierarchy that is not present at other laboratories. The overall goal is to have the culture report be sent under the first OBR and to have the susceptibility report be sent as a child in a subsequent OBR. For most reporting, only one organism and its susceptibilities will be sent. As a “bare bones” message, this would appear as:

```
MSH|…
```

```
PID|…
SPM|…
SAC|…
OBR|1||MC127600|Stool Culture|…
OBX|1||Microorganism identified|1|Campylobacter jejuni|…
OBR|2||MC127601|Susceptibility Panel|…|Microorganism identified^1^
      Campylobacter jejuni|||^MC127600|…
OBX|1||Ampicillin|1|<0.06|µg/mL||S|…
OBX|2||Gentamicin|1|0.05|µg/mL||S|…
OBX|3||Ciprofloxacin|1|0.05|µg/mL||S|…
```

Or for those having the same filler order number for culture and susceptibility:

```
MSH|…
PID|…
OBR|1||MC127600|Stool Cult and Sus|…
OBX|1||Microorganism identified|1|Campylobacter jejuni|…
OBR|2||MC127600|Stool Cult and Sus|…|Microorganism identified^1^
      Campylobacter jejuni|||^MC127600|…
OBX|1||Ampicillin|1|<0.06|µg/mL||S|…
OBX|2||Gentamicin|1|0.05|µg/mL||S|…
OBX|3||Ciprofloxacin|1|0.05|µg/mL||S|…
```

End Notes – Sections quoted from HL7 Messaging Standard Version 2.5

[1] 2.5.2

[2] 2.5.3

[3] 2.3.1

[4] 2.A.6

[5] 2.A.11

[6] 2.A.13

[7] 2.A.14

[8] 2.A.20

[9] 2.A.21

[10] 2.A.22

[11] 2.A.25

[12] 2.A.26

[13] 2.A.30

[14] 2.A.31

[15] 2.A.33

[16] 2.A.35

[17] 2.A.36

[18] 2.A.44

[19] 2.A.45

[20] 2.A.47

[21] 2.A.56

[22] 2.A.57

[23] 2.A.67

[24] 2.A.69

[25] 2.A.70

[26] 2.A.74

[27] 2.A.77

[28] 2.A.81

[29] 2.A.78

[30] 2.A.85

[31] 2.A.86

[32] 2.A.87

[33] 2.A.88

[34] 2.A.89

[35] 7.3.7

[36] 2.15.9.3

[37] 2.15.9.4

[38] 2.15.9.5

[39] 2.15.9.6

[40] 2.15.9.7

[41] 2.15.9.9

[42] 2.15.9.9

[43] 2.15.9.10

[44] 2.15.9.11

[45] 2.15.9.12

[46] 2.15.9.17

[47] 2.15.9.21

[48] 2.15.9.21

[49] 2.15.9.21

[50] 2.15.9.21

[51] 2.15.12

[52] 2.15.12

[53] 2.15.12.1

[54] 2.15.12.2

[55] 2.15.12.3

[56] 2.15.12.4

[57] 2.15.12.5

[58] 2.15.12.6

[59] 3.4.2

[60] 3.4.2.1

[61] 3.4.2.3

[62] 3.4.2.5

[63] 3.4.2.7

[64] 3.4.2.8

[65] 3.4.2.10

[66] 3.4.2.11

[67] 3.4.2.13

[68] 3.4.2.14

[69] 3.4.2.16

[70] 3.4.2.21

[71] 3.4.2.22

[72] 3.4.2.23

[73] 3.4.2.24

[74] 3.4.2.25

[75] 3.4.2.26

[76] 3.4.2.29

[77] 3.4.2.30

[78] 3.4.2.31

[79] 3.4.2.32

[80] 3.4.2.35

[81] 3.4.2.36

[82] 3.4.2.37

[83] 3.4.2.38

[84] 3.4.2.39

[85] 7.4.3

[86] 7.4.3.1

[87] 7.4.3.2

[88] 7.4.3.3

[89] 7.4.3.4

[90] 7.4.3.6

[91] 7.4.3.7

[92] 7.4.3.10

[93] 7.4.3.11

[94] 7.4.3.12

[95] 7.4.3.13

[96] 7.4.3.14

[97] 7.4.3.15

[98] 7.4.3.16

[99] 7.4.3.17

[100] 7.4.3.18

[101] 7.4.3.19

[102] 7.4.3.20

[103] 7.4.3.21

[104] 7.4.3.22

[105] 7.4.3.23

[106] 7.4.3.34

[107] 7.4.3.25

[108] 7.4.3.26

[109] 7.4.3.27

[110] 7.4.3.28

[111] 7.4.3.29

[112] 13.4.3

[113] 13.4.3

[114] 13.4.3.1

[115] 13.4.3.2

[116] 13.4.3.3

[117] 13.4.3.4

[118] 13.4.3.5

[119] 13.4.3.7

[120] 13.4.3.8

[121] 13.4.2.9

[122] 13.4.3.10

[123] 13.4.3.11

[124] 13.4.3.12

[125] 13.4.3.13

[126] 13.4.3.14

[127] 13.4.3.15

[128] 13.4.3.16

[129] 13.4.3.17

[130] 13.4.3.18

[131] 13.4.3.19

[132] 13.4.3.20

[133] 13.4.3.21

[134] 13.4.3.22

[135] 13.4.3.23

[136] 13.4.3.24

[137] 13.4.3.25

[138] 13.4.3.26

[139] 13.4.3.27

[140] 13.4.3.28

[141] 13.4.3.28

[142] 13.4.3.29

[143] 13.4.3.30

[144] 13.4.3.31

[145] 13.4.3.32

[146] 13.4.3.33

[147] 13.4.3.34

[148] 13.4.3.35

[149] 13.4.3.36

[150] 13.4.3.37

[151] 13.4.3.38

[152] 13.4.3.39

[153] 13.4.3.40

[154] 13.4.3.41

[155] 13.4.3.42

[156] 13.4.3.44

[157] 13.4.4

[158] 13.4.4.1

[159] 13.4.4.2

[160] 13.4.4.3

[161] 13.4.4.4

[162] 13.4.4.5

[163] 13.4.4.6

[164] 13.4.4.7

[165] 13.4.4.8

[166] 13.4.4.9

[167] 13.4.4.10

[168] 13.4.4.11

[169] 13.4.4.12

[170] 13.4.4.13

[171] 13.4.4.15

[172] 13.4.4.16

[173] 13.4.4.17

[174] 13.4.4.18

[175] 13.4.4.19

[176] 13.4.4.20

[177] 7.4.1

[178] 7.4.1.1

[179] 7.4.1.2

[180] 7.4.1.3

[181] 7.4.1.3

[182] 7.4.1.4

[183] 7.4.1.7

[184] 7.4.1.8

[185] 7.4.1.10

[186] 7.4.1.13

[187] 7.4.1.16

[188] 7.4.1.17

[189] 7.4.1.22

[190] 7.4.1.25

[191] 7.4.1.26

[192] 7.4.1.28

[193] 7.4.1.29

[194] 7.4.1.31

[195] 7.4.1.32

[196] 7.4.1.33

[197] 7.4.1.34

[198] 7.4.1.35

[199] 7.4.1.39

[200] 7.4.1.40

[201] 7.4.1.49

[202] 4.5.1

[203] 4.5.1.1,j

[204] 4.5.1.1

[205] 4.5.1.2

[206] 4.5.1.3

[207] 4.5.1.21

[208] 4.5.1.22

[209] 4.5.1.23

[210] 4.5.1.24

[211] 7.4.2

[212] 7.4.2.2

[213] 7.4.2.3

[214] 7.4.2.4

[215] 7.4.2.5

[216] 7.4.2.5

[217] 7.4.2.6

[218] 7.4.2.7

[219] 7.4.2.8

[220] 7.4.2.10

[221] 7.4.2.11

[222] 7.4.2.12

[223] 7.4.2.13

[224] 7.4.2.14

[225] 7.4.2.15

[226] 7.4.2.16

[227] 7.4.2.17

[228] 7.4.2.18

[229] 13.4.10

[230] 13.4.10.1

[231] 13.4.10.2

[232] 13.4.10.3

[233] 13.4.10.4

[234] 13.4.10.5

[235] 13.4.10.6

[236] 13.4.10.7

[237] 13.4.10.8

[238] 13.4.11

[239] 13.4.11.1

[240] 13.4.11.2

[241] 13.4.11.3

[242] 13.4.11.4

[243] 2.15.10.1

[244] 2.15.10.2

[245] 2.15.10.3

[246] 2.15.10.4