

**Integrating the Healthcare Enterprise**



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**IHE Laboratory (LAB)  
Technical Framework**

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**Volume 2x  
(LAB TF-2x)  
Volume 2 Appendices**

15

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70 **Appendix A: Relationship between Transactions, Messages, Events**

The following tables list all the combinations of message types and trigger events that can be used by each Transaction in the IHE Laboratory Framework.

75 OML, ORL, ORU and OUL message types use a primary trigger event stored in second component of MSH-9, which describes the message structure (O21, O22, O33, O34, O35, O36, R01, R22, R23), and a secondary trigger event stored in ORC-1 (Order Control), which actually is the real world trigger event. The “Event type” column is formatted “primary event/secondary event”. For these, the “Event type” column is formatted: primary event/secondary event.

80 For ORU and OUL message types the content of the field OBR-25 (Results Status) gives a precision on the global status of the results of the order. The values of this field are shown in an additional column in the tables for transaction LAB-3 and LAB-5.

**Transaction LAB-1: Placer Order Management**

Transaction definition	Message type	Trigger event	Event type	HL-7 Ver2.5
Placing a new order (OP -> OF)	OML	Laboratory Order Message (Battery Centric)	O21/NW	Chapter 4
		Laboratory Order for multiple orders related to a single specimen	O33/NW	
		Laboratory Order for multiple orders related to a single container of a specimen	O35/NW	
Application response to a new order message (OF -> OP)	ORL	General laboratory order response message to any OML	O22/OK O22/UA	
		Laboratory order response message to a multiple order related to a single specimen OML	O34/OK O34/UA	
		Laboratory order response message to a single container of a specimen OML	O36/OK O36/UA	
Order or battery canceled by Order Filler (OF -> OP)	OML	Laboratory Order Message (Battery Centric)	O21/OC	
		Laboratory Order for multiple orders related to a single specimen	O33/OC	
		Laboratory Order for multiple orders related to a single container of a specimen	O35/OC	
Order Placer application response to order or battery canceled by Order Filler (OP -> OF)	ORL	General laboratory order response message to any OML	O22/OK O22/UA	
		Laboratory order response message to a multiple order related to a single specimen OML	O34/OK O34/UA	
		Laboratory order response message to a single container of a specimen OML	O36/OK O36/UA	
Status Changed (OF -> OP)	OML	Laboratory Order Message (Battery Centric)	O21/SC	
		Laboratory Order for multiple orders related to a single specimen	O33/SC	
		Laboratory Order for multiple orders related to a single container of a specimen	O35/SC	

Transaction definition	Message type	Trigger event	Event type	HL-7 Ver2.5
Application response to a status changes (OP -> OF)	ORL	General laboratory order response message to any OML	O22/OK O22/UA	
		Laboratory order response message to a multiple order related to a single specimen OML	O34/OK O34/UA	
		Laboratory order response message to a single container of a specimen OML	O36/OK O36/UA	
Order service replace request by Order Placer (OP -> OF)	OML	Laboratory Order Message (Battery Centric)	O21/RP	
		Laboratory Order for multiple orders related to a single specimen	O33/RP	
		Laboratory Order for multiple orders related to a single container of a specimen	O35/RP	
Order Filler application response to order service replace request by Order Placer (OF -> OP)	ORL	General laboratory order response message to any OML	O22/RQ O22/UM	
		Laboratory order response message to a multiple order related to a single specimen OML	O34/RQ O34/UM	
		Laboratory order response message to a single container of a specimen OML	O36/RQ O36/UM	
Order replaced by Order Filler (OF -> OP)	OML	Laboratory Order Message (Battery Centric)	O21/RU	
		Laboratory Order for multiple orders related to a single specimen	O33/RU	
		Laboratory Order for multiple orders related to a single container of a specimen	O35/RU	
Order placer application response to order replaced by Order Filler (OP -> OF)	ORL	General laboratory order response message to any OML	O22/RQ O22/UM	
		Laboratory order response message to a multiple order related to a single specimen OML	O34/RQ O34/UM	
		Laboratory order response message to a single container of a specimen OML	O36/RQ O36/UM	
Cancel order request by Order Placer (OP -> OF)	OML	Laboratory Order Message (Battery Centric)	O21/CA	
		Laboratory Order for multiple orders related to a single specimen	O33/CA	
		Laboratory Order for multiple orders related to a single container of a specimen	O35/CA	
Order Filler application response to cancel request by Order Placer (OF -> OP)	ORL	General laboratory order response message to any OML	O22/CR O22/UC	
		Laboratory order response message to a multiple order related to a single specimen OML	O34/CR O34/UC	
		Laboratory order response message to a single container of a specimen OML	O36/CR O36/UC	

**Transaction LAB-2: Filler Order Management**

Transaction definition	Message type	Trigger event	Event type	HL-7 Ver2.5
Send order / service number request (OF -> OP)	OML	Laboratory Order Message (Battery Centric)	O21/SN	Chapter 4
		Laboratory Order for multiple orders related to a single specimen	O33/SN	
		Laboratory Order for multiple orders related to a single container of a specimen	O35/SN	
Acknowledgement to order / service number request (OP -> OF)	ORL	General laboratory order response message to any OML	O22/NA or O22/UA	
		Laboratory order response message to a multiple order related to a single specimen OML	O34/NA or O34/UA	
		Laboratory order response message to a single container of a specimen OML	O36/NA or O36/UA	

85 **Transaction LAB-3: Order Results Management**

Transaction definition	Message type	Trigger event	Event type	OBR-25 status	HL-7 Ver2.5
Reception of specimen(s) (no results available, procedure incomplete)	OUL	Unsolicited specimen centered observation message	R22/SC	I	Chapter 7
	ORU	Unsolicited order centered observation message	R01/SC	I	
Some or all of the results available Not validated yet.	OUL	Unsolicited specimen centered observation message	R22/SC	R	
	ORU	Unsolicited order centered observation message	R01/SC	R	
Preliminary: Some of results available, validated.	OUL	Unsolicited specimen centered observation message	R22/SC	P	
	ORU	Unsolicited order centered observation message	R01/SC	P	
Final: All results available, validated	OUL	Unsolicited specimen centered observation message	R22/SC	F	
	ORU	Unsolicited order centered observation message	R01/SC	F	
Correction of final results, results final	OUL	Unsolicited specimen centered observation message	R22/SC	C	
	ORU	Unsolicited order centered observation message	R01/SC	C	
Deletion of battery/test in a filler order (no results available)	OUL	Unsolicited specimen centered observation message	R22/SC	X	
	ORU	Unsolicited order centered observation message	R01/SC	X	
Addition of a battery/test in an order (but not done)	OUL	Unsolicited specimen centered observation message	R22/SC	S	
	ORU	Unsolicited order centered observation message	R01/SC	S	

**Transaction LAB-4: Work Order Management**

Transaction definition	Message type	Trigger event	Event type	HL-7 Ver2.5
Order Filler issues the new order (test request) (OF -> AM)	OML	Laboratory order message	O21/NW	Chapter 4
		Laboratory order for multiple orders related to a single specimen	O33/NW	
		Laboratory order for multiple orders related to a single container of a specimen	O35/NW	
Automation Manager responds to new order (AM -> OF)	ORL	General laboratory order response message to any OML	O22/OK O22/UA	
		Laboratory order response message to a multiple order related to single specimen OML	O34/OK O34/UA	
		Laboratory order response message to a single container of a specimen OML	O36/OK O36/UA	
Order Filler replaces the order (test request) (OF -> AM)	OML	Laboratory order message	O21/RP	
		Laboratory order for multiple orders related to a single specimen	O33/RP	
		Laboratory order for multiple orders related to a single container of a specimen	O35/RP	
Automation Manager responds to replace order (AM -> OF)	ORL	General laboratory order response message to any OML	O22/RQ O22/UM	
		Laboratory order response message to a multiple order related to single specimen OML	O34/RQ O34/UM	
		Laboratory order response message to a single container of a specimen OML	O36RQ O36UM	
Order Filler cancels the order (test request) (OF -> AM)	OML	Laboratory order message	O21/CA	
		Laboratory order for multiple orders related to a single specimen	O33/CA	
		Laboratory order for multiple orders related to a single container of a specimen	O35/CA	
Automation Manager responds to cancel order (AM -> OF)	ORL	General laboratory order response message to any OML	O22/CR O22/UC	
		Laboratory order response message to a multiple order related to single specimen OML	O34/CR O34/UC	
		Laboratory order response message to a single container of a specimen OML	O36/CR O36/UC	

**Transaction LAB-5: Test Results Management**

Transaction definition	Message type	Trigger event	Event type	OBR-25 status	HL-7 Ver2.5
Automation Manager transmits the reception of specimen(s) / container(s) (no results available, procedure incomplete)	OUL	Unsolicited Specimen Oriented Observation Message	R22/SC	I	Chapter 7
		Unsolicited Specimen Container Oriented Observation Message	R23/SC	I	

<b>Transaction definition</b>	<b>Message type</b>	<b>Trigger event</b>	<b>Event type</b>	<b>OBR-25 status</b>	<b>HL-7 Ver2.5</b>
Automation Manager transmits some (or all) of the results not yet validated	OUL	Unsolicited Specimen Oriented Observation Message	R22/SC	R	
		Unsolicited Specimen Container Oriented Observation Message	R23/SC	R	
Automation Manager transmits the preliminary results (some of results available, validated) (AM -> OF)	OUL	Unsolicited Specimen Oriented Observation Message	R22/SC	P	
		Unsolicited Specimen Container Oriented Observation Message	R23/SC	P	
Automation Manager transmits the final results (all results available, validated)	OUL	Unsolicited Specimen Oriented Observation Message	R22/SC	F	
		Unsolicited Specimen Container Oriented Observation Message	R23/SC	F	
Automation Manager transmits the correction of final results	OUL	Unsolicited Specimen Oriented Observation Message	R22/SC	C	
		Unsolicited Specimen Container Oriented Observation Message	R23/SC	C	

## 90 Appendix B: Implementation Notes for POCT1-A DML

The transactions LAB-30 and LAB-31 between the actors POCRG and POCDM rely on *Device Messaging Level* interface defined in Appendix B of the standard POCT1-A.. In this *DML* interface the POCRG actor is called the “*Device*” and the POCDM actor is called “*Observation Reviewer*”.

95 All messages of DML are encoded in XML (eXtended Markup Language). The syntax of each of these messages is defined by a DTD (Document Type Definition).

The *Device* communicates with the *Observation Reviewer* through an *Access Point*, which can be part of a *Device* persistently connected to the network, or be a subsystem that consolidates data from one or more *Devices* onto an established communication link with the *Observation Reviewer* (POCDM).

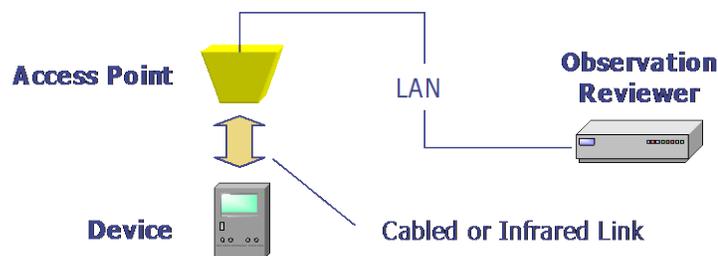


Figure B-1: Excerpt from POCT1-A

105 The IHE LPOCT profile does not describe the protocol between the *Device* and the *Access Point*, and recommends that manufacturers refer to and adopt the standard POCT1-A specification for this layer.

The IHE LPOCT profile describes the use of the DML, which is the top layer of the interface between the *Device* (POCRG actor) and the *Observation Reviewer* (POCDM actor). The lower layer protocols are not described in this IHE profile. IHE recommends the use of the MLLP transport protocol between the Device Access Point and the POCDM, as this protocol is used by all profiles of IHE Laboratory Technical Framework.

### B.1 IHE usages for DML

The conventions of usage in the DML interface from POCT1-A are the same as those defined for HL7 messages in section 2.2.1 of this volume (R, RE, O, C, X).

### 115 B.2 Conversations and Topics

Appendix B of POCT1-A defines two terms:

**Conversation:** A prescribed flow of messages between the Device and Observation Reviewer, having both an initialization and a termination phase. A Conversation is made up of a series of ‘Topics.’

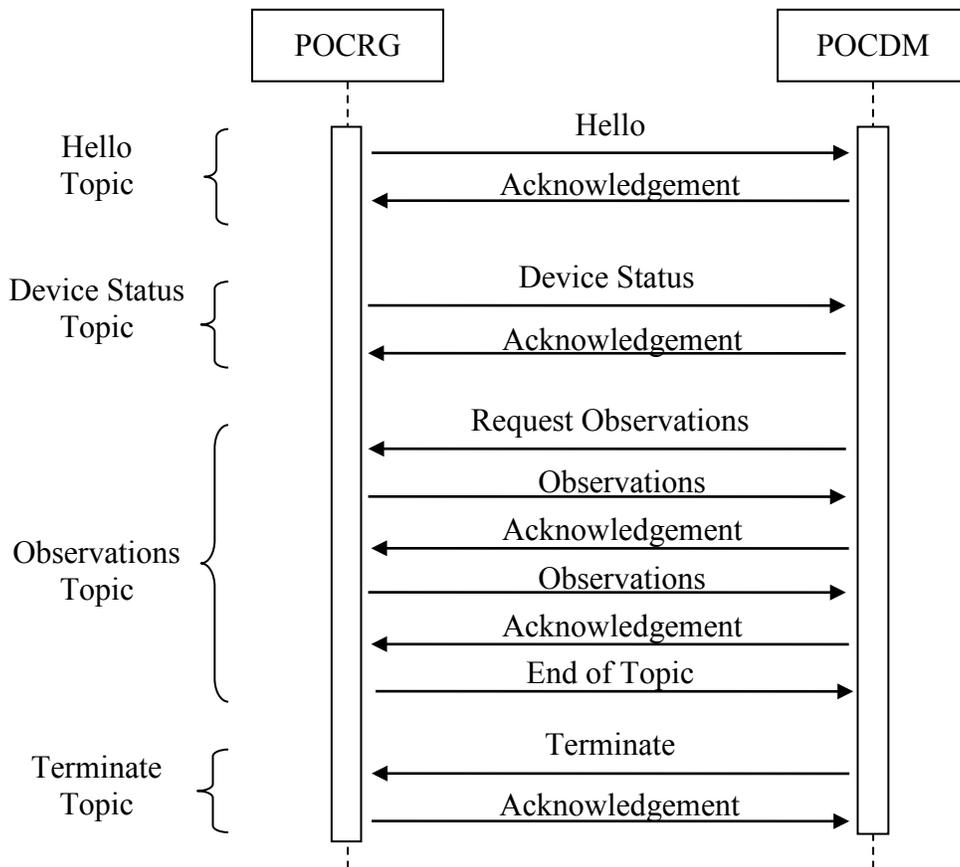
120 **Topic:** The flow of messages to exchange a complete set of data within a Conversation (e.g., Observations, Device Events). A Topic is composed of a series of ‘Messages.’

The IHE LPOCT Profile describes only the Topic **Observations** which is used by Transactions LAB-30 and LAB-31. It is assumed that the systems implementing a POCRG actor or a POCDM actor support the other Topics listed below, according to the standard POCT1-A.

**POCT1-A “basic profile” for transaction LAB-31**

To support Transaction LAB-31 of LPOCT Integration profile, a **Device** (POCRG actor) and an **Observation Reviewer** (POCDM actor) must support at least the “**Basic Profile**”, as defined in Appendix B section 4.1 of POCT1-A.. This “**Basic Profile**” specifies a minimum set of “**Topics**” that Devices and Observation Reviewers must support. These Topics are:

- Hello
- Device Status
- Observations
- Terminate



135

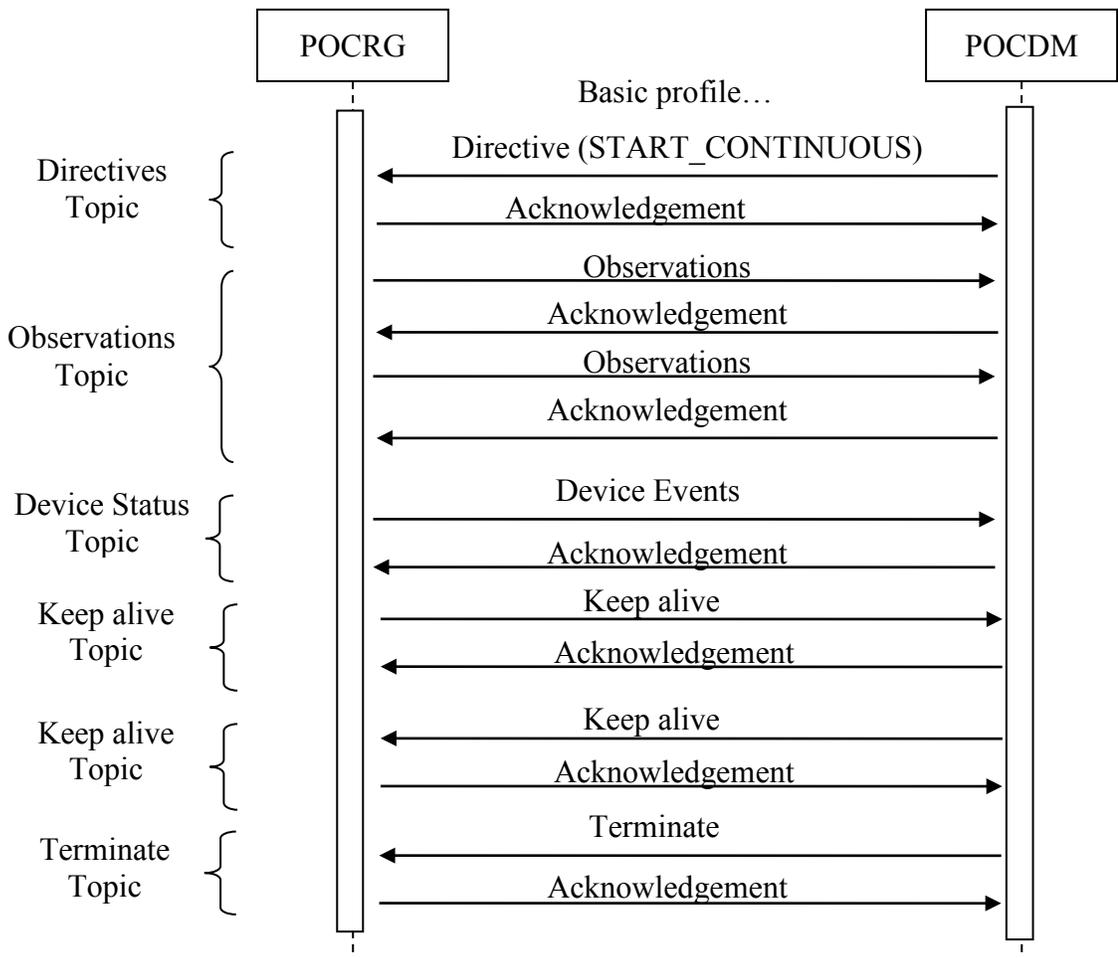
**Figure B.2-1: Error-Free Basic Profile Flow, POCT1-A – Appendix B**

The “Terminate” topic can also be performed in reverse, with the POCRG sending a Terminate message and the POCDM acknowledging it. This termination can occur at any time.

**Continuous Mode to support Transactions LAB-30 and LAB-31**

140 To support the “Patient Identity Checking” option of this Profile (i.e., the transaction LAB-30  
 between POCRG and POCDM) the *Device* (POCRG) and the *Observation Reviewer* (POCDM)  
 must support the “*Continuous Mode*”, as defined in Appendix B of POCT1-A.. This  
*Continuous Mode* requires that Devices and Observation Reviewers support a more complete set  
 of *Topics*:

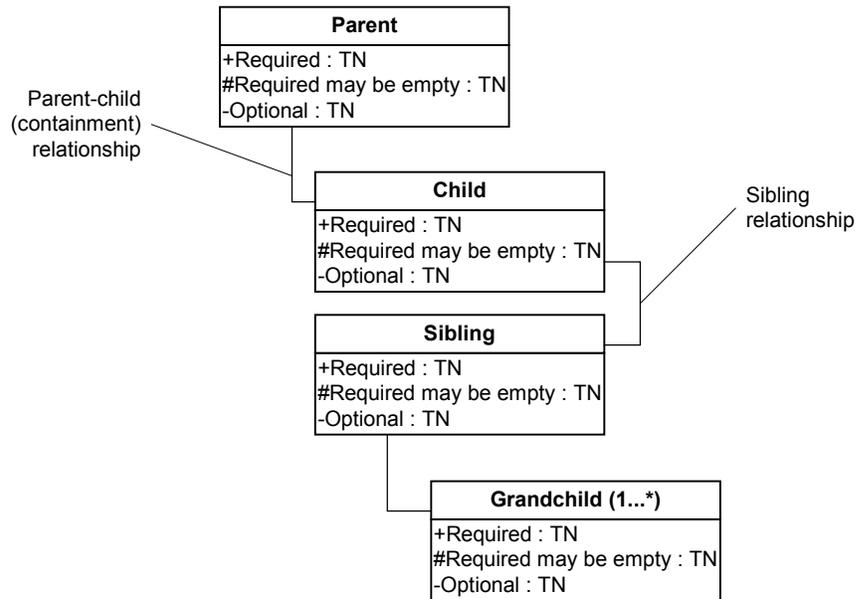
- 145
- Hello
  - Device Status
  - Directives (with at least START\_CONTINUOUS Directive)
  - Observations
  - Keep Alive
- 150
- Termination



**Figure B.2-2: Ideal Continuous Mode Message Flow, POCT1-A – Appendix B**

155 **B.3 Characteristics of DML Messages****Notation**

DML messages are encoded in XML. As any XML document, a DML message is a hierarchic tree. The POCT1-A standard uses the following representation for this hierarchic structure:

160 **Figure B.3-1 Message Model Example, excerpt from POCT1-A – Appendix B**

Each element is represented as an object. Object cardinality is noted as part of the object name:

- (0...1) – zero or one instance
  - (0...\*) – zero or more instances
  - (1...\*) – one or more instances
- 165 • The absence of a cardinality notation indicates one, and only one, instance

The components of the object are sub-elements of the XML element.

- sub-elements preceded by ‘+’ are Required
  - sub-elements preceded by a ‘-’ are Optional
  - sub-elements preceded by ‘#’ are Required if available (may be empty if there is no relevant data (which corresponds to the “RE” usage code)
- 170

## Use of the Header Object in DML Messages

Every message of the DML starts with a mandatory Header object encoded with the XML **<HDR>** element. This IHE profile defines the following usage for this object:

Attribute	Data Type	IHE Usage	IHE Cardinalities	Description
message_type	CV	X	[0..0]	A code made up of the message name and trigger value. Examples: "OBS.R01", "ACK.R01". This field is redundant with the root element of the message. It is not supported by IHE.
control_id	ST	R	[1..1]	A string guaranteed to uniquely identify this message instance throughout the conversation
version_id	ST	R	[1..1]	Set to "POCT1" for all messages that adhere to this standard
creation_dttm	TS	R	[1..1]	The sender's time when the message was sent.
encoding_chars	ST	X	[0..0]	Not used by IHE

Example of the beginning of a message of the Hello Topic:

175

```

<HEL.R01>
  <HDR>
    <HDR.control_id V="10001"/>
    <HDR.version_id V="POCT1"/>
    <HDR.creation_dttm V="2001-11-01T16:30:00-08:00"/>
  </HDR>
  ...

```

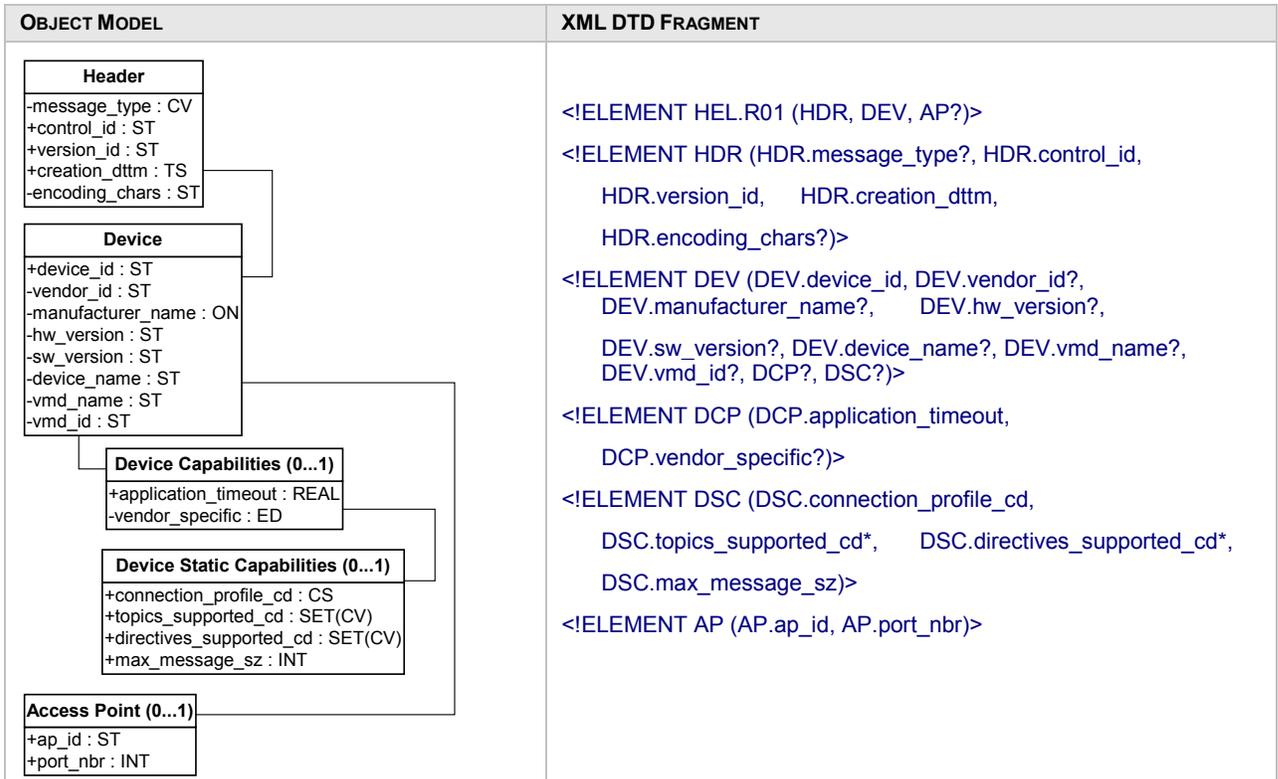
180

## Hello Topic in DML

185 The Hello Topic contains two messages: The Hello message sent by the *Device* (POCRG) and the acknowledgement message sent by the *Observation Reviewer* (POCDM).

A Device sends the Hello message only once as the first message in a Conversation. This message identifies the *Device*, its capabilities, its status, and the *Access Point* with its unique network address and port number.

- The root element of this message is <HEL.R01>
- 190 • The header element of this message, is mika in any message <HDR>
- The element representing the Device (POCRG) is <DEV>
- The element representing the Device capabilities is <DCP>
- The element representing the Device static capabilities is <DSP>
- The element representing the Access Point is <AP>



195 **Figure B.3-2: Hello Message Model, excerpt from POCT1-A – Appendix B**

Example of Hello message taken from POCT1-A – appendix B:

```

200 <HEL.R01>
    <HDR>
        <HDR.control_id V="10001"/>
        <HDR.version_id V="POCT1"/>
        <HDR.creation_dttm V="2001-11-01T16:30:00-08:00"/>
    </HDR>
    <DEV>
205     <DEV.device_id V="0A-00-19-00-00-23-84"/>
        <DEV.vendor_id V="BCHMX"/>
        <DEV.model_id V="8000A"/>
        <DEV.serial_id V="42367C"/>
        <DEV.manufacturer_name V="Biochemtronix"/>
        <DEV.hw_version V="8000A-C"/>
        <DEV.sw_version V="2001-10-04"/>
        <DEV.device_name V="ICU-4 Glucose"/>
        <DCP>
215         <DCP.application_timeout V="60"/>
    </DCP>
    <DSC>
        <DSC.connection_profile_cd V="SA"/>
        <DSC.topics_supported_cd V="DTV"/>
        <DSC.topics_supported_cd V="OP_LST"/>
220         <DSC.directives_supported_cd V="SET_TIME"/>
        <DSC.directives_supported_cd V="LOCK"/>
        <DSC.directives_supported_cd V="UNLOCK"/>
        <DSC.max_message_sz V="800"/>
    </DSC>
225 </DEV>
    <AP>
        <AP.ap_id V="00-10-9D-FF-FF-23-45-67"/>
    
```

230

```
<AP.port_nbr V="0"/>
</AP>
</HEL.R01>
```

## B.4 Main Data Types in DML for Transactions LAB-30 and LAB-31

### PN – Person name

235

The PN data type is used to communicate the elements of a person’s name. This data type may carry:

- One single attribute “V” that contains a formatted for display version of the name.
- Any of the child elements described below:

Element	Use
GIV	The given name component
MID	The middle name component
FAM	The family name component
PFX	A prefix component (e.g., “Dr.”)
SFX	A suffix component (e.g., “Ph.D”)
DEL	A delimiter character used to separate components

240

Example: The following XML fragment illustrates how the **OPR.name** field can be used to encode the operator “Dr. John Ebert.”

245

```
<OPR.name V="Dr. John Ebert">
  <FAM V="Ebert"/>
  <GIV V="John"/>
  <PFX V="Dr."/>
  <SFX V="MD"/>
</OPR.name>
```

### PQ – Physical Quantity

250

The PQ data type is used to communicate a measured value, with the units of measure. The attributes this data type may use are described in the following table. Either the ‘V’ and the ‘U’ attributes or the ‘NULL’ attribute must be specified.

**Table 72: PQ Data Type Attributes**

Field	Required	Use
V	No	Contains the string representation of the value (1)
U	No	Indicates the units of measure for the value (2)
NULL	No	Indicates one of the values from <b>Table 70</b>

Note 1: Trailing zeros may be used in the ‘V’ attribute to indicate precision.

255

Note 2: The HL7 “ISO+” units code set, defined in a section of the HL7 v2.5 specification, comprises the default values for the PQ units attribute. This specification defines an abbreviation for a single case unit (ISO 2955-83) plus extensions, which do not collide with ISO abbreviations.

Example of a pCO<sub>2</sub> value of 71.1 mmHg:

```
<OBS.value V="71.1" U="mmHg"/>
```

Example of a patient's height value of 1.85 m: `<PT.height V="1.85" U="m"/>`

**TS – Point in time**

260 This data type is used to communicate a point in time. This data type may use one and only one of these two alternative attributes:

‘V’: String representation of a point in time: YYYY-MM-DDTHH:MM:SS.SSxOH:OM

Where:

265 YYYY = four-digit year;  
 MM = two-digit month of the year;  
 DD = two-digit day of the month;  
 HH = 24-hour representation of the hour;  
 MM = minute;  
 270 SS.SS = second (optional decimal digits may follow the ‘.’ separator);  
 x = ‘+’ if time is GMT *plus* offset; ‘-’ if time is GMT *minus* offset;  
 OH = hours offset from GMT; and  
 OM = minutes offset from GMT.

‘NULL’: One of the values from Table 70:

275 Example: The following XML fragment illustrates how a device could communicate that an observation was made on June 1, 2005 at 5:09:10 PM, in the time zone of Tokyo that is nine hours prior to GMT: `<SVC.observation_dttm V="2005-06-01T17:09:10+09:00"/>`

**Table 70: Null Code Values**

Value	Use
NI	No Information
NA	Not Applicable
UNK	Unknown
NASK	Not Asked
ASKU	Asked But Unknown
NAV	Not Available
OTH	Other
PINF	Positive Infinity
NINF	Negative Infinity

280

**APPENDIX C: Common HL7 Message Segments for IHE LAB TF**

This section describes the common message segments used by IHE transactions.

285 Each table represents a segment. Below the table are commented only the fields for which IHE Laboratory Technical Framework brings some precision on usage. The optional fields are not shown in the table, unless they require a particular comment within the context of the IHE Framework.

## C.1 MSH – Message Header Segment

HL7 v2.5: chapter 2 (2.15 Message control)

290 This segment defines the intent, source, destination, and some specifics of the syntax of a message.

**Table C.1-1: MSH - Message Header**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM #	Element name
1	1	SI	R	[1..1]		00001	Field Separator
2	4	ST	R	[1..1]		00002	Encoding Characters
3	227	HD	R	[1..1]		00003	Sending Application
4	227	HD	R	[1..1]		00004	Sending Facility
5	227	HD	R	[1..1]		00005	Receiving Application
6	227	HD	R	[1..1]		00006	Receiving Facility
7	26	TS	R	[1..1]		00007	Date/Time of Message
8	40	ST	X	[0..0]		00008	Security
9	15	MSG	R	[1..1]		00009	Message Type
10	20	ST	R	[1..1]		00010	Message Control Id
11	3	PT	R	[1..1]		00011	Processing Id
12	60	VID	R	[1..1]		00012	Version ID
14	180	ST	X	[0..0]		00014	Continuation Pointer
15	2	ID	X	[0..0]	0155	00015	Accept Acknowledgement Type
16	2	ID	X	[0..0]	0155	00016	Application Acknowledgement Type
17	3	ID	RE	[1..1]	0399	00017	Country Code
18	16	ID	C	[0..1]	0211	00692	Character Set
19	250	CE	RE	[1..1]		00693	Principal Language of Message
20	20	ID	C	[0..1]	0356	01317	Alternate Character Set Handling Scheme
21	427	EI	RE	[0..*]		01598	Message Profile Identifier

### MSH-1 Field Separator (SI), required.

295 The IHE Laboratory Technical Framework requires that applications support HL7-recommended value that is | (ASCII 124).

### MSH-2 Encoding Characters (ST), required.

300 This field contains the four characters in the following order: the component separator, repetition separator, escape character, and subcomponent separator. The IHE Laboratory Technical Framework requires that applications support HL7-recommended values ^~\& (ASCII 94, 126, 92, and 38, respectively).

### MSH-4 Sending Facility (HD), required.

Components: <Namespace ID (IS)> ^ <Universal ID (ST)> ^ <Universal ID Type (ID)>

The IHE Laboratory Technical Framework requires that this field be populated with:

305 First component (required): Namespace ID. The name of the organizational entity responsible for the sending application.

Second component (optional): The URI (OID) of the organizational entity responsible for the sending application.

310 Third component (optional): The type of identification URI provided in the second component of this field. The codification of these three components is entirely site-defined. It may be detailed in the national extensions of this framework.

**MSH-6 Receiving Facility (HD)**, required.

Components: <Namespace ID (IS)> ^ <Universal ID (ST)> ^ <Universal ID Type (ID)>

The IHE Laboratory Technical Framework requires that this field be populated with:

315 First component (required): Namespace ID. The name of the organizational entity responsible for the receiving application.

Second component (optional): The URI (e.g., OID) of the organizational entity responsible for the receiving application.

320 Third component (optional): The type of identification URI provided in the second component of this field. The codification of these three components is entirely site-defined. It may be detailed in the national extensions of this framework.

**MSH-9 Message Type (MSG)**, required.

Components: <Message Code (ID)> ^ <Trigger Event (ID)> ^ <Message Structure (ID)>

Definition: This field contains the message type, trigger event, and the message structure ID for the message. All three components are required.

325 Its content is defined within each transaction-specific section of this document.

**MSH-10 Message Control Id (ST)**, required.

330 Definition: This field contains a number or other identifier that uniquely identifies the message. Each message should be given a unique identifier by the sending system. The receiving system will echo this ID back to the sending system in the Message Acknowledgment segment (MSA). The combination of this identifier and the name of the sending application (MSH-3) should be unique across the Healthcare Enterprise.

**MSH-11 Processing ID (PT)**, required.

Components: <Processing ID (ID)> ^ <Processing Mode (ID)>

335 HL7 definition: This field indicates whether to process a message as defined in HL7 Application (level 7) Processing rules.

This IHE Laboratory Technical Framework mandates only the first component, with permitted values listed in HL7 table 0103 – Processing ID:

340

**HL7 Table 0103 - Processing ID**

Value	Meaning	Comment
D	Debugging	
P	Production	
T	Training	

**MSH-12 Version ID (VID)**, required.

Components: <Version ID (ID)> ^ <Internationalisation Code (CE)> ^ <International Version ID (CE)>

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

The IHE Laboratory Technical framework requires the first component to be populated with a value starting with the character string "2.5" representing HL7 major release 2.5. Later minor releases of this 2.5, like the current release 2.5.1, are also supported by the Laboratory Technical Framework.

350

Valid examples: |2.5| |2.5.1|

**MSH-15 Accept Acknowledgment Type (ID)**, not supported.

IHE uses only the HL7 original acknowledgement mode.

**MSH-16 Application Acknowledgment Type (ID)**, not supported for the same reason.

355 **MSH-17 Country Code (ID)**, required if available.

Definition: This field contains the country of origin for the message. The values to be used are those of ISO 3166, with the 3-character (alphabetic form). Refer to HL7 Table 0399 - Country code

Examples of valid values:

360 JPN = Japan, USA = United States, GBR = United Kingdom, ITA = Italy, FRA = France, NLD = Netherlands.

**MSH-18 Character Set (ID)**, conditional.

Definition: This field contains the character set for the entire message. Refer to HL7 table 0211 - Alternate character sets for valid values.

365 Examples of valid values:

ASCII: The printable 7-bit ASCII character set.

8859/1: The printable characters from the ISO 8859/1 Character set used by Western Europe. This character set can still be used, but 8859/15 should be used by preference. This character set is the forward-compatible version of 8859/1 and includes new characters such as the Euro currency symbol.

370

ISO IR87: Code for the Japanese Graphic Character set for information interchange (JIS X 0208-1990).

UNICODE UTF-8: UCS Transformation Format, 8-bit form.

375 Condition predicate: This field shall only be valued if the message uses a character set other than the 7-bit ASCII character set. Though the field is repeatable in HL7, IHE authorizes only one occurrence (i.e., one character set). The character set specified in this field is used for the encoding of all of the characters within the message.

**MSH-19 Principal Language of Message (CE)**, required if available.

Coded from ISO 639.

380 Examples: DE = German, EN = English, ES=Spanish, JA = Japanese, FR = French, NL = Dutch, IT = Italian

**MSH-20 Alternate Character Set Handling Scheme (ID)**, conditional.

385 HL7 definition: When any alternative character sets are used (as specified in the second or later iterations of MSH-18 character sets), and if any special handling scheme is needed, this component is to specify the scheme used, according to HL7 Table 0356- Alternate character set handling scheme as defined below:

**HL7 Table 0356 - Alternate Character Set Handling Scheme**

Value	Description	Comment
ISO 2022-1994	This standard is titled "Information Technology - Character Code Structure and Extension Technique". .	This standard specifies an escape sequence from basic one byte character set to specified other character set, and vice versa. The escape sequence explicitly specifies what alternate character set to be evoked. Note that in this mode, the actual ASCII escape character is used as defined in the referenced ISO document. As noted in 1.7.1, escape sequences to/from alternate character set should occur within HL7 delimiters. In other words, HL7 delimiters are basic one byte characters only, and just before and just after delimiters, character encoding status should be the basic one byte set.
2.3	The character set switching mode specified in HL7 2.5, section 2.7.2, "Escape sequences supporting multiple character sets" and section 2.A.46, "XPN – extended person name".	Note that the escape sequences used in this mode do not use the ASCII "esc" character, as defined in ISO 2022-1994. They are "HL7 escape sequences" as first defined in HL7 2.3, sec. 2.9.2. (Also, note that sections 2.8.28.6.1 and 2.9.2 in HL7 2.3 correspond to sections 2.16.93 and 2.7.2 in HL7 2.5.)
<null>	This is the default, indicating that there is no character set switching occurring in this message.	This is the default.

Condition predicate: This field shall be valued for messages using more than one character set.

390 Example of HL7 messages in Japan:

**MSH-21 Message Profile Identifier (EI)**, required if available.

395 For IHE Laboratory Technical Framework, this field shall only be valued in the messages for which a Message Profile has been officially defined and identified. When multiple message profiles are listed in this field they should be (vendor specific, country specific) constraints of the IHE Laboratory Profile. Note that the overriding of IHE Laboratory Profile constraints is only allowed in national extensions to this framework.

## C.2 NTE – Notes and Comment Segment

HL7 v2.5 : chapter 2 (2.15 Message control)

This segment is used for sending notes and comments.

400 The IHE Laboratory Technical Framework limits the use of this segment to only one purpose: To comment the observations and the orders. Therefore, in the messages of this Integration Profile, NTE segments appear only below OBR or OBX segments.

Information that can be coded in OBX segments or OBR segments shall not be sent in a NTE segment.

405 **Table C.2-1: NTE - Notes and Comment Segment**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	4	SI	R	[1..1]		00096	Set ID – NTE
2	8	ID	RE	[0..1]		00097	Source of Comment
3	65536	FT	RE	[0..1]		00098	Comment
4	250	CE	RE	[0..1]		01318	Comment Type

**NTE-1 Set ID - NTE (SI)**, required.

**NTE-2 Source of Comment (ID)**, required but may be empty.

IHE Laboratory Technical Framework populates this field with one of these values:

410 **Table C.2-2: Source of Comment**

Value	Meaning	Comment
L	Order Filler is the source of the comment	
P	Order Placer is the source of the comment	
A	Automation Manager is the source of the comment	
O	Other system is the source of the comment	

**NTE-3 Comment (FT)**, required but may be empty:

This field contains the text of the comment. This text may be formatted. In order to delete an existing comment, the field shall contain empty quotation marks: “ ”.

415 Comment text of identical type and source shall be included in the same occurrence of an NTE segment, and not be split over multiple segments.

**NTE-4 Comment Type (CE)**, required if known.

The IHE Laboratory Technical Framework populates this field with one of these values:

**Table C.2-3: Comment Type**

Value	Meaning	Comment
I	Internal remark, that shall not be sent outside of the laboratory	Used between Automation Manager and Order Filler. Shall not be sent to the Order Result Tracker
C	Comment addressed to medical staff and physician,	Should be sent to the Order Result Tracker or the Order Placer, but should not be showed to the patient

Value	Meaning	Comment
P	Comment addressed to medical staff and physician, may be showed to the patient	Should be sent to the Order Result Tracker or the Order Placer, and may appear on the result report addressed to the patient.

### 420 C.3 PID – Patient Identification Segment

HL7 v2.5: chapter 3 (3.4.2)

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.

425

**Table C.3-1: PID - Patient Identification Segment**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	4	SI	O	[1..1]		00104	Set ID - PID
2	20	CX	X	[0..1]		00105	Patient ID
3	250	CX	R	[1..*]		00106	Patient Identifier List
4	20	CX	X	[0..1]		00107	Alternate Patient ID - PID
5	250	XP	R	[1..*]		00108	Patient Name
6	250	XP	O	[0..1]		00109	Mother's Maiden Name
7	26	TS	RE	[0..1]		00110	Date/Time of Birth
8	1	IS	R	[1..1]	0001	00111	Administrative Sex
9	250	XP	X	[0..1]		00112	Patient Alias
10	250	CE	RE	[0..1]	0005	00113	Race
11	250	XAD	RE	[0..*]		00114	Patient Address
12	4	IS	X	[0..1]	0289	00115	County Code
13	250	XTN	O	[0..*]		00116	Phone Number - Home
14	250	XTN	O	[0..*]		00117	Phone Number - Business
15	250	CE	O	[0..1]	0296	00118	Primary Language
16	250	CE	O	[0..1]	0002	00119	Marital Status
17	250	CE	O	[0..1]	0006	00120	Religion
18	250	CX	RE	[0..1]		00121	Patient Account Number
19	16	ST	X	[0..1]		00122	SSN Number - Patient
20	25	DLN	X	[0..1]		00123	Driver's License Number - Patient
21	250	CX	O	[0..*]		00124	Mother's Identifier
22	250	CE	O	[0..1]	0189	00125	Ethnic Group
23	250	ST	O	[0..1]		00126	Birth Place
24	1	ID	O	[0..1]	0136	00127	Multiple Birth Indicator
25	2	NM	O	[0..1]		00128	Birth Order
26	250	CE	O	[0..1]	0171	00129	Citizenship
27	250	CE	O	[0..1]	0172	00130	Veterans Military Status
28	250	CE	X	[0..0]	0212	00739	Nationality
29	26	TS	O	[0..1]		00740	Patient Death Date and Time
30	1	ID	O	[0..1]	0136	00741	Patient Death Indicator

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
31	1	ID	RE	[0..1]	0136	01535	Identity Unknown Indicator
32	20	IS	RE	[0..1]	0445	01536	Identity Reliability Code
35	250	CE	C	[0..1]	0446	01539	Species Code
36	250	CE	C	[0..1]	0447	01540	Breed Code

The specific usage of these fields, especially those fields with usage " O " (optional) in the table above, is explained in the national extensions.

**PID-7 Date/Time of Birth (TS)**, required if known.

- 430 If the exact date of birth is not known, the second component of this field can be used to describe the degree of precision of the information entered in the first component.

**PID-18 Patient Account Number (CX)**, required if known.

- 435 The use of the Patient Account Number may be related to the Visit Number (PV1-19). Generally, one of both fields will be filled. Additional requirements for these fields may be documented in Regional or National appendices to the IHE Laboratory Technical Framework.

**PID-35 Species Code (CE), PID-36 Breed Code (CE)**, conditional.

Condition predicate: shall be used if the test subject is a non-human living subject.

## C.4 PV1 – Patient Visit Segment

HL7 v2.5: chapter 3 (3.4.3)

- 440 The PV1 segment is used by Registration/Patient Administration applications to communicate information on an account or visit-specific basis.

**Table C.4-1: PV1 - Patient Visit Segment**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
2	1	IS	R	[1..1]	0004	00132	Patient Class
3	80	PL	RE	[0..1]		00133	Assigned Patient Location
9	250	XCN	X	[0..0]	0010	00139	Consulting Doctor
19	250	CX	RE	[0..1]		00149	Visit Number
40	1	IS	X	[0..0]	<a href="#">0116</a>	00170	Bed Status
51	1	IS	C	[0..1]	0326	01226	Visit Indicator
52	250	XCN	X	[0..0]	0010	01274	Other Healthcare Provider

The specific usage of these fields may be elaborated upon in the national extensions.

- 445 The use of the Visit Number (PV1-19) may be related to the Patient Account Number (PID-18). Generally, one of both fields will be filled. Additional requirements for these fields may be documented in Regional or National appendices to the IHE Laboratory Technical Framework.

Field PV1-51 shall be valued with value 'V' if the field PV1-19 is present. The field may be omitted otherwise.

450 The PV1 segment doesn't entirely cover the data model as defined in this framework. In some countries (especially in Europe), national extensions will define new segment to manage issues like 'functional units'.

The use of the PV1 segment shall be clarified in each national extension.

### C.5 ORC – Common Order Segment

455 HL7 v2.5: chapter 4 (4.5.1). The ORC and OBR segments contain a number of duplicate fields. The Laboratory Technical Framework is defined in such a way that fields in the OBR segment will be used in prevalence over their equivalents in ORC. If a field is listed as being optional in ORC, its equivalent in OBR may well be mandatory.

460

**Table C.5-1: ORC Segment**

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
1	2	ID	R	[1..1]	0119	00215	Order Control
2	22	EI	C	[0..1]		00216	Placer Order Number
3	22	EI	C	[0..1]		00217	Filler Order Number
4		EIP	RE	[0..1]		00218	Placer Group Number
5	2	ID	C	[0..1]	0038	00219	Order Status
6	1	ID	O	[0..1]	0121	00220	Response Flag
7	200	TQ	X	[0..0]		00221	Quantity/Timing
8	200	EIP	C	[0..1]		00222	Parent
9	26	TS	R	[1..1]		00223	Date/Time of Transaction
10	250	XCN	RE	[0..*]		00224	Entered By
11	250	XCN	RE	[0..*]		00225	Verified By
12	250	XCN	O	[0..1]		00226	Ordering Provider
13	80	PL	O	[0..1]		00227	Enterer's Location
14	250	XTN	O	[0..2]		00228	Call Back Phone Number
15	26	TS	O	[0..1]		00229	Order Effective Date/Time
16	250	CE	O	[0..1]		00230	Order Control Code Reason
17	250	CE	C	[0..1]		00231	Entering Organization
18	250	CE	O	[0..1]		00232	Entering Device
19	250	XCN	O	[0..*]		00233	Action By
20	250	CE	X	[0..0]	0339	01310	Advanced Beneficiary Notice Code
21	250	XON	O	[0..1]		01311	Ordering Facility Name
22	250	XAD	O	[0..1]		01312	Ordering Facility Address
23	250	XTN	O	[0..1]		01313	Ordering Facility Telephone Number
24	250	XAD	O	[0..1]		01314	Ordering Provider Address
25	250	CWE	X	[0..0]		01473	Order Status Modifier
26	60	CWE	X	[0..0]	0552	01641	Advanced Beneficiary Notice Override Reason
27	26	TS	C	[0..1]		01642	Filler's Expected Availability Date/Time

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
28	250	CWE	O	[0..1]		00615	Confidentiality Code
29	250	CWE	RE	[0..1]		01643	Order Type
30	250	CNE	O	[0..1]		01644	Enterer Authorization Mode
31	250	CWE	X	[0..1]		02286	Parent Universal Service Identifier

**ORC-1 Order Control (ID)**, required.

This field may be considered the "trigger event" identifier for orders. Many order control codes are defined in the *HL7 table 0119 – Order Control Codes*. The IHE Laboratory Technical Framework allows only the following subset:

465

**Subset of HL7 table 0119 – Order Control Codes Supported by IHE**

Value	Description of use
NW	"New Order". Event request in OML message sent by the Order Placer in transaction LAB-1 or in OML message sent by the Order Filler in transaction LAB-4.
OK	"Notification or request accepted". Event notification in OML message. Event acknowledgement in ORL message
UA	"Unable to accept order/service". Event notification in OML message. Event acknowledgement in ORL message sent by the Order Filler in transaction LAB-1 or in ORL message sent by the Automation Manager in transaction LAB-4.
SC	"Status changed". Event notification in OML, ORU and OUL messages
CA	"Cancel order/ service request". Event request in OML message sent by the Order Placer in LAB-1, or by the Order Filler in LAB-4.
CR	"Canceled as requested". Event acknowledgement in ORL message responding to OML (CA)
UC	"Unable to cancel". Event acknowledgement in ORL message responding to OML (CA)
OC	"Order service canceled". Event notification in OML message sent by the Order Filler in transactions LAB-1 and LAB-3.
SN	"Send order/service number". Event request in OML message sent by the Order Filler in transaction LAB-2
NA	"Number assigned". Event acknowledgement in ORL message sent by the Order Placer in LAB-2, responding to OML (SN)
RP	"Order/service replace request". Event request in OML message sent by the Order Placer in transaction LAB-1 or in OML message sent by the Order Filler in transaction LAB-4.
RQ	"Replaced as requested". Event acknowledgement in ORL message responding to OML (RQ)
UM	"Unable to replace". Event acknowledgement in ORL message responding to OML (RQ)
RU	"Replaced unsolicited". Event notification in OML message (LAB-1) and OUL message (LAB-3) sent by the Order Filler.
XO	"Change order/service request". Used by the Order Placer in LAB-1
XR	"Changed as requested". Used by the Order Filler in LAB-1 in response to XO
UX	"Unable to change" Used by the Order Filler in LAB-1 in response to XO
PR	"Previous results with new order/service". Used in LAB-1, LAB-4, LAB-21 and LAB-22 to provide some previous results with the order or work order or wok order step that is requested by the sender.

**ORC-2 Placer Order Number (EI)**, conditional.

470 The Placer Order Number (ORC-2, OBR-2) is local to the transaction: In transactions LAB-1, LAB-2, LAB-3 it is a number assigned to the Order by the Order Placer Actor. In transactions LAB-4, LAB-5 it is a number assigned to the Work Order by the Order Filler Actor. In transactions LAB-21, LAB-22, LAB-23 it is a number assigned to the WOS (Work Order Step) by the Automation Manager.

475 Condition predicate: if the field is valued then its value shall match the value of the required field OBR-2. Please refer to section 2.4.6.1 for the details of the data type.

**ORC-3 Filler Order Number (EI)**, conditional.

Condition predicate: if the field is valued then its value shall match the value of the required field OBR-3. Please refer to section 2.4.6.1 for the details of the data type.

**ORC-4 Placer Group Number (EIP)**, required if known to the sender.

480 The data type of ORC-4 is upgraded from EI to EIP, in pre-adoption of HL7 2.8.

The Placer Group Number represents an identification of a set of closely related orders, i.e., a list of batteries and tests ordered together by the placer to the laboratory for one subject, known as an **Order Group**. This field carries the Order Group identification, which is a pair of identifiers. The first identifier, if present, is assigned by the Order Placer application. The second identifier, if present, is assigned by the Order Filler application.

Refer to section LAB TF-2a: 2.4.6.1 for the details of data type EIP.

An Order Group may be identified by the order placer or by the order filler or by both applications. The Order Group consists of all the ORCs and order detail segments sharing the same Order Group identification.

490 In cases laboratory orders are not grouped under a common Order Group this field is empty.

495 The Order Group identification is constant throughout the laboratory workflow once the Order Group has been accepted and registered in the Order Filler application. From that point the content of this field (one or two identifiers) should be constant across all messages related to an Order Group, circulating between Order Placer, Order Filler, Order Result Tracker, Automation Manager, Pre/post-processor, Analyzer Manager, Analyzer, Label Broker, Label Information Provider.

**ORC-5 Order Status (ID)**, conditional.

500 Condition predicate: This field shall be valued in all OML messages sent by the Order Filler. It represents the status of the order. This field shall not be valued in OML messages sent by the Order Placer.

The allowed values for this field within IHE Laboratory Technical Framework are a subset of *HL7 table 0038 - Order Status*:

**HL7 Table 0038 - Order Status: IHE Subset for all Transactions**

Value	Description	Comment
A	Some, but not all, results available	

Value	Description	Comment
CA	Order was canceled	
CM	Order is completed	
IP	In process, unspecified	
SC	In process, scheduled	

505

Note: For the conditions of use of these values, please read section 3.10 “Correlations of status between ORC, OBR and OBX”.

**ORC-6 Response Flag (ID)**, optional.

The Laboratory Technical Framework does not constrain the usage of this field.

510 **ORC-7 Quantity/Timing (TQ)**, not supported.

The Laboratory Technical Framework does not support this field.

**ORC-8 Parent (EIP)**, conditional.

HL7 definition: This field relates a child to its parent when a parent-child relationship exists.

515 In this Laboratory Technical Framework this field is used in the context of microbiology orders, in transactions LAB-2 and LAB-3. The Order Filler Actor uses this field to specify the parent order from which a child order was generated on the laboratory side.

Condition predicate: If this field is valued, its content must be the same as the content of OBR-29.

**ORC-9 Date/Time of Transaction (TS)**, required.

520 HL7 Definition: This field contains the date and time of the event that initiated the current transaction as reflected in ORC-1 Order Control Code. This field is not equivalent to MSH-7 Date and Time of Message that reflects the date/time of the creation of the physical message.

In OML messages "Status changed", this field contains the date/time of the last status change of the unit of work (ORC-5).

525 **ORC-10 Entered By (XCN)**, optional.

530 HL7 definition: This field contains the identity of the person who actually keyed the request into the application. Note that this refers to the current transaction as reflected in ORC-1 Order Control Code. It provides an audit trail in case the request is entered incorrectly and the ancillary department needs to clarify the request. By local agreement, either the ID number or name component may be omitted.

The Laboratory Technical Framework does not constrain the usage of this field.

For a new order placed (ORC-1="NW"), the field specifies the person who typed the order on the Order Placer application.

**ORC-11 Verified By (XCN)**, optional.

535 HL7 definition: This field contains the identity of the person who verified the accuracy of the entered request. Note that this refers to the current transaction as reflected in ORC-1 Order Control Code. It is used in cases where the request is entered by a technician and needs to be

verified by a higher authority (e.g., a nurse). By local agreement, either the ID number or name component may be omitted.

540 The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-12 Ordering Provider (XCN)**, optional.

HL7 definition: This field contains the identity of the person who is responsible for creating the request (i.e., the ordering physician).

If the field is valued then its value has to match the value of the required field OBR-16.

545 **ORC-13 Enterer's Location (PL)**, optional.

HL7 definition: This field specifies the location (e.g., nurse station, ancillary service location, clinic, floor) where the person who entered the request was physically located when the order was entered. Note that this refers to the current transaction as reflected in ORC-1 Order Control Code. Only those subcomponents relevant to enterer's location should be valued (commonly

550 nursing unit; facility; building; floor). The person who entered the request is defined in ORC-10-entered by.

The Laboratory Technical Framework does not further constrain the usage of this field, which contains location that is geographic data, not organizational data, as opposed to ORC-17.

555 For a new order placed (ORC-1="NW"), the field specifies the location where this order was typed on the Order Placer application.

**ORC-14 Callback Phone Number (XTN)**, optional.

HL7 definition: This field contains the telephone number to call for clarification of a request or other information regarding the order.

560 Up to two phone numbers can be stored in this field. If the field is valued then its value has to match the value of field OBR-17.

**ORC-15 Order Effective Date/Time (TS)**, optional.

HL7 definition: This field contains the date/time that the changes to the request took effect or are supposed to take effect.

565 If the field is left empty, its value is assumed to be equal to that specified in ORC-9-date/time of transaction or MSH-7-date/time of message if the transaction date/time is empty.

The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-16 Order Control Code Reason (CE)**, optional.

HL7 definition: This field contains the explanation (either in coded or text form) of the reason for the order event described by the order control code (HL7 Table 0119).

570 The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-17 Entering Organization (CE), conditional.**

HL7 definition: This field identifies the organization that the enterer belonged to at the time he/she enters/maintains the order, such as medical group or department. The person who entered the request is defined in ORC-10 -entered by.

575 IHE Condition predicate:

This field represents the medical organization or team (e.g., the cardiology department) who places a new order.

It should be provided by the Order Placer in OML messages carrying new orders (ORC-1="NW") sent to the Order Filler, over transaction LAB-1.

580 It should be propagated by the Order Filler in all messages related to this order, sent to the Automation Manager over transaction LAB-4 as well as to the Order Result Tracker over transaction LAB-3.

**ORC-18 Entering Device (CE), optional.**

HL7 definition: This field identifies the physical device (terminal, PC) used to enter the order.

585 The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-19 Action By (XCN), optional.**

HL7 definition: This field contains the identity of the person who initiated the event represented by the corresponding order control code. For example, if the order control code is CA (cancel order request), this field represents the person who requested the order cancellation. This person is typically a care provider but may not always be the same as ORC-12 ordering provider.

590

The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-20 Advanced Beneficiary Notice Code (CE), optional.**

HL7 definition: This field indicates the status of the patient's or the patient's representative's consent for responsibility to pay for potentially uninsured services.

595 The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-21 Ordering Facility Name (XON), optional.**

HL7 definition: This field contains the name of the facility placing the order.

The facility (hospital, clinic, institution) placing the order shall be represented with at least these three components: 1st = Organization name. 7th = Identifier Type Code with the value "FI", which means "Facility ID" as stated by HL7 table n° 0203. 10th = Organization Identifier.

600

**ORC-22 Ordering Facility Address (XAD), optional.**

HL7 definition: This field contains the address of the facility placing the order.

The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-23 Ordering Facility Phone Number (XTN), optional.**

605 HL7 definition: This field contains the telephone number of the facility placing the order.

The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-24 Ordering Provider (XAD)**, optional.

HL7 definition: This field contains the address of the care provider requesting the order.

The Laboratory Technical Framework does not constrain the usage of this field.

610 **ORC-25 Order Status Modifier (CWE)**, optional.

HL7 definition: This field is a modifier or refiner of the ORC-5-Order status field. This field may be used to provide additional levels of specificity or additional information for the defined order status codes. Unlike the Order Status field, which is controlled by an HL7 defined table, this field is a CE data type allowing applications to support an unlimited library of Order Status Modifier codes.

The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-26 Advanced Beneficiary Notice Override Reason (CWE)**, optional.

HL7 definition: This field contains the reason why the patient did not sign an Advanced Beneficiary Notice. The reason may be coded or it may be a free text entry.

620 The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-27 Fillers Expectable Availability Date/Time (TS)**, conditional.

This field contains the date/time when the laboratory results are planned to be available.

Condition predicate: This field may be valued only in OML messages sent by the Order Filler to the Order Placer.

625 **ORC-28 Confidentiality Code (CWE)**, optional.

HL7 definition: This field contains information about the level of security and/or sensitivity surrounding the order (e.g., highly sensitive, not sensitive, sensitive, etc.).

The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-29 Order Type (CWE)**, required, may be empty.

630 HL7 definition: This field indicates whether the order is to be executed in an inpatient setting or an outpatient setting. If this field is not valued, the system default is assumed. Refer to HL7 Table 0482 – Order Type for suggested values:

**HL7 Table 0482 - Order Type**

Value	Description	Comment
I	Inpatient Order	
O	Outpatient Order	

635 Field ORC-29 enables to distinguish between orders related to inpatient activity or outpatient activity, independently of the real situation of the patient expressed in PV1. This field should be populated if known in messages sent by the Order Placer to the Order Filler, and propagated by the latter to the Automation Manager and to the Order Result Tracker.

**ORC-30 Enterer Authorization Mode (CNE)**, optional.

640 HL7 definition: This field indicates the form of authorization a recorder had from the responsible practitioner to create or change an order.

The Laboratory Technical Framework does not constrain the usage of this field.

**ORC-31 Parent Universal Service Identifier (CWE)**, not supported.

This field contains the identifier code for the parent order, which caused this observation/test/battery to be performed. Its content is the same as the one of OBR-50

645 ORC-31 and OBR-50 will be deprecated in version 2.7 of the standard.

## C.6 TQ1 – Timing Quantity Segment

HL7 v2.5: chapter 4 (4.5.4)

**Table C.6-1: TQ1 - Timing Quantity Segment**

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
7	26	TS	C	[0..1]		01633	Start date/time
9	250	CWE	R	[1..1]	0485	01635	Priority
12	10	ID	X	[0..0]	0427	01638	Conjunction

650 This cycle of the IHE Laboratory Technical Framework does not use TQ2 segment, and uses only one occurrence of TQ1 segment.

**TQ1-7 Start date/time (TS)**, conditional.

HL7 definition: This field may be specified by the requester, in which case it indicates the earliest date/time at which the services should be started. In many cases, however, the start date/time will be implied or will be defined by other fields in the service request record (e.g., urgency - STAT). In such a case, this field will be empty.

655

Condition predicate: This field is used in messages from the requester to the filler (Order Placer to Order Filler in LAB-1, Order Filler to Automation Manager in LAB-4, Automation Manager to LD in LAB-21 and LAB-22) in cases where the requester wants to enforce a starting date/time for the execution of the ordered tests.

660 **TQ1-9 Priority (CWE)**, required.

This field defines the priority of the order. The values authorized by the IHE Laboratory Technical Framework are this subset of HL7 table 0485 - Priority codes:

**HL7 Table 0485 - Priority Codes**

Value	Description	Comment
S	Stat	With highest priority
A	ASAP	Fill after S orders
R	Routine	Default
P	Preop	
C	Callback	
T	Timing critical	A request implying that it is critical to come as close as possible to the requested time, e.g., for a trough anti-microbial level.

665

Note: Transactions LAB-1, LAB-2 and LAB-3 restrict the usage to the first 6 values: S, A, R, P, C, T

**TQ1-12 Conjunction (ID)**, not supported.

This field is conditional in HL7: It has to be valued only in case there is more than one TQ1 segment. As this IHE Framework restricts TQ1 to one single occurrence this field shall never be valued.

## 670 C.7 SPM – Specimen Segment

HL7 v2.5: chapter 7 (7.4.3)

**Table C.7-1: SPM - Specimen Segment**

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
1	4	SI	R	[1..1]		01754	Set ID – SPM
2	80	EIP	RE	[0..1]		01755	Specimen ID
3	80	EIP	RE	[0..*]		01756	Specimen Parent IDs
4	250	CWE	R	[1..1]	0487	01900	Specimen Type
5	250	CWE	X	[0..0]	0541	01757	Specimen Type Modifier
6	250	CWE	O	[0..*]	0371	01758	Specimen Additives
7	250	CWE	RE	[0..1]	0488	01759	Specimen Collection Method
8	250	CWE	RE	[0..1]		01901	Specimen Source Site
9	250	CWE	RE	[0..*]	0542	01760	Specimen Source Site Modifier
10	250	CWE	RE	[0..1]	0543	01761	Specimen Collection Site
11	250	CWE	RE	[0..*]	0369	01762	Specimen Role
12	20	CQ	X	[0..0]		01902	Specimen Collection Amount
13	6	NM	X	[0..0]		01763	Grouped Specimen Count
14	250	ST	O	[0..1]		01764	Specimen Description
15	250	CWE	O	[0..*]	0376	01908	Specimen Handling Code
16	250	CWE	RE	[0..1]	0489	01903	Specimen Risk Code
17	26	DR	RE	[0..1]		01765	Specimen Collection Date/Time
18	26	TS	C	[0..1]		00248	Specimen Received Date/Time
19	26	TS	O	[0..1]		01904	Specimen Expiration Date/Time
20	1	ID	C	[0..1]	0136	01766	Specimen Availability
21	250	CWE	C	[0..*]	0490	01767	Specimen Reject Reason
22	250	CWE	O	[0..1]	0491	01768	Specimen Quality
23	250	CWE	O	[0..1]	0492	01769	Specimen Appropriateness
24	250	CWE	O	[0..*]	0493	01770	Specimen Condition
25	20	CQ	O	[0..1]		01771	Specimen Current Quantity
26	4	NM	RE	[0..1]		01772	Number of Specimen Containers
27	250	CWE	C	[0..1]		01773	Container Type
28	250	CWE	O	[0..1]	0544	01774	Container Condition
29	250	CWE	O	[0..1]	0494	01175	Specimen Child Role

**SPM-1 Set ID – SPM (SI)**, required.

675 This field is used to identify SPM segment instances in messages where the SPM segment repeats. For the first (or only) occurrence of the segment, the sequence number is |1|; for the second occurrence, the sequence number is |2|; etc.

**SPM-2 Specimen ID (EIP)**, required if available.

680 This field contains a unique identifier or pair of unique identifiers for the specimen, enterprise-wide. Refer to section 2.4.6.1 for the details of the data type.

The transactions of profiles LAW and LBL use only the 1st component of datatype EIP.

**SPM-3 Specimen Parent ID (EIP)**, required if available.

685 This field contains the identifier for the parent specimen, from which the specimen described by the segment instance has been extracted. Please refer to section 2.4.6.1 for the details of the data type.

The transactions of profiles LAW and LBL use only the 1st component of datatype EIP.

**SPM-4 Specimen Type (CWE)**, required.

690 This field describes the precise nature of the entity that will be the source material for the observations. Valid coding systems for this field include HL7 table 0487 listed below, SNOMED CT, or any national coding scheme.

**HL7 Table 0487**

Value	Description	Comment
ABS	Abscess	
AMN	Amniotic fluid	
ASP	Aspirate	
BIFL	Bile fluid	
BLDA	Blood arterial	
BBL	Blood bag	
BLDC	Blood capillary	
BPU	Blood product unit	
BLDV	Blood venous	
BON	Bone	
BRO	Bronchial	
BRN	Burn	
CALC	Calculus (=Stone)	
CDM	Cardiac muscle	
CNL	Cannula	
CTP	Catheter tip	
CSF	Cerebral spinal fluid	
CVM	Cervical mucus	
CVX	Cervix	
COL	Colostrum	
BLDCO	Cord blood	

<b>Value</b>	<b>Description</b>	<b>Comment</b>
CNJT	Conjunctiva	
CUR	Curettage	
CYST	Cyst	
DIAF	Dialysis fluid	
DOSE	Dose med or substance	
DRN	Drain	
DUFL	Duodenal fluid	
EAR	Ear	
EARW	Ear wax (cerumen)	
ELT	Electrode	
ENDC	Endocardium	
ENDM	Endometrium	
EYE	Eye	
EXG	Exhaled gas (=breath)	
FLT	Filter	
FIST	Fistula	
FLU	Body fluid, unsp	
GAS	Gas	
GAST	Gastric fluid/contents	
GEN	Genital	
GENC	Genital cervix	
GENL	Genital lochia	
GENV	Genital vaginal	
HAR	Hair	
IHG	Inhaled Gas	
IT	Intubation tube	
ISLT	Isolate	
LAM	Lamella	
LN	Line	
LNA	Line arterial	
LNV	Line venous	
LIQ	Liquid NOS	
MAR	Marrow	
MEC	Meconium	
MBLD	Menstrual blood	
MLK	Milk	
MILK	Breast milk	
NAIL	Nail	
NOS	Nose (nasal passage)	
ORH	Other	
PAFL	Pancreatic fluid	

<b>Value</b>	<b>Description</b>	<b>Comment</b>
PRT	Peritoneal fluid /ascites	
PLC	Placenta	
PLAS	Plasma	
PLB	Plasma bag	
PLR	Pleural fluid (thoracentesis fld)	
PPP	Platelet poor plasma	
PRP	Platelet rich plasma	
PUS	Pus	
RT	Route of medicine	
SAL	Saliva	
SMN	Seminal fluid	
SER	Serum	
SKN	Skin	
SKM	Skeletal muscle	
SPRM	Spermatozoa	
SPT	Sputum	
SPTC	Sputum - coughed	
SPTT	Sputum - tracheal aspirate	
STL	Stool = Fecal	
SWT	Sweat	
SNV	Synovial fluid (Joint fluid)	
TEAR	Tears	
THRT	Throat	
TISS	Tissue	
TISG	Tissue gall bladder	
TLGI	Tissue large intestine	
TLNG	Tissue lung	
TISPL	Tissue placenta	
TSMI	Tissue small intestine	
TISU	Tissue ulcer	
TUB	Tube NOS	
ULC	Ulcer	
UMB	Umbilical blood	
UMED	Unknown medicine	
URTH	Urethra	
UR	Urine	
URC	Urine clean catch	
URT	Urine catheter	
URNS	Urine sediment	
USUB	Unknown substance	
VITF	Vitreous Fluid	

Value	Description	Comment
VOM	Vomitus	
BLD	Whole blood	
BDY	Whole body	
WAT	Water	
WICK	Wick	
WND	Wound	
WNSA	Wound abscess	
WNDE	Wound exudate	
WNDD	Wound drainage	

**SPM-5 Specimen Type Modifier (CWE)**, not supported.

This field contains modifying or qualifying description(s) about the specimen type whenever the vocabulary used in SPM-4 lacks of precision.

695 The IHE Laboratory Framework precludes the use of SPM-5 and recommends to use field SPM-4 only, to characterize the type of material subject of investigation, using an appropriate vocabulary such as HL7 table 0487, or a more precise one if needed.

**SPM-6 Specimen Additives (CWE)**, optional, repeatable.

700 HL7 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.

The IHE Laboratory Technical Framework has not constrained the usage of this field yet, other than adopting HL7 table 0371 for valid values:

705

**HL7 Table 0371 – Additive/Preservative**

Value	Description	Comment
F10	10% Formalin	Tissue preservative
C32	3.2% Citrate	Blue top tube
C38	3.8% Citrate	Blue top tube
HCL6	6N HCL	24 HR Urine Additive
ACDA	ACD Solution A	Yellow top tube
ACDB	ACD Solution B	Yellow top tube
ACET	Acetic Acid	Urine preservative
AMIES	Amies transport medium	Protozoa
HEPA	Ammonium heparin	Green top tube
BACTM	Bacterial Transport medium	Microbiological culture
BOR	Borate Boric Acid	24HR Urine Additive
BOUIN	Bouin's solution	Tissue
BF10	Buffered 10% formalin	Tissue
WEST	Buffered Citrate (Westergren Sedimentation Rate)	Black top tube

<b>Value</b>	<b>Description</b>	<b>Comment</b>
BSKM	Buffered skim milk	Viral isolation
CARS	Carson's Modified 10% formalin	Tissue
CARY	Cary Blair Medium	Stool Cultures
CHLTM	Chlamydia transport medium	Chlamydia culture
CTAD	CTAD (this should be spelled out if not universally understood)	Blue top tube
ENT	Enteric bacteria transport medium	Bacterial culture
ENT+	Enteric plus	Stool Cultures
JKM	Jones Kendrick Medium	Bordetella pertussis
KARN	Karnovsky's fixative	Tissue
LIA	Lithium iodoacetate	Gray top tube
HEPL	Lithium/Li Heparin	Green top tube
M4	M4	Microbiological culture
M4RT	M4-RT	Microbiological culture
M5	M5	Microbiological culture
MICHTM	Michel's transport medium	IF tests
MMDTM	MMD transport medium	Immunofluorescence
HNO3	Nitric Acid	Urine
NONE	None	Red or Pink top tube
PAGE	Pages's Saline	Acanthoemba
PHENOL	Phenol	24 Hr Urine Additive
KOX	Potassium Oxalate	Gray top tube
<b>EDTK</b>	<b>Potassium/K EDTA</b>	<b>Deprecated. Replaced by EDTK15 and EDTK75</b>
EDTK15	Potassium/K EDTA 15%	Purple top tube
EDTK75	Potassium/K EDTA 7.5%	Purple top tube
PVA	PVA (polyvinylalcohol)	O&P
RLM	Reagan Lowe Medium	Bordetella pertussis cultures
SST	Serum Separator Tube (Polymer Gel)	'Tiger' Top tube
SILICA	Siliceous earth, 12 mg	Gray top tube
NAF	Sodium Fluoride	Gray top tube
FL100	Sodium Fluoride, 100mg	Urine
FL10	Sodium Fluoride, 10mg	Urine
NAPS	Sodium polyanethol sulfonate 0.35% in 0.85% sodium chloride	Yellow (Blood Culture)
HEPN	Sodium/Na Heparin	Green top tube
EDTN	Sodium/Na EDTA	Dark Blue top tube
SPS	SPS(this should be spelled out if not universally understood)	Anticoagulant w/o bacteriocidal properties
STUTM	Stuart transport medium	Bacterial culture
THROM	Thrombin	Orange or Grey/Yellow (STAT Chem)
FDP	Thrombin NIH; soybean trypsin inhibitor (Fibrin Degradation Products)	Dark Blue top tube

Value	Description	Comment
THYMOL	Thymol	24 Hr Urine Additive
THYO	Thyoglycollate broth	Bacterial Isolation
TOLU	Toluene	24 Hr Urine Additive
URETM	Ureaplasma transport medium	Ureaplasma culture
VIRTM	Viral Transport medium	Virus cultures

**SPM-7 Specimen Collection Method (CWE)**, required if available.

This field describes the procedure or process by which the specimen was collected. Valid coding systems for this field include HL7 table 0488 listed below, SNOMED CT, or any national coding scheme.

710

**HL7 Table 0488 – Specimen Collection Method**

Value	Description	Comment
FNA	Aspiration, Fine Needle	
PNA	Aterial puncture	
BIO	Biopsy	
BCAE	Blood Culture, Aerobic Bottle	
BCAN	Blood Culture, Anaerobic Bottle	
BCPD	Blood Culture, Pediatric Bottle	
CAP	Capillary Specimen	
CATH	Catheterized	
EPLA	Environmental, Plate	
ESWA	Environmental, Swab	
LNA	Line, Arterial	
CVP	Line, CVP	
LNV	Line, Venous	
MART L	Martin-Lewis Agar	
ML11	Mod. Martin-Lewis Agar	
PACE	Pace, Gen-Probe	
PIN	Pinworm Prep	
KOFF P	Plate, Cough	
MLP	Plate, Martin-Lewis	
NYP	Plate, New York City	
TMP	Plate, Thayer-Martin	
ANP	Plates, Anaerobic	
BAP	Plates, Blood Agar	
PRIME	Pump Prime	
PUMP	Pump Specimen	

Value	Description	Comment
QC5	Quality Control For Micro	
SCLP	Scalp, Fetal Vein	
SCRA PS	Scrapings	
SHA	Shaving	
SWA	Swab	
SWD	Swab, Dacron tipped	
WOO D	Swab, Wooden Shaft	
TMOT	Transport Media,	
TMAN	Transport Media, Anaerobic	
TMCH	Transport Media, Chlamydia	
TMM4	Transport Media, M4	
TMM Y	Transport Media, Mycoplasma	
TMPV	Transport Media, PVA	
TMSC	Transport Media, Stool Culture	
TMUP	Transport Media, Ureaplasma	
TMVI	Transport Media, Viral	
VENIP	Venipuncture	

**SPM-8 Specimen Source Site (CWE)**, required if available.

This field should be populated, particularly in microbiology, both in order and result messages when the specimen source site is known. Example: “EAR”.

**SPM-9 Specimen Source Site Modifier (CWE)**, required if available, repeatable.

- 715 This field should be populated, particularly in microbiology, both in order and result messages when the specimen source site modifier is known. Example: “LEFT” when the specimen has been collected from the left ear. More than one source site modifier maybe populated.

**SPM-10 Specimen Collection Site (CWE)**, required if available.

- 720 HL7 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”.

- 725 The IHE Laboratory Technical Framework leaves the usage of this field with no pre-specified vocabulary. HL7 user defined Table 0453 does not suggest any values.

**SPM-11 Specimen Role (CWE)**, required if known by the sender, repeatable.

The allowed values are listed in HL7 user defined table 0369, complemented by IHE:

**HL7 User-Defined Table 0369 – Specimen Role**

Value	Description	Comment
B	Blind Sample	
C	Calibrator, used for initial setting of calibration	
E	Electronic QC, used with manufactured reference providing signals that simulate QC results	
F	Specimen used for testing proficiency of the organization performing the testing (Filler)	
G	Group (where a specimen consists of multiple individual elements that are not individually identified)	
L	Pool (aliquots of individual specimens combined to form a single specimen representing all of the components.)	
O	Specimen used for testing Operator Proficiency	
P	Patient (human or other species)	
Q	Control specimen	
R	Replicate	
V	Verifying Calibrator, used for periodic calibration checks	
PSN	Human patient	added by IHE LAB TF, taken from HL7 V3 vocab
ANM	Animal	added by IHE LAB TF, taken from HL7 V3 vocab
MIC	Microorganism	added by IHE LAB TF, taken from HL7 V3 vocab
PLNT	Plant	added by IHE LAB TF, taken from HL7 V3 vocab
MAT	Material, non-living subject	added by IHE LAB TF, taken from HL7 V3 vocab

## Restricted value sets:

- 730 Transactions LAB-1, LAB-2 and LAB-3 deal with orders and results basically related to specimens collected from a patient and in some cases specimens collected from a non-person or even non-living subject (suspected rabid fox, spoiled water, rotten meat, isolated microorganism...) Therefore in these transactions, the only valid values are: “P” (patient, human or not), “PSN” (human patient), “ANM” (animal), “MIC” (microorganism subject), “PLNT” (vegetable subject), “MAT” (non-living subject e.g., air, water, instrument, food...)
- 735

Transactions LAB-4 and LAB-5 use the same value set as LAB-1, LAB-2 and LAB-3, plus one extra value: “Q” (control specimen) used on Work Orders and results related to quality control specimens.

- 740 The other transactions of the Laboratory Technical Framework using the SPM segment use the values in the table above, with no particular restriction.

**SPM-12 Specimen Collection Amount (CQ), not supported.**

HL7 definition: This field specifies the volume (quantity and units) of the collected specimen. The field has two components: <Quantity (NM)>^<Units (CE)>

The IHE Laboratory Technical Framework in its current release does not use this field.

745 In particular, the volume of a 24 hour urine specimen is carried in the OML message placing the Order (or the Work Order) as an observation in itself, using one or two OBX segments, as in the example below:

750 SPM|2|654\_2^chemistry||UR|||||P|||||200310060735|200310060821||Y|||||1  
 OBX|1|NM|13362-9^URINE COLLECTION DURATION^LN||24|Hr|||||F|||200309060735  
 OBX|2|NM|19153-6^URINE SPECIMEN VOLUME^LN||980|ml|||||F|||200309060735

**SPM-13 Grouped Specimen Count (NM), not supported.**

755 The IHE Laboratory Technical Framework in its current release does not use this field, since none of its Transaction deals with grouped specimens.

**SPM-14 Specimen Description (ST), optional.**

HL7 definition: This is a text field that allows additional information specifically about the specimen to be sent in the message.

The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

760 **SPM-15 Specimen Handling Code (CWE), optional, repeatable.**

HL7 definition: This field describes how the specimen and/or container need to be handled from the time of collection through the initiation of testing.

765 IHE Laboratory usage: This field may be used in messages placing an Order (in LAB-1) or a Work Order (in LAB-4) or a Work Order Step (in LAB-21 and LAB-22) as well as in messages carrying labeling instructions (in LAB-61 and LAB-62).

The allowed values are listed in HL7 user defined table 0369, complemented by IHE:

**HL7 User-Defined Table 0376 – Specimen Handling Code**

Code	Description	Comment/Usage Note/Definition
C37	Body temperature	Critical to keep at body temperature: 36 - 38° C.
AMB	Ambient temperature	Keep at ambient (room) temperature, approximately 22 ± 2 degrees C. Accidental refrigeration or freezing is of little consequence
CAMB	Critical ambient temperature	Critical ambient – must not be refrigerated or frozen.
REF	Refrigerated temperature	Keep at refrigerated temperature: 4-8° C. Accidental warming or freezing is of little consequence
CREF	Critical refrigerated temperature	Critical refrigerated – must not be allowed to freeze or warm until immediately prior to testing
FRZ	Frozen temperature	Keep at frozen temperature: -4° C. Accidental thawing is of little consequence
CFRZ	Critical frozen	Critical frozen – must not be allowed to thaw until immediately prior to testing

Code	Description	Comment/Usage Note/Definition
	temperature	
DFRZ	Deep frozen	Deep frozen: -16 to -20° C.
UFRZ	Ultra frozen	Ultra cold frozen: ~ -75 to -85° C. (ultra cold freezer is typically at temperature of dry ice).
NTR	Liquid nitrogen	Keep in liquid nitrogen.
PRTL	Protect from light	Protect from light (e.g., wrap in aluminum foil).
CATM	Protect from air	Critical. Do not expose to atmosphere. Do not uncap.
DRY	Dry	Keep in a dry environment.
PSO	No shock	Protect from shock.
PSA	Do not shake	Do not shake.
UPR	Upright	Keep upright. Do not turn upside down.
MTLF	Metal Free	Container is free of heavy metals including lead.

**SPM-16 Specimen Risk Code (CWE)**, required if available.

770 This field contains any known or suspected specimen hazards.

Condition predicate: This field shall be populated if known in OML messages sent by the Order Placer, within transaction LAB-1, and OML messages sent by the Order Filler within transactions LAB-2 and LAB-4. The allowed values are given by HL7 user-defined table 0489:

775

**HL7 User-Defined Table 0489 – Risk Codes**

Code	Description	Comment/Usage Note/Definition
BIO	Biological	The dangers associated with normal biological materials (i.e., potential risk of unknown infections). Routine biological materials from living subjects.
COR	Corrosive	Material is corrosive and may cause severe injury to skin, mucous membranes and eyes. Avoid any unprotected contact.
ESC	Escape Risk	The entity is at risk for escaping from containment or control.
AGG	Aggressive	A danger that can be associated with certain living subjects, including humans.
IFL	MaterialDangerInflammable	Material is highly inflammable and in certain mixtures (with air) may lead to explosions. Keep away from fire, sparks and excessive heat.
EXP	Explosive	Material is an explosive mixture. Keep away from fire, sparks, and heat.
INF	MaterialDangerInfectious	Material known to be infectious with human pathogenic microorganisms. Those who handle this material must take precautions for their protection.
BHZ	Biohazard	Material contains microorganisms that are an environmental hazard. Must be handled with special care.
INJ	Injury Hazard	Material is solid and sharp (e.g., cannulas.) Dispose in hard container.
POI	Poison	Material is poisonous to humans and/or animals. Special care must be taken to avoid incorporation, even of small amounts.
RAD	Radioactive	Material is a source for ionizing radiation and must be handled with special care to avoid injury of those who handle it and to avoid

Code	Description	Comment/Usage Note/Definition
		environmental hazards.

**SPM-17 Specimen Collection Date/Time (DR)**, required if available.

780 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

**SPM-18 Specimen Received Date/Time (TS)**, conditional.

The time that the specimen is received at the laboratory.

785 Condition predicate: This field shall be populated in OML messages sent by the Order Filler, within transactions LAB-1 (all use cases), LAB-2 and LAB-3, if the specimen has been received by the laboratory. In other words this field is RE for the Order Filler actor in both transactions LAB-1, LAB-2 and LAB-3.

**SPM-19 Specimen Expiration Date/Time (TS)**, optional.

HL7 definition: This field is the date and time the specimen can no longer be used for the purpose implied by the order.

790 The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SPM-20 Specimen Availability (ID)**, conditional.

This describes whether the specimen, as it exists, is currently available to use in an analysis. The two authorized values are "Y" (yes) or "N" (no).

795 Condition predicate: This field shall be populated in messages sent by the Order Filler, within transactions LAB-1, LAB-2 and LAB-3. The value 'N' indicates either that the laboratory hasn't received the specimen yet, or that it has rejected the received specimen.

The value of this field can be implicitly derived from ORC-5 (e.g., ORC-5 = 'IP' implicitly means that the specimen has arrived, otherwise the test could not be in progress).

800 If SPM-20 = "N" and ORC-5 is empty or valued with "SC" this means that the specimen has not been received yet. In that case SPM-21 is empty.

If SPM-20 = "N" and ORC-5 is valued with "CA" this means that the specimen has been rejected by the laboratory and the related Order(s) canceled. SPM-21 must be valued with a reject reason.

**SPM-21 Specimen Reject Reason (CWE)**, conditional, repeatable.

This field describes one or more reasons the specimen is rejected for the ordered batteries.

805 Condition predicate: This field shall be populated whenever the laboratory rejects a specimen, .in OML messages sent by the Order Filler in transaction LAB-1, as well as in ORU or OUL messages sent by the Order Filler in transaction LAB-3.

HL7 Table 0490 lists valid values:

810

**HL7 Table 0490 - Specimen Reject Reason**

Value	Description	Comment
EX	Expired	
QS	Quantity not sufficient	
RB	broken container	
RC	Clotting	
RD	missing collection date	
R	missing patient ID number	
RE	missing patient name	
RH	Hemolysis	
RI	Identification problem	
RL	Improper labeling	
RM	labeling	
RN	contamination	
RP	missing phlebotomist ID	
RR	improper storage	
RS	name misspelling	

In case a reject reason is not coded, only SPM-21.2 is populated with the reason in a free text format.

**SPM-22 Specimen Quality (CWE)**, optional.

815 HL7 definition: The degree or grade of excellence of the specimen at receipt. The filler populates this attribute.

The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SPM-23 Specimen Appropriateness (CWE)**, optional.

HL7 Definition: The suitability of the specimen for the particular planned use as determined by the filler.

820 The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SPM-24 Specimen Condition (CWE)**, optional, repeatable.

HL7 definition: A mode or state of being that describes the nature of the specimen.

The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SPM-25 Specimen Current Quantity (CQ)**, optional.

825 HL7 definition: This attributes contains the amount of specimen that currently exists or is available for use in further testing.

The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SPM-26 Number of Specimen Containers (NM)**, required if available.

830 HL7 Definition: This field identifies the number of containers for a given specimen. For sample receipt verification purposes; may be different from the total number of specimens that accompany the order.

Example: One 24 Hr urine specimen collected in two bottles.

**SPM-27 Container Type (CWE)**, conditional.

The container(s) on or in which a specimen is transported.

835 Condition predicate:

This field shall be populated in ORL messages of transaction LAB-1, in the context of the use case "Order placed with specimens identified by a third party" defined in volume 1, when the third party is the Order Filler application.

840 This field shall be populated by the Label Information Provider in RSP messages of transaction LAB-62 and in OML messages of transaction LAB-61.

The IHE Laboratory Technical Framework does not further constrain the usage of this field, nor does it provide any preferred vocabulary for it. This can be done in national extensions of this framework.

**SPM-28 Container Condition (CWE)**, optional.

845 HL7 definition: This attributes contains the amount of specimen that currently exists or is available for use in further testing.

The IHE Laboratory Technical Framework does not constrain the usage of this field yet, nor provides any preferred vocabulary for it.

**SPM-29 Specimen Child Role (CWE)**, optional.

850 HL7 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.

The IHE Laboratory Technical Framework does not constrain the usage of this field yet.

855

## C.8 SAC – Container Detail Segment

HL7 v2.5: chapter 13

860 The IHE Laboratory Technical Framework uses some of the fields of the SAC segment listed below. It allows all other fields to be optionally used, except those superseded by fields of the SPM segment.

**Table C.8-1: SAC Segment**

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
3	80	EI	RE	[0..1]		01331	Container Identifier
4	80	EI	C	[0..1]		01332	Primary (parent) Container Identifier
6	300	SPS	X	[0..0]		00249	Specimen Source
10	80	EI	O	[0..1]		01337	Carrier Identifier
11	80	NA	O	[0..1]		01338	Position in Carrier
13	80	EI	O	[0..1]		01340	Tray Identifier
14	80	NA	O	[0..1]		01341	Position in Tray
15	250	CE	O	[0..*]		01342	Location

**SAC-3 Container Identifier (EI)**, required if available.

865 SAC-3 field identifies the container. This field is the container's 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.

**SAC-4 Primary (parent) Container Identifier (EI)**, conditional.

870 Condition predicate: This field is used only in transactions LAB-4 and LAB-5, LAB-21, LAB-22, LAB-23, LAB-26, LAB-61 and LAB-62 when dealing with an aliquoted specimen. In that case, SAC-3 and SAC-4 are used simultaneously as described below:

If SAC-4 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.

875 **SAC-6 Specimen Source (SPS)**, not supported.

This field is superseded by the SPM segment.

**SAC-10 Carrier Identifier (EI)**, optional.

HL7 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.

880 The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SAC-11 Position in Carrier (NA)**, optional.

Components: <Value1 (NM)> ^ <Value2 (NM)> ^ <Value3 (NM)> ^ <Value4 (NM)> ^ < ()>

885 HL7 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).

The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SAC-13 Tray Identifier (EI), optional.**

HL7 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.

890 The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SAC-14 Position in Tray (NA), optional.**

Components: <Value1 (NM)> ^ <Value2 (NM)> ^ <Value3 (NM)> ^ <Value4 (NM)> ^ < ()>

HL7 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).

895 The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

**SAC-15 Location (CE), optional.**

HL7 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.

900

The IHE Laboratory Technical Framework has not constrained the usage of this field yet.

905 General rules concerning the communication of specimen id and container id:

In all IHE LAB profiles, when a message references a primary specimen identified and labeled, the identifier (e.g.; bar-coded) appearing on the label represents the content of field SPM-2.

910

In IHE LAB profiles handling workflows between the clinical laboratory and external parties (LTW, LBL, ILW, LPOCT), the specimen identifier is identical to the identifier appearing (e.g.; bar coded) on the container that holds this specimen. The proper field to carry this identifier in these profiles is SPM-2 “Specimen identifier”.

915

In IHE LAB profiles handling automated workflows internal to the clinical laboratory (LDA, LAW), the SAC segment is required and carries the “specimen in container” identification.

**C.9 OBX - Observation/Result Segment**

HL7 v2.5.1: chapter 7 (7.4.2)

920

**Table C.9-1: OBX Segment**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	4	SI	R	[1..1]		00569	Set ID – OBX
2	2	ID	C	[0..1]	0125	00570	Value Type
3	250	CE	R	[1..1]		00571	Observation Identifier
4	20	ST	C	[0..1]		00572	Observation Sub-ID
5	99999	Varies	C	[0..1]		00573	Observation Value
6	250	CE	C	[0..1]		00574	Units
7	60	ST	RE	[0..1]		00575	References Range
8	5	IS	RE	[0..*]	0078	00576	Abnormal Flags
9	5	NM	X	[0..0]		00577	Probability
10	2	ID	X	[0..0]	0080	00578	Nature of Abnormal Test
11	1	ID	R	[1..1]	0085	00579	Observation Result Status
12	26	TS	X	[0..0]		00580	Effective Date of Reference Range
13	20	ST	C	[0..1]		00581	User Defined Access Checks
14	26	TS	RE	[0..1]		00582	Date/Time of the Observation
15	250	CE	RE	[0..1]		00583	Producer's ID
16	250	XCN	RE	[0..1]		00584	Responsible Observer
17	250	CE	C	[0..1]		00936	Observation Method
18	22	EI	O	[0..*]		01479	Equipment Instance Identifier
19	26	TS	RE	[0..1]		01480	Date/Time of the Analysis
20							Reserved by HL7 for future use
21							Reserved by HL7 for future use
22							Reserved by HL7 for future use
23	567	XON	C	[0..1]		02283	Performing Organization Name
24	631	XAD	O	[0..1]		02284	Performing Organization Address
25	3002	XCN	O	[0..1]		02285	Performing Organization Director Name

**OBX-1 Set ID - OBX (SI), required.**

This field contains the sequence number of the OBX.

**OBX-2 Value Type (ID), conditional.**

925 Condition predicate: This field shall be valued if OBX-5 (Observation Value) is populated. The Value Type field should be filled according to HL7 Version 2.5 standard (table 0125). For example, if the result is ">300" the Value Type "SN" (Structured Numeric) SHALL be used instead of the "ST" (String) value type that was used in previous versions of HL7. See the details and the examples in the HL7 V2.5 (7.4.2). For an observation that consists of a time measurement (e.g., bleeding time) the TM Value Type is preferred to NM but this is not made

930 mandatory.

**OBX-3 Observation Identifier (CE)**, required.

The usage of LOINC(r) test codes for the identification of tests is strongly recommended. Details of this free vocabulary can be found at <http://www.loinc.org>.

935 The first and third sub-fields “Identifier” and “Name of Coding System” are required in all transactions. The value of the “Name of Coding System” in the case of LOINC is “LN”.

In transaction LAB-3 the second sub-field “Text” is mandatory, which allows the Order Result Tracker to manage the results without the help of Test Master File.

The last three sub-fields are optional in all transactions.

940 **OBX-4 Observation Sub-ID (ST)**, conditional.

HL7 Definition: This field is used to distinguish between multiple OBX segments with the same observation ID organized under one OBR.

Condition predicate:

This field is required in two situations:

- 945
1. In a result message (ORU or OUL) when the OBR segment reports the results of a microbiology culture, then the Observation Sub-ID of each related OBX segment must be populated.
  2. In an order (OML) or result (ORU, OUL) message carrying observations, if under an OBR, there is more than one observation for the same Observation Identifier (OBX-3), then these multiple observations must value OBX-4 so that each OBX segment have a unique combination of OBX-3 (Observation Identifier) and OBX-4 (Observation Sub-ID) values.
- 950

In all other situations this field is optional.

955 Note: For usage of this field in microbiology see section 3.11 “Microbiology Reporting Rules” and the microbiology example in section 19.5)

**OBX-5 Observation Value (varies)**, conditional.

960 Condition predicate: This field is required unless the Observation Result Status field (OBX-11) is valued either with "D", or "I" or "X". The Observation Value field shall be valued according to the definition made in Chapter 7 of HL7 2.5 version.

**OBX-6 Units (CE)**, conditional.

965 This field should be populated when there is an effective observation value (OBX-5 not empty) and when the type of this observation value is numeric (OBX-2 = "NM" or "SN"), and when this value is associated with a unit of measure. The content of this field shall be taken from the Unified Code for Units of Measure (UCUM).

**OBX-7 References Range (ST)**, required if available.

This field should be valued as described in HL7 V2.5 for all observations for which it is relevant. The References range that figures in this field is supposed to be related to age and sex of the

970 patient or to other parameters such as number of weeks of pregnancy when applicable, which makes the OBX-10 field (nature of abnormal test) unnecessary.

**OBX-8 Abnormal Flags (IS)**, required if available.

This field is required when applicable. This field is repeatable in the IHE Laboratory Framework as in the standard. Among the possible values listed for this field in HL7 table 0078, the actors of IHE Laboratory Technical Framework should support the following values:

975

**HL7 Table 0078**

Value	Description	Comment
L	Below low normal	
H	Above high normal	
LL	Below lower panic limits	
HH	Above upper panic limits	
N	Normal (applies to non-numeric results)	
A	Abnormal (applies to non-numeric results)	
AA	Very abnormal (applies to non-numeric units, analogous to panic limits for numeric units)	
Null	No range defined, or normal ranges don't apply	
S	Susceptible. Indicates for microbiology susceptibilities only.	
R	Resistant. Indicates for microbiology susceptibilities only.	
I	Intermediate. Indicates for microbiology susceptibilities only.	
MS	Moderately susceptible. Indicates for microbiology susceptibilities only.	
VS	Very susceptible. Indicates for microbiology susceptibilities only.	

980 The S, R, I, MS and VS values shall be used to indicate the interpreted result of susceptibilities in microbiology, in case the value field (OBX-5) contains a numeric value that represents the MIC (Minimum Inhibitive Concentration). In case the order filler only reports the interpreted result for susceptibilities, the S, R, I, MS and VS value could be filled in the value field (OBX-5) with a Value Type (OBX-2) set to "ST".

Note: For reporting antimicrobial susceptibilities in microbiology see section 3.11 "Microbiology Reporting Rules" and the microbiology example in section 19.5)

**OBX-11 Observation Result Status (ID)**, required.

985 This field should be filled according to HL7 Table 0085 described in Chapter 7 of HL7. In this version of the Laboratory Technical Version, the possible values for this field are a subset of this table:

**HL7 Table 0085**

Value	Description	Comment
O	Order detail description only (no result)	This can be used in LAB-3 to provide the Order Result Tracker with the list of individual tests that will be performed
I	Specimen in lab; results pending	This can be used in LAB-3 to provide the Order Result Tracker with the list of individual tests that are being performed
D	Deletes the OBX record	This status should be used when the sender of a results message (analyzer, AM, POCDM, Order Filler...) wants to

Value	Description	Comment
		cancel a false result transmitted in a former message, in the situation where the right result is still pending. The result should NEVER be shown to clinical users.
R	Results entered – not verified	In results messages sent by analyzer, AM, POCDM: result not technically validated. In transaction LAB-3: result not clinically validated.
P	Preliminary results	In results message sent by analyzer, AM, POCDM: preliminary result technically validated but can still change In transaction LAB-3: preliminary result clinically validated but can still change
F	Final results; Can only be changed with a corrected result.	Can only be changed with a corrected result. In LAB-1 and LAB-3, a final result is clinically validated. In results message sent by analyzer, AM, POCDM, a final result is technically validated.
C	Record coming over is a correction and thus replaces a final result	This status may be used only after an ‘F’ or a ‘C’ status.
X	Results cannot be obtained for this observation	Tests that have this status have to be shown to the user.

990 Note: For the conditions of use of these values, please read section 3.10 “Correlations of status between ORC, OBR and OBX”.

**OBX-12 Effective Date of Reference Range (TS), not supported.**

995 Since the Reference range given by the order filler is the one that applies to the Observation result taking into account other parameters such as patient age or sex; there is no need to manage the present field. The Order Result Tracker should store the observation result and its associated reference range. In case the Order Result Tracker offers the capability to compare results of the same observation over different requests, it should then associate each result with its associated reference range.

**OBX-13 User Defined Access Checks (ST), conditional.**

1000 Condition predicate: In transaction LAB-3, the Order Filler should value this field with a "P" when it wants to inform the Order Result Tracker of restricted access on some results to privileged users.

**OBX-14 Date/Time of the Observation (TS), required if available.**

1005 This field should be valued when the OBX-5 field (Value field) is also valued. In very exceptional case this information may be unknown by the Order Filler (case the test is transmitted in a reference lab and observation date and time is not returned together with the result), this field can be null and the Order Result Tracker should not generate an error.

1010 In all cases, the observation date-time is the physiologically relevant date-time or the closest approximation to that date-time. For tests performed on specimens, which is the case in the Laboratory Technical Framework, the relevant date-time is the specimen’s collection date-time.

**OBX-15 Producer's ID (CE), required if available.**

This field is required in case the observation was not produced by the sending organization.

**OBX-16 Responsible Observer (XCN)**, required if available.

- 1015 This field is required when the observation result status (OBX-11) is valued with "D" or "R" or "P" or "F" or "C" or "X" and the Producer's ID field is not valued. It should contain the identity of the observer that causes the change of the observation result status. Only the first component (ID number) of this field is necessary, provided that it is possible to retrieve the full identity of responsible person in the Order Filler system with only this ID number.

**OBX-17 Observation Method (CE)**, conditional.

- 1020 Condition predicate: This field is required when the value of the result may be dependent of the Observation Method and the Observation Identifier does not permit to identify the Method. With some Observation Identifiers such as LOINC® Codes, the identifier also identifies the Method, in which case this field does not need to be valued.

**OBX-18 Equipment Instance Identifier (EI)**, optional.

- 1025 HL7 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).

- 1030 This repeatable field carries the instrument context of a laboratory result. 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.

**OBX-19 Date/Time of the Analysis (TS)**, required if available.

HL7 definition: This field is used to transfer the time stamp associated with generation of the analytical result by the instrument specified in Equipment Instance Identifier (see above).

- 1035 This field should be valued when the OBX-5 field (Value field) is also valued. It represents the effective date-time the test was performed on the analyzer or on the manual workbench.

**OBX-23 Performing Organization Name (XON)**, conditional.

- 1040 This field has been added by release 2.5.1 of HL7. It specifies the laboratory that produced the test result described in this OBX segment. When this field is null, the receiving system assumes that the observations were produced by the sending organization.

Condition predicate: This field shall be valued in transaction LAB-3 when the test result carried by this OBX is produced by an outside laboratory, subcontracting a part of the order. In that case, this field shall be populated with the name of the subcontractor laboratory.

**OBX-24 Performing Organization Address (XAD)**, optional.

- 1045 This field has been added by release 2.5.1 of HL7. It specifies the address of the laboratory that produced the test result described in this OBX segment.

This field may be valued in transaction LAB-3 when the test result carried by this OBX is produced by an outside laboratory, subcontracting a part of the order. If populated the field carries the address of the subcontractor laboratory.

1050 The IHE Laboratory Technical Framework does not constrain the usage further than this. Some national extensions of this Technical Framework (for example the US extension to deal with a CLIA amendment) may enforce this field to be valued whenever OBX-23 is valued.

**OBX-25 Performing Organization Director Name (XCN), optional.**

1055 This field has been added by release 2.5.1 of HL7. It specifies the director of the laboratory that produced the test result described in this OBX segment.

This field may be valued in transaction LAB-3 when the test result carried by this OBX is produced by an outside laboratory, subcontracting a part of the order. If populated the field carries the director’s name of the subcontractor laboratory.

1060 The IHE Laboratory Technical Framework does not constrain the usage further than this. Some national extensions of this Technical Framework (for example the US extension to deal with a CLIA amendment) may enforce this field to be valued whenever OBX-23 is valued.

**C.10 Correlations of Status between ORC, OBR, OBX**

**C.10.1 Semantics of the Main Status Code Associations**

1065 In HL7 version 2.5 a change in the status of an observation is identified by a combination of the Trigger Event field contained in segment MSH, the ORC-5 (Filler Order status) field, the OBR-25 (Order Result Status) field and the OBX.11 (Observation Result Status) field. OBX-11 contains the status of an individual test, OBR-25 the status of the entire order.

**Table C.10.1-1: Summary of the 3 Relevant Reference Tables:**

Order Table 0038 (ORC-5)	Request Table 0123 (OBR-25)	Result Table 0085 (OBX-11)	Description (combined from 3 tables)
	O	O	Order received; specimen not yet received. Order detail description only (OBX contains no result). This value should only be used in ORL event acknowledgment messages. It should not be used in OML messages.
SC	S		No results available; procedure scheduled, but not done. The specimen may not have arrived at the laboratory. No OBX is present
IP	I	I	In process; The specimen is available in the laboratory; results are pending; the procedure is incomplete
		D	Deletes the OBX record
A	R	R	(Some) results entered -- not yet verified
A	P	P	(Some) preliminary verified results: ( technically validated in LAB-5, clinically validated in LAB-3). The final results are not yet obtained
CM	F	F	Final results; results stored and verified : ( technically validated in LAB-5, clinically validated in LAB-3). Can only be changed with a corrected result.
(CM)	C	C	Record coming over is a correction and thus replaces a final result

<b>Order Table 0038 (ORC-5)</b>	<b>Request Table 0123 (OBR-25)</b>	<b>Result Table 0085 (OBX-11)</b>	<b>Description (combined from 3 tables)</b>
CA	X	X	(OBX) Results cannot be obtained for this observation. (ORC/OBR) No results available; Order canceled.

1070

Notes:

The status codes used in ORC-5 are less ‘atomic’ than those used in OBR-25/OBX-11. If there is no direct ‘semantic match’ the ORC-5 column lists the closest equivalent between braces.

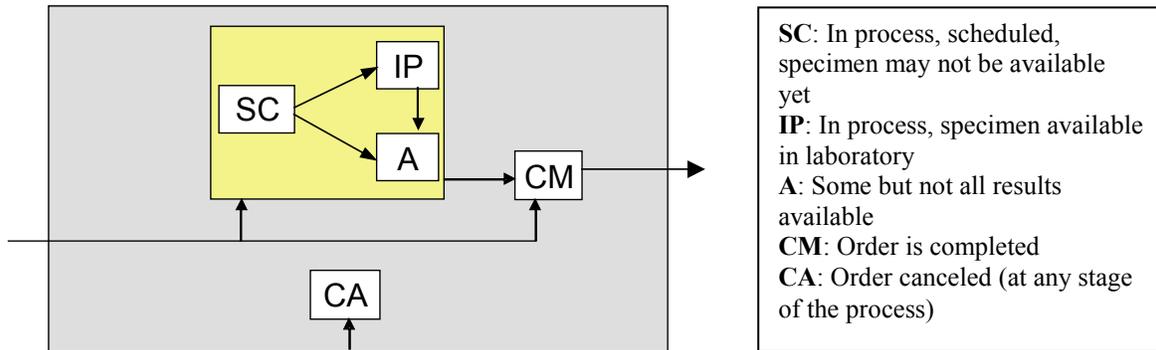
1075

The table shown above contains a description of the semantics of the code values used by these fields. Please note that this table does not identify all possible relationships of the various status fields. The relationship between the various status fields are described below.

**C.10.2 Status Transition Diagrams**

1080 **C.10.2.1 ORC-5: Order Status**

The status fields of an order and the associated result express the status of the order and result as they are processed and finalized. The transition of the coded values used in the status fields is shown below:

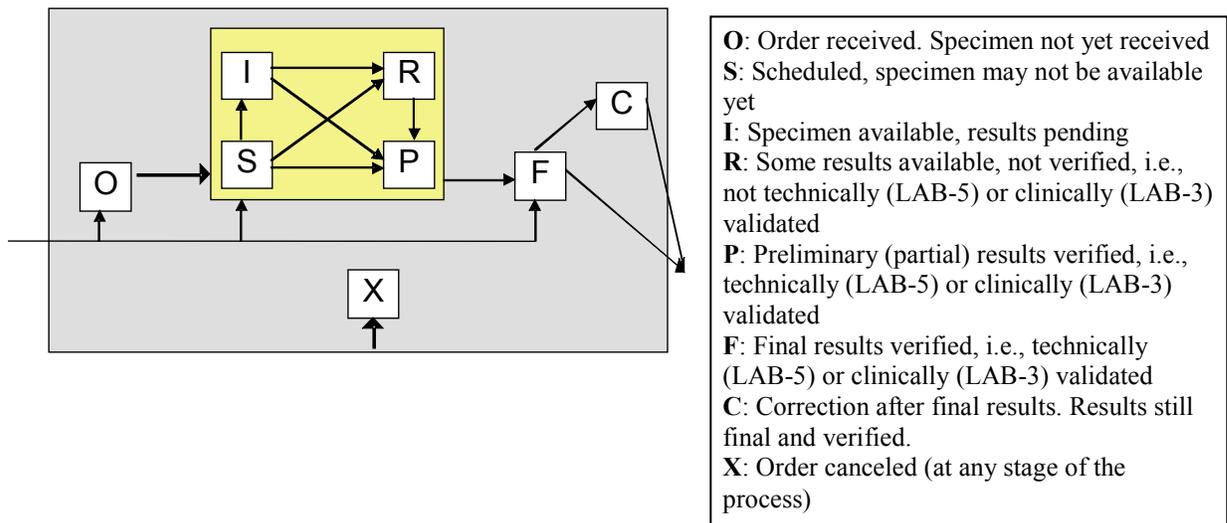


1085 **Figure C.10.2.1-1: The ORC-5 status transition diagram**

The status diagram in figure C.10.2.1-1 above shows that, during normal processing, the initial status code in ORC-5 will be SC, IP, A or CM. If the status code equals SC, the next status code could be IP, A, CM or SC. If the status code equals IP, the next status code could be A, CM or IP. The special status codes CA (order was canceled) may occur at any stage of processing.

1090

**C.10.2.2 OBR-25: Order Result Status**

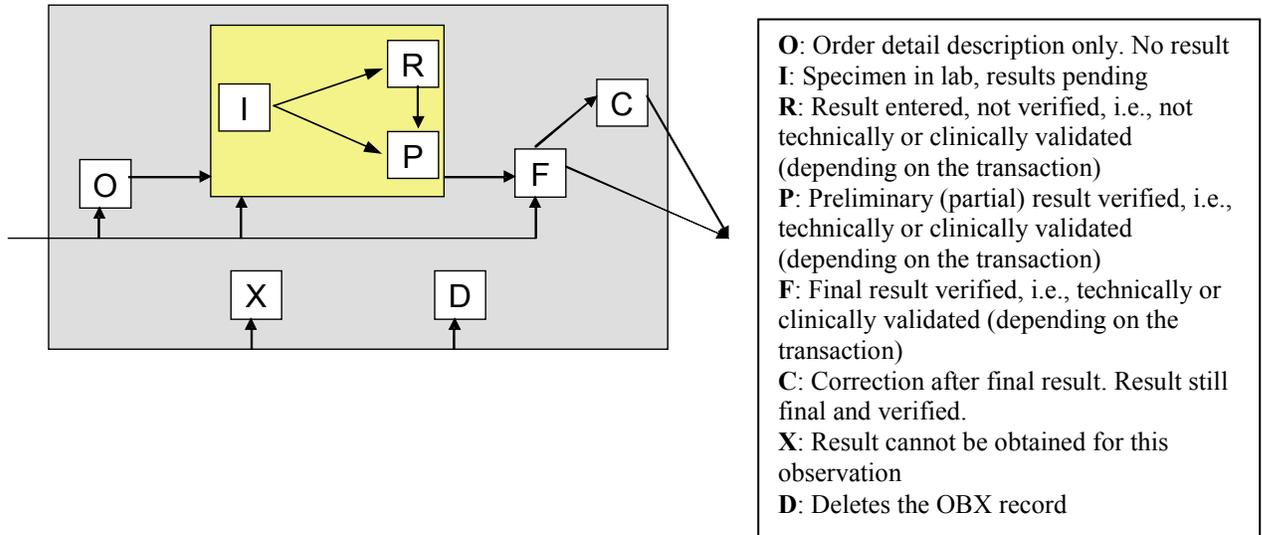


1095 **Figure C.10.2.2-1: The OBR-25 Status Transition Diagram**

The status diagram in figure C.10.2.2-1 above shows that, during normal processing, the initial status code in OBR-25 will be O, F, or one of the four codes shown in the center block. If the status code equals S, the next status code could be either I, R, P, F or S. If the status code equals

1100 P, the next status code could be either F or P. If the status code equals F, the next status could be either F or C. The special status code X (order canceled) may occur at any stage of processing.

**C.10.2.3 OBX-11: Observation Result Status**



1105

**Figure C.10.2.3-1: The OBX-11 Status Transition Diagram**

1110 The status diagram in figure C.10.2.3-1 above shows that, during normal processing, the initial status code in OBX-11 will be O, F, or one of the three codes shown in the center block. If the status code equals I, the next status code could be either I, R, P or F. If the status code equals P, the next status code could be either F or P.

1115 The special status codes X (Result cannot be obtained for this observation) and D may occur at any stage of processing.

**C.10.3 Relationship between the 3 Status Fields**

The relationship between the 3 status fields is stated by the following rules:

1. The status as contained in the OBR-25 field cannot be “higher/more finalized” than the “lowest” status of any of the related individual tests (as contained in OBX-11). For example: OBR-25 can only be ‘F’ (Final) when all related OBX-11 fields contain ‘F’.
2. The status of the order as defined by the Order Fulfiller cannot be “higher/more finalized” than the status of the related request (as contained in OBR-25). For example: ORC-5 can only be ‘CM’ (Complete) when the related OBR-25 field contains ‘F’ (Final) or ‘C’ (Corrected).
3. For the purposes of determining which status is “higher/more finalized”, any OBX-11 status code value equal to X or D, and any OBR-25 status code value equal to X should be compared as if the value was F.

1125

## C.11 Microbiology Reporting Rules

1130 This section explains how messages carrying microbiology results shall be structured in transactions LAB-3, LAB-5 and LAB-23 of this IHE Laboratory Technical Framework.

The requirements expressed in this section are aligned with Appendix A of the “*INTEROPERABLE LABORATORY RESULT REPORTING TO EHR (US REALM) RELEASE 1*” Implementation Guide and with Appendix A of the “*V 2.5.1 Implementation Guide: Orders & Observations; Ambulatory Care Lab Result (ELINCS), Release 1*”. Both implementation guides  
1135 have been published by HL7 ([www.hl7.org](http://www.hl7.org)). These requirements on messages carrying microbiology results apply to the following exchanges:

4. from analyzer to LAS (transaction LAB-23)
5. from LAS to LIS (transaction LAB-5)
6. from LIS to CIS/EMR in intra-hospital workflow (transaction LAB-3)

### 1140 C.11.1 Principle

The effective reporting of culture results and antimicrobial sensitivities requires that data across different OBR segments and OBX segments be appropriately associated (for example, to associate the correct antimicrobial sensitivity with the correct cultured organism when multiple organisms have grown). HL7 v2.5.1 provides specific mechanisms to represent such  
1145 associations, which must be used when reporting culture and sensitivity results.

### C.11.2 Culture Results

Culture results typically report the identity of cultured organisms and (sometimes) quantify the degree to which such organisms appear in the cultured specimen. Such results shall be reported as described below.

#### 1150 C.11.2.1 Definition

A “culture” is any microbiological test in which infectious organisms are identified and characterized by allowing the organisms present in a specimen to reproduce in predetermined media in laboratory. The cultured organisms may be bacteria, viruses, or parasites. The results of any such test must be reported according to the specification below.

#### 1155 C.11.2.2 An Example

The following example shows the preliminary results of a sputum culture that identified *Staphylococcus aureus* and Beta hemolytic *Streptococcus A*.

```

MSH|...
PID|...
ORC|SC|||REQ885|A
OBR|1|ORD885-04A3X|5788475-04333^^05D0642827^L-CL|5863^Spt Routine
    Cult^99Lab^5863^Spt Routine Cult^99Lab|||20070114|||L|||
    G48482^Good^Robert^^^^^^^UPIN|||200701181430-0800|||P<cr>
OBX|1|CE|11475-1^MICROORGANISM IDENTIFIED^LN1|1|
    3092008^Staphylococcus aureus^SCT3||A||P|...<cr>
OBX|2|SN|564-5^COLONY COUNT^LN|12|^10000-^90000||A||P|...<cr>
OBX|3|CE|11475-1^MICROORGANISM IDENTIFIED^LN1|21|412643004^Beta
    hemolytic Streptococcus A^SCT3||A||P|...<cr>
OBX|4|SN|564-5^COLONY COUNT^LN|22|<^1000||A||P|...<cr>
    
```

- 1160        Superscript 1: OBX-3 Observation Identifier
- Superscript 2: OBX-4 Observation Sub-ID
- Superscript 3: OBX-5 Observation Value

**Figure C.11.2.2-1: Example of Culture Results**

**C.11.2.3      OBX-3 Observation Identifier**

1165    For OBX segments in which a cultured organism is identified, an appropriate LOINC® code must be used, i.e., a code with the LOINC® component value of “MICROORGANISM IDENTIFIED”. There are approximately 175 such LOINC® codes in version 2.15 of the LOINC® terminology, varying with respect to the method of culture and the specimen type.

1170    The above example shows two organisms identified, reported with the LOINC® code 11475-1 in OBX-3.

For OBX segments in which the colony count of a cultured organism is reported, an appropriate LOINC® code must be used, i.e., a code with the component value of “COLONY COUNT”. There are approximately 10 such LOINC® codes in version 2.15 of the LOINC® terminology.

1175    The above example shows two colonies counted, reported with the LOINC® code 564-5 in OBX-3.

**C.11.2.4      OBX-4 Observation Sub-ID**

1180    Each OBX segment that reports a culture result must have the Observation Sub-ID field populated. OBX segments that contain information pertaining to the same identified microorganism must be “grouped” via the same value in the Observation Sub-ID field. For example, the first two OBX segments in the example above contain information pertaining to the Staphylococcus Aureus organism identified in the sputum sample (in this case, the identity of that organism and its colony count). These OBX segments, therefore, both have the Observation

Sub-ID value of “1”. The second two OBX segments contain information pertaining to the Beta-hemolytic Streptococcus A organism, and both have the Observation Sub-ID value of “2”.

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Note 1: Even if only one OBX segment appears for each identified organism, the Observation Sub-ID field must be populated in these OBX segments, because the value of the Observation Sub-ID field is used to reference the appropriate OBX segment in subsequent reporting of antimicrobial sensitivities. Even in the case that only a single OBX segment is used to report a culture result, the Observation Sub-ID field must be populated, for the same reason. For example, if only one organism had been identified in the example above and no colony counts had been reported, the Observation Sub-ID field would still need to contain the value “1”.

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Note 2: Within any OBR segment, the OBX segments must be sequenced such that they are grouped by their Observation Sub-ID values. For example, in the culture result shown above, the OBX segments with the Observation Sub-ID value “1” all appear before the OBX segments with the Observation Sub-ID value “2”.

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Note 3: When the results of a specific culture are sent more than once (for example, as a preliminary result and later as a final result), the combination of OBX-3 (Observation Identifier) and OBX-4 (Observation Sub-ID) values for the identified organisms must be the same in each result message that is sent. This consistency allows the receiving system to correctly update the identified organisms as they are revised by the sending system. The example below shows the preliminary and the (subsequently sent) final values of a sputum culture, with the OBX-3 (Observation Identifier) and OBX-4 (Observation Sub-ID) values maintained correctly.

1200

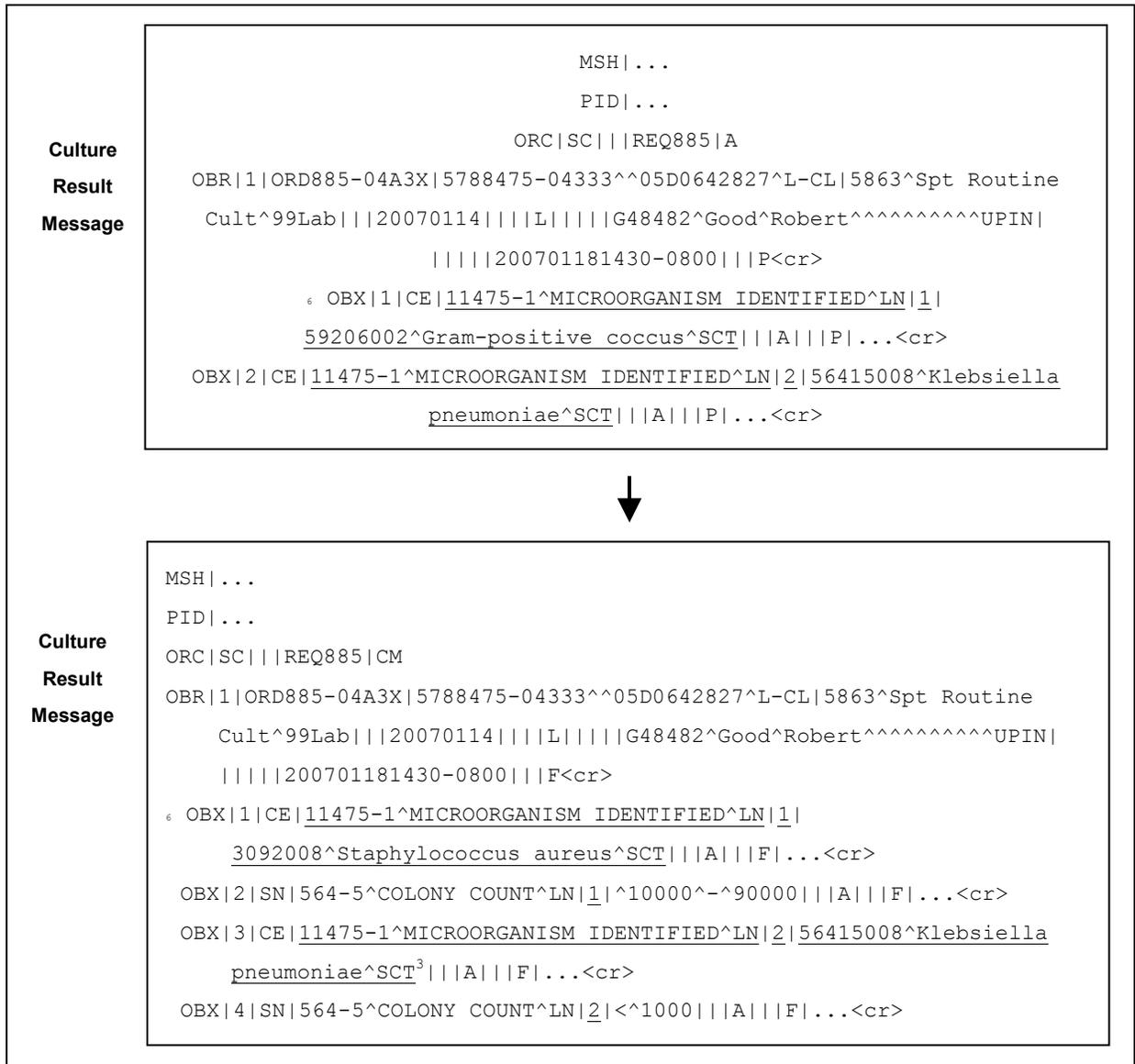


Figure C.11.2.4-1: Example of Successive Culture Results Messages

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### C.11.2.5 OBX-5 Observation Value

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The value of each organism identified by a culture must be represented by a coded entity (CE data type). Use of a standard coding system, such as SNOMED CT, will enable important reporting and decision-support capabilities for infectious diseases. When SNOMED codes are used, the SNOMED CT concept ID should appear in the first component of OBX-5 and the coding system designator “SCT” should appear in the third component. The second component should be populated with an accurate text description of the organism identified, typically the preferred display term as assigned by the SNOMED CT terminology. Regardless of the coding

1215 system used, the first three components of OBX-5 must be populated with the code, text description, and coding-system designator, respectively.

1220 Note 1: Use of the SNOMED CT terminology is most useful for encoding the Observation Value in the OBX that identifies an organism (e.g., the first and third OBX segments in the sample message above). The Observation Value for colony counts or other observations related to the culture may be represented in any reasonable way chosen by the laboratory.

### **C.11.3 Antimicrobial Sensitivities Results**

1225 Antimicrobial sensitivity (or susceptibility) results report the sensitivity of cultured microorganisms to specific antibiotics, a standard part of medical microbiology and critical to the treatment of infectious diseases. The reporting of such tests in a uniformly structured and coded manner allows EHR systems to assist in the selection or assessment of antibiotic therapies, thereby promoting effective care and patient safety.

Such tests shall be reported as described in this section.

#### **C.11.3.1 Definition**

1230 An antimicrobial sensitivity test is any test that assesses the susceptibility of a microorganism previously identified via culture to one or more specific antibiotic medications. The results of such a test may indicate, for example, that the microorganism is “susceptible,” “moderately susceptible,” or “resistant” to a specific antibiotic.

#### **C.11.3.2 An Example**

1235 The following example shows the final results of a sputum culture that identified *Staphylococcus aureus* and Beta hemolytic *Streptococcus A*, and the results of subsequent sensitivity testing on these organisms with respect to the antimicrobials Ampicillin and Amoxicillin/Clavulanate.

Note that the sensitivity tests were performed as “reflex tests,” i.e., they were initiated by the laboratory in response to the positive culture results.

1240 This example is a message ORU^R01 of transaction LAB-3, assuming that transaction LAB-2 has been used in the meantime to obtain a Placer Order Number for the sensitivity test orders.

<p>MSH ... PID ...</p> <p><b>Culture Results with two isolates identified</b></p>	<pre> ORC SC   REQ885 CM OBR 1 ORD885-04A3X<sup>1</sup> 5788475-04333^^05D0642827^L-CL<sup>2</sup> 5863^Spt Routine   Cult^99Lab   20070114   L      G48482^Good^Robert^^^^^^^UPIN   200701181430-0800   F&lt;cr&gt; OBX 1 CE 11475-1^MICROORGANISM IDENTIFIED^LN 1    3092008^Staphylococcus aureus^SCT   A   F ...&lt;cr&gt; OBX 2 SN 564-5^COLONY COUNT^LN 1 ^10000^-^90000   A   F ...&lt;cr&gt; OBX 3 CE 11475-1^MICROORGANISM IDENTIFIED^LN 2    412643004^Beta hemolytic Streptococcus A^SCT   A   F ...&lt;cr&gt; OBX 4 SN 564-5^COLONY COUNT^LN 2 &lt;^1000   A   F ...&lt;cr&gt;                 </pre>
<p><b>Sensitivity Result on isolate 1 (reflex test)</b></p>	<pre> ORC SC   REQ885 CM OBR 2 ORD885-04A4Y<sup>1</sup> 5788475-04334^^05D0642827^L-CL<sup>2</sup> 6402^Bacterial Susc   Panel Islt^99Lab   20070114   G      G48482^Good^Robert^^^^^^^UPIN   200701181430-0800   F    11475-1&amp;MICROORGANISM IDENTIFIED&amp;LN^1^   Staphylococcus aureus<sup>3</sup>      ORD885-04A3X^5788475-04333&amp;&amp;05D0642827&amp;L-CL<sup>4</sup>&lt;cr&gt; OBX 1 NM 28-1^Ampicillin^LN<sup>6</sup> 1 32 ug/mL  R<sup>7</sup>   F ...&lt;cr&gt; OBX 2 NM 20-8^Amoxicillin+Clavulanate^LN<sup>5</sup> 1 2 ug/mL  S<sup>6</sup>   F ...&lt;cr&gt;                 </pre>
<p><b>Sensitivity Result on isolate 2 (reflex test)</b></p>	<pre> ORC SC   REQ885 CM OBR 3 ORD885-04A5Z<sup>1</sup> 5788475-04335^^05D0642827^L-CL<sup>2</sup> 6402^Bacterial Susc   Panel Islt^99Lab   20070114   G      G48482^Good^Robert^^^^^^^UPIN   200701181430-0800   F    11475-1&amp;MICROORGANISM IDENTIFIED&amp;LN&amp;783&amp;CultOrg&amp;99Lab^2^   Beta hemolytic Streptococcus A<sup>3</sup>      ORD885-04A3X^5788475-04333&amp;&amp;05D0642827&amp;L-CL<sup>4</sup>&lt;cr&gt; OBX 1 NM 28-1^Ampicillin^LN<sup>6</sup> 2 2 ug/mL  S<sup>7</sup>   F ...&lt;cr&gt; OBX 2 NM 20-8^Amoxicillin+Clavulanate^LN<sup>5</sup> 2 2 ug/mL  S<sup>6</sup>   F ...&lt;cr&gt;                 </pre>

- Superscript 1: OBR-2 Placer Order Number
- Superscript 2: OBR-3 Filler Order Number
- Superscript 3: OBR-26 Parent Result
- Superscript 4: OBR-29 Parent
- Superscript 5: OBR-50 Parent Universal Service Identifier
- Superscript 6: OBX-4 Observation ID
- Superscript 7: OBX-8 Abnormal Flags

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**Figure C.11.3.2-1: Example of complete microbiology reporting, with sensitivity**

1250 Note 1: Each Placer Order Number (OBR-2) and each Filler Order Number (OBR-3) in this message is unique, in conformance with this IHE Laboratory Technical Framework. In particular, the order numbers in the sensitivity tests differ from the order numbers of the culture. The laboratory requisition all these orders belong to, is identified by its Placer Group Number REQ885 in ORC-4.

**C.11.3.3 OBR-26 Parent Result**

1255 In the OBR segment of a sensitivity result, the value of the Parent Result field references the OBX segment for the identified organism that prompted the sensitivity testing. For example, the value in the Parent Result field of the first sensitivity result above is:

11475-1&MICROORGANISM IDENTIFIED&LN&783&CultOrg&99Lab^1^Staphylococcus aureus

1260 which references the Observation ID (OBX-3), Observation Sub-ID (OBX-4), and the text component of the Observation Value (OBX-5.2) of the first OBX segment in the culture result.

The table below shows the correspondence between the components and sub-components of OBR-26 Parent Result field in the sensitivity result and the fields and components of the corresponding OBX segment in the culture result:

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**Field OBR-26 - Parent Result (Sensitivity Result)**

Component/Sub-Component in OBR-26	Usage	Referenced Field/Component in Parent OBX Segment
OBR-26.1 (1 <sup>st</sup> component)	R	
OBR-26.1.1 ( 1 <sup>st</sup> sub-component)	R	OBX-3.1 Observation Identifier.Identifier
OBR-26.1.2 (2 <sup>nd</sup> sub-component)	RE	OBX-3.2 Observation Identifier.Text
OBR-26.1.3 (3 <sup>rd</sup> sub-component)	RE	OBX-3.3 Observation Identifier.Name of Coding System
OBR-26.1.4 ( 4 <sup>th</sup> sub-component)	RE	OBX-3.1 Observation Identifier.Alt Identifier
OBR-26.1.5 (5 <sup>th</sup> sub-component)	RE	OBX-3.2 Observation Identifier.Alt Text
OBR-26.1.6 (6 <sup>th</sup> sub-component)	RE	OBX-3.3 Observation Identifier.Name of Alt Coding System
OBR-26.2 (2 <sup>nd</sup> component)	R	OBX-4 Observation Sub-ID
OBR-26.3 (3 <sup>rd</sup> component)	R	OBX-5.2 Observation Value.Text

Note 1: Because organisms identified in culture results must be reported as coded entities, one can safely assume that OBX-5.2 of the parent result will be the text representation of a coded entity.

**C.11.3.4 OBR-29 Parent**

1270 OBR-29 references the values of the Placer Order Number (OBR-2) and the Filler Order Number (OBR-3) in the OBR segment of the culture result that spawned the sensitivity testing. OBR-29 must be populated when reporting the result of any reflex test, including an antimicrobial susceptibility.

In the example above, the value of OBR-29 for both sensitivity results is:

1275 ORD885-04A3X^5788475-04333&&05D0642827&L-CL

which reflects the values of OBR-2 and OBR-3 in the preceding culture result:

OBR-2: ORD885-04A3X

OBR-3: 5788475-04333^^05D0642827^L-CL

Referencing the OBR-2 and OBR-3 values of the “parent” culture allows a receiving system to uniquely associate sensitivity results with the culture results that generated them.

1280 The table below shows the usage and semantic of the components of OBR-29 Parent field in the sensitivity result:

**Field OBR-29 - Parent (EIP)**

Component/Sub-Component	Usage
OBR-29.1 Placer assigned identifier (EI) → OBR-2 of culture OBR	R
OBR-29.2 Filler assigned identifier (EI) → OBR-3 of culture OBR	R

**C.11.3.5 OBX-3 Observation Identifier**

1285 For sensitivity results, the Observation Identifier must be encoded using the LOINC® terminology. Specifically, the value of the observation identifier must be one of the LOINC® codes designated to identify antimicrobials tested within susceptibility panels, i.e., codes with a PROPERTY attribute of “SUSC”. The LOINC® coding system includes approximately 1100 such codes, which cover all antimicrobials that are typically assessed in microbiology sensitivity testing.

1290 Sample Values:

1-8^ ACYCLOVIR^LN

12-5^ AMIKACIN:MIC^LN

193-3^ CLINAMYCIN:MIC^LN

395-4^ PENICILLIN V:MLC^LN

1295 **C.11.3.6 OBX-5 Observation Value**

For sensitivity results, the Observation Value field may be represented in whatever manner suits the laboratory and is consistent with conventional practice (in particular the MIC value). The uniform coding of the Abnormal Flags field (see below) is more important for the automated processing of sensitivity results.

1300 **C.11.3.7 OBX-8 Abnormal Flags**

For sensitivity results, the value of the Abnormal Flags field must be one of the following values from Table 0078:

**Subset of HL7 Table 0078 for Antimicrobial Sensitivity**

Value	Description
S	Susceptible. Indicates for microbiology susceptibilities only.
R	Resistant. Indicates for microbiology susceptibilities only.
I	Intermediate. Indicates for microbiology susceptibilities only.
MS	Moderately susceptible. Indicates for microbiology susceptibilities only.
VS	Very susceptible. Indicates for microbiology susceptibilities only.

## C.12 QAK – Query Acknowledgment Segment

1305 This segment is used in the response to query messages of these Transactions:

- Query for Label Delivery Instruction [LAB-62]
- Query for Work Order Step [LAB-22]

**Table C.12-1: QAK Segment**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM #	Element name
1	32	ST	C	[0..1]		00696	Query Tag
2	2	ID	R	[1..1]	0208	00208	Query Response Status
3	250	CE	O	[0..1]	0471	01375	Message Query Name
4	10	NM	O	[0..1]		01434	Hit Count
5	10	NM	O	[0..1]		01622	This payload
6	10	NM	O	[0..1]		01623	Hits remaining

1310 **QAK-1 Query Tag (ST)**, conditional.

This field in the response message is echoing QPD-2 in the query message.

Condition predicate: QAK-1 shall be valued with the content of QPD-2 received in the query message.

**QAK-2 Query Response Status (ID)**, required.

1315 This mandatory field carries one of these values:

**HL7 Table 0208 - Query Response Status**

Value	Description	Comment
OK	Data found, no errors (this is the default)	
NF	No data found, no errors	
AE	Application error	
AR	Application reject	

## C.13 MFI – Master File Identification Segment

This segment is used by transaction [LAB-51].

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**Table C.13-1: MFI – Master File Identification**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	250	CE	R	[1..1]	0175	00658	Master File Identifier
2	180	HD	R	[1..1]		00659	Master File Application Identifier
3	3	ID	R	[1..1]	0178	00660	File-Level Event Code
4	26	TS	O	[0..1]		00661	Entered Date/Time
5	26	TS	R	[1..1]		00662	Effective Date/Time
6	2	ID	R	[1..1]	0179	00663	Response Level Code

**MFI-1 Master File Identifier (CE)**, required.

It shall contain one of the values:

- OMA (Numerical Observation Master File)
- OMB (Categorical Observation Master File)
- 1325 • OMD (Calculated Observations Master File)

**MFI-2 Master File Application Identifier (HD)**, required.

Contains a code of up to 180 characters which uniquely identifies the application responsible for maintaining this file at a particular site.

1330 The value of this field shall be formatted by concatenating the values below using the “\_” (underscore) character as a separator:

- the name of the application that owns the code set. This shall be equal to the value of the field MSH-3 Sending Application.
- the type of master file. This shall be equal to the value of the field MFI-1 Master File Identifier.
- 1335 • the language of the (textual descriptions of the) code set. This shall be equal to the value contained in the field MSH-19 Principal Language of the Message.
- (optional, if applicable) the version/revision of the code set. The character string used to identify a new version or revision should sort to be alphabetically “later” when compared to any previous versions or revisions.

1340 The resulting identifier will have the form “SENDINGAPP\_MFTYPE\_LANGUAGE” or “SENDINGAPP\_MFTYPE\_LANGUAGE\_VERSION”. The receiver should not attempt to deconstruct this string into its constituent elements; it should use the identifying string in its entirety. With the exception of version/revision all elements are available elsewhere in the message.

1345 Examples include “Lab1\_OMA\_EN\_1.2” or “X-PAS\_OMB\_FR”.

**MFI-3 File-Level Event Code (ID)**, required.

It shall contain the value REP (replace current version of this master file with the version contained in this message).

**MFI-5 Effective Date/Time (TS)**, required.

1350 Contains the date/time the Code Set Master expects that the event is to have been completed on the receiving system. The sending system should use the current date/time as a default. The Code Set Consumer shall process the event as soon as possible if the value of this field is in the past. If the value of this field is at some point in the future, then the Code Set Consumer shall process the event *before* that time.

1355 **MFI-6 Response Level Code (ID)**, required.

It shall contain the value ER. The acceptance status of the individual master file entries is only to be reported in case of an error. Since the IHE Laboratory Technical Framework uses the HL7

original acknowledgment mode, all MFA segments must be returned via the application-level acknowledgment message.

1360 **C.14 MFE – Master File Entry Segment**

**Table C.14-1: MFE – Master File Entry Segment**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	3	ID	R	[1..1]	0180	00664	Record-Level Event Code
2	20	ST	R	[1..1]		00665	MFN Control ID
3	26	TS	O	[0..1]		00662	Effective Date/Time
4	200	Varies	R	[1..1]		00667	Primary Key Value – MFE
5	3	ID	R	[1..1]	0355	01319	Primary Key Value Type

**MFE-1 Record-Level Event Code (ID)**, required.

It shall contain the value MAD (add record to master file). Given that the file-level event code is REP, each MFE segment must have a record-level event code of MAD.

1365 **MFE-2 MFN Control ID (ST)**, required.

The response level code is ER. It contains an identifier that uniquely identifies the change to the record.

**MFE-4 Primary Key Value – MFE**, required.

Uniquely identifies a record of the code set. The data type of this field is CE (coded element).  
 1370 One unique identifier shall be provided; the last 3 components of the CE data type shall not be valued.

**MFE-5 Primary Key Value Type (ID)**, required.

Contains the value CE (coded element).

1375