Integrating the Healthcare Enterprise

IHE Laboratory (LAB)
Technical Framework

Volume 2a
LAB TF-2a
Transactions Part A

Revision 6.0 - Final Text
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1 Introduction

1.1 Overview of IHE

Integrating the Healthcare Enterprise (IHE) is an initiative designed to stimulate the integration of the information systems that support modern healthcare institutions. Its fundamental objective is to ensure that in the care of patients all required information for medical decisions is both correct and available to healthcare professionals. The IHE initiative is both a process and a forum for encouraging integration efforts. It defines a technical framework for the implementation of established interoperability standards to achieve specific clinical goals. It includes a rigorous testing process for the implementation of this framework, organizes educational sessions, exhibits at major meetings of medical professionals to demonstrate the benefits of this framework and encourage its adoption by industry and users.

The approach employed in the IHE initiative is to support the use of existing standards, e.g., HL7, ASTM, DICOM, ISO, IETF, OASIS, CLSI and others as appropriate, rather than to define new standards. IHE profiles further constrain configuration choices where necessary in these standards to ensure that they can be used in their respective domains in an integrated manner between different actors. When clarifications or extensions to existing standards are necessary, IHE refers recommendations to the relevant standards bodies.

1.2 Overview of the Laboratory Technical Framework

1.2.1 Production

This document, the Laboratory Technical Framework (LAB TF), defines specific implementations of established standards to achieve integration goals of clinical laboratories with other components of a healthcare enterprise or with a broader community of healthcare providers, hereafter called a healthcare community.

This document is updated annually, following a period of public review, and maintained regularly through the identification and correction of errata. The current version, rev. 6.0 Final Text, specifies the IHE transactions defined and implemented as of July 2015. The latest version of the document is always available via the Internet at http://ihe.net/Technical_Frameworks.

It has been produced with the help of the following organizations:

- CAP (College of American Pathologists)
- ASIP Santé (Agence des Systèmes d'Information Partagés de Santé) formerly GMSIH (Groupement pour la Modernisation du Système d'Information Hospitalier)
- JAHIS (Japanese Association of Healthcare Information Systems Industry)
- IHE-J (IHE Japan)
- SFIL (Société Française d'Informatique de Laboratoire)

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- HL7 and its affiliate organizations
- RSNA (Radiological Society of North America)

1.2.2 How the Laboratory Technical Framework is organized

The IHE Laboratory Technical Framework identifies a subset of the functional components of the healthcare enterprise or healthcare community, called IHE actors, and specifies their interactions in terms of a set of coordinated, standards-based transactions. It describes this body 295 of transactions in progressively greater depth, and is organized in volumes:

- **Volume 1** of the Laboratory Technical Framework (LAB TF-1) provides a high-level view of IHE functionality, showing the transactions organized into functional units called integration profiles that highlight their capacity to address specific integration requirements for clinical purposes.

300
- **Volumes 2a, 2b, and 2x** of the Laboratory Technical Framework (LAB TF-2a, Lab TF-2b, LAB TF-2x) provide a detailed technical description of each message-based transaction and of its messages.

- **Volume 3** of the Laboratory Technical Framework (LAB TF-3) provides a detailed technical description of each document-based transaction, its persistent content and 305 binding.

- **Volume 4** of the Laboratory Technical Framework (LAB TF-4) has been deprecated

1.3 Audience

The intended audience of this document is:

- Technical staff of vendors participating in the IHE initiative

310
- IT managers of healthcare institutions and healthcare communities

- Experts involved in standards development

- Anyone interested in the technical aspects of integrating healthcare information systems

1.4 Relationship to Standards

The IHE Laboratory Technical Framework identifies functional components of a distributed 315 healthcare environment (referred to as IHE actors), solely from the point of view of their interactions in the healthcare enterprise. At its current level of development, it defines a coordinated set of transactions based on HL7, IETF, ISO, CLSI, OASIS and W3C standards. As the scope of the IHE initiative expands, transactions based on other international standards may be included as required.

320 In some cases, IHE recommends selection of specific options supported by these standards; however, IHE does not introduce technical choices that contradict conformance to these

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standards. If errors in or extensions to existing standards are identified, IHE's policy is to report them to the appropriate standards bodies for resolution within their conformance and standards evolution strategy.

325   IHE is therefore an implementation framework, not a standard. Conformance claims for products must still be made in direct reference to specific standards. In addition, vendors who have implemented IHE integration capabilities in their products may publish IHE Integration Statements to communicate their products' capabilities. Vendors publishing IHE Integration Statements accept full responsibility for their content. By comparing the IHE Integration

330   Statements from different products, a user familiar with the IHE concepts of actors and integration profiles can determine the level of integration between them.

1.5 Relationship to Real-world architectures

The IHE Actors and transactions are abstractions of the real-world healthcare information system environment. While some of the transactions are traditionally performed by specific product

335   categories (e.g., Hospital Information System, Electronic Patient Record, Clinical Information System, Laboratory Information System, Laboratory Automation System, analyzer, robotic transportation system and other pre and post-analytic process equipment), the IHE Laboratory Technical Framework intentionally avoids associating functions or actors with such product categories. For each actor, the IHE Laboratory Technical Framework defines only those

340   functions associated with integrating information systems. The IHE definition of an actor should therefore not be taken as the complete definition of any product that might implement it, nor should the framework itself be taken to comprehensively describe the architecture of a healthcare information system.

1.6 History of Annual Changes

345   The IHE Technical Framework is updated annually to reflect new profiles, corrections and new transactions.

1.6.1 Scope of Changes Introduced in the Current Year (2015)

This revision 6.0 incorporates a single minor correction from Change Proposal #293, by removing duplication of content that was present in both this chapter and chapter 2b, from where

350   it has been removed. It will be the basis for 2016 Connectathons.

- Added support for NTE segments after ORC and TCD in RSP^WOS^RSP_K11 per CR#219 (see Section 913.7.5.2)

- Added support for NTE segment after PID in OML^O33 (see Section 3.6.7), per CR#237.

355   - Updated usage of specimen group in LAB-3 (see Section 3.5.5.2) and related examples in Section 4 per CR#238

- Updated Updates/corrections to the sections that are out of line with the base standard in Sections 3.1.5.3, 3.1.5.4, 3.1.5.9, 3.3.5.2, 3.3.5.3 per CR#240

1.6.2 Scope of Changes Introduced in the Current Year (2013)

360   This revision 5.0 incorporates a single minor correction from Change Proposal #193. It will be the basis for 2014 Connectathons.

1.6.3 Scope of Changes Introduced in Year 2012

This revision 4.0 incorporates a number of Change Proposals resulting from the Connectathons of years 2011 – 2012. It will be the basis for 2013 Connectathons.

1.6.4 Scope of Changes Introduced in Year 2011

365

This revision 3.0 incorporates a number of Change Proposals resulting from the Connectathons of years 2008 – 2010. It will be the basis for Connectathons 2011 (in Europe, Japan and other regions) and 2012 (in North-America).

The major enhancements are:

370   - Batch option and various refinements added to transaction LAB-51 (LCSD Profile)

- Fixes and refinements on some field definitions in various transactions.

1.6.5 Scope of Changes Introduced in Year 2008

The main changes introduced by revision 2.1 were the following:

- Refined descriptions of segments ORC, SAC, TQ1, OBX, SPM (see sections 3.5 to 3.9)

375   - Microbiology reporting rules (see Section 3.11 and example in Section 19.5)

- Option "Report Facsimile For Order Group" (see sections 4, 6 and example in Section 19.4)

- HL7 Ack, and MSA, ERR segments descriptions externalized to ITI TF-2:Appendix C

- Support of HL7 v2.5.1 (see OBX segment description in Section 3.9)

380   - Cleanup of all examples messages in Section 19

1.7 Comments

IHE International welcomes comments on this document and the IHE initiative. They should be directed to the co-chairs of the IHE Laboratory Committee, using the address lab@ihe.net.

1.8 Copyright Permissions

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395   1.9   IHE Technical Framework Development and Maintenance Process

The IHE Laboratory Technical Framework is being continuously extended and maintained by the IHE Laboratory Technical committee. The development and maintenance process of the Framework follows a number of principles to ensure stability of the specification so that both vendors and users may use it reliably in specifying, developing and acquiring systems with IHE
400   integration capabilities.

The first of these principles is that any extensions, clarifications and corrections to the Technical Framework must maintain backward compatibility with previous versions of the framework in order to maintain interoperability with systems that have implemented IHE Actors and Integration Profiles defined there.

405   1.10 Glossary

See the Glossary in LAB TF-1:1.11

2 Conventions

2.1 Technical Framework Cross-references

410 When references are made to another section within a Technical Framework volume, a section number is used by itself. When references are made to other volumes or to a Technical Framework in another domain, the following format is used:

<domain designator> TF-<volume number>: <section number>, where

<domain designator> is a short designator for the IHE domain (ITI = IT Infrastructure, PCC =
415 Patient Care Coordination, LAB = Laboratory)

<volume number> is the applicable volume within the given Technical Framework (e.g., 1, 2, 3),

<section number> is the applicable section number.

For example: ITI TF-1: 3.1 refers to Section 3.1 in volume 1 of the IHE IT Infrastructure.

When references are made to Transaction numbers in the Technical Framework, the following
420 format is used:

[<domain designator>-<transaction number>], where

<transaction number> is the transaction number within the specified domain. For example: [LAB-1] refers to Transaction 1 from the IHE Laboratory Technical Framework, [ITI-30] refers to Transaction 30 from the IT Infrastructure Technical Framework.

425 2.2 The generic IHE Transaction Model

Transaction descriptions are provided in Section 3. In each transaction description, the actors, the roles they play, and the transactions between them are presented as use cases.

The generic IHE transaction description includes the following components:

- Scope: a brief description of the transaction.

430 - Use case roles: textual definitions of the actors and their roles, with a simple diagram relating them, e.g.,:

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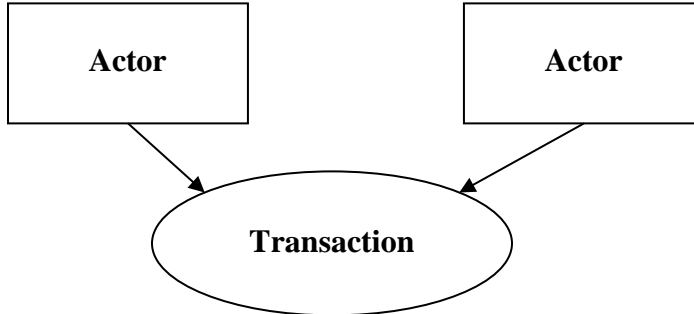
- *Referenced Standards*: the standards (stating the specific parts, chapters or sections thereof) to be used for the transaction.

435

- *Interaction Diagram*: a graphical depiction of the actors and messages that support the transaction, with related processing within an Actor shown as a rectangle and time progressing downward, similar to:
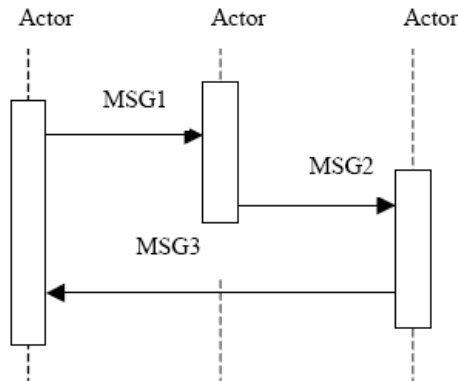
The interaction diagrams used in the IHE Laboratory Technical Framework are modeled
440 after those described in Grady Booch, James Rumbaugh, and Ivar Jacobson, *The Unified Modeling Language User Guide*, ISBN 0-201-57168-4. Simple acknowledgment messages are often omitted from the diagrams for brevity. One or more messages may be required to satisfy a transaction. Each message is represented as an arrow starting from the Actor initiating the message.

445

- *Message definitions*: descriptions of each message involved in the transaction, the events that trigger the message, its semantics, and the actions that the message triggers in the receiver.

2.3 HL7 Profiling Conventions

The messages used by each transaction are described in this document using static definitions of
450 "HL7 constrainable message profiles". Refer to HL7 v2.5 Section 2.12.6. The static definition of each message is represented within tables. At the message level, a table represents the message

structure and its definition in terms of segments. At the segment level, a table details one segment and its definition in terms of fields.

2.3.1 Static Definition - Message Level

455 The table describing a message contains 5 columns:

- *Segment*: gives the segment name, and places the segment within the hierarchy of the HL7message structure. Segments or segment groups not required appear between square brackets. Repeatable segments or segment groups appear between braces.

- *Meaning*: Meaning of the segment as defined by HL7

460 - *Usage*: Coded usage of the segment, as defined by this static definition built for the context of this particular transaction within IHE Laboratory Technical Framework. The coded values used in this document are:

R: Required: A compliant sending application shall populate all "R" elements with a non-empty value. A compliant receiving application shall process (save/print/archive/etc.)
465 or ignore the information conveyed by required elements. A compliant receiving application shall not raise an error due to the presence of a required element, but may raise an error due to the absence of a required element.

RE: Required if available. The element may be missing from the message, but shall be sent by the sending application if there is relevant data. A conformant sending
470 application shall be capable of providing all "RE" elements. If the conformant sending application knows the required values for the element, then it shall send that element. If the conformant sending application does not know the required values, then that element may be omitted.
Receiving applications will be expected to process (save/print/archive/etc.) or ignore
475 data contained in the element, but shall be able to successfully process the message if the element is omitted (no error message should be generated if the element is missing).

O: Optional. The usage for this field within IHE Laboratory Technical Framework has not been defined yet

480 **C**: Conditional. This usage has an associated condition predicate. (See HL7 v2.5 Section 2.12.6.6 "Condition Predicate").
If the predicate is satisfied: A compliant sending application shall always send the element. A compliant receiving application shall process or ignore data in the element. It may raise an error if the element is not present.
485 If the predicate is NOT satisfied: A compliant sending application shall NOT send the element. A compliant receiving application shall NOT raise an error if the condition predicate is false and the element is not present, though it may raise an error if the element IS present.

X: Not supported. For conformant sending applications, the element will not be sent.
490   Conformant receiving applications may ignore the element if it is sent, or may raise an application error.

- Cardinality: Within square brackets, minimum and maximum number of occurrences authorized for this segment, in this static definition of the message, built for the context of this particular transaction within IHE Laboratory Technical Framework.

495
- HL7 chapter: Reference of the HL7 v2.5 chapter that describes this segment.

> Simplification:
>
> For a better readability of the table, the usage "X" is not shown at the message level: if a segment is "not supported" by an IHE profile, it simply doesn't appear in the table representing the message structure.

Table 2.3.1-1: Example - Initial segments of a message description

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	O	[0..1]	
PID	Patient Identification	R	[1..1]	3
[	--- PATIENT VISIT begin	RE	[0..1]	
PV1	Patient Visit	R	[1..1]	3

2.3.2 Static Definition - Segment Level

500 The table describing a segment and its definition in terms of fields contains 7 columns:

- **SEQ**: Position (sequence) of the field within the segment.

- **LEN**: Maximum length of the field

- **DT**: Field Data Type

- **Usage**: Usage of the field in this particular context of IHE Laboratory Technical
505   Framework. Same coded values as in the message level: R, RE, C, O, X

- **Cardinality**: Minimum and maximum number of occurrences for the field in this particular context of IHE Laboratory Technical Framework. Same meaning as in the message level.

- **TBL#**: Table reference (for fields using a set of defined values)

510
- **ITEM#**: HL7 unique reference for this field

- **Element Name**: Name of the field.

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Simplification :

For a better readability of the table, the usage "O" is not shown at the segment level: Optional fields do not appear in the tables unless there is text regarding this field in the description that follows the table. The number in the first column SEQ is the only item of information that provides the exact position of a field within this segment.

Table 2.3.2-1: Example - The MSH segment description

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
1	1	ST	R	[1..1]		00001	Field Separator
2	4	ST	R	[1..1]		00002	Encoding characters
3	227	HD	R	[1..1]	0361	00003	Sending Application
…							

515 2.4 HL7 Implementation Notes

2.4.1 Network Guidelines

The IHE Laboratory Technical Framework makes these recommendations:

Applications shall use the Minimal Lower Layer Protocol (MLLP) defined in appendix C of the HL7 Implementation Guide.

520 An application that wants to send a message (initiate a transaction) will initiate a network connection (if one does not already exist) to start the transaction. The receiver application will respond with an acknowledgement or response to query but will not initiate new transactions on this network connection.

2.4.2 Message Granularity

525 A message is generated from one trigger event in the real world. Therefore a message is related to one single business object:

- A LAB-1, LAB-2 or LAB-3 message is related to one Order or to one Order Group.

- A LAB-4 or LAB-5 message is related to one Work Order.

- A LAB-21, LAB-22, LAB-23 or LAB-26 message is related to one Work Order Step.

530 2.4.3 Empty and Nullified Fields

According to HL7 standard, if the value of a field is not present, the receiver shall not change corresponding data in its database. However, if the sender defines the field value to be the explicit NULL value (i.e., two double quotes ""), it shall cause removal of any values for that field in the receiver's database. This convention is fully applied by the IHE Laboratory Technical
535 Framework.

2.4.4 Acknowledgement Modes

The Laboratory Technical Framework applies thoroughly the acknowledgement rules and syntax as defined in **ITI TF-2: C.2.3**. Implementers are referred to this **section C.2.3 in Appendix C of ITI TF volume 2** for all details regarding the usage of the MSA segment in acknowledgement
540 messages (that is ACK, ORL and RSP messages), as well as the usage of the ERR segment.

For the IHE Laboratory Technical Framework, applications that receive HL7 messages shall send acknowledgements using the HL7 original acknowledgement mode as defined in HL7 v2.5 chapter 2, 2.9.2. The enhanced acknowledgement rules are not supported.

An OML message shall be acknowledged by one single ORL message. An OUL or an ORU
545 message shall be acknowledged by one single ACK message. These acknowledgements are application-level acknowledgements (i.e., not transport acknowledgements) and must be generated by the receiving application after it has parsed the message and processed its content.

The receiving application shall automatically generate the application-level acknowledgement messages without waiting for human approval of the contents of the message that was received.

550 **2.4.5 IHE Laboratory Technical Framework Acknowledgement Policies**

From a transactional viewpoint a MLLP (Minimal Lower Layer Protocol) network connection is *unidirectional*. Event-triggered messages flow in one direction and acknowledgement messages related to those event-triggered messages flow in the other direction.

The acknowledgement message to an event-triggered message shall be sent *immediately* to the
555 sender on the same MLLP connection that carried the event-triggered message. The receiver of an event-triggered message should assume that the sending application is blocking and send an application-level acknowledgement as soon as possible.

It may take the receiving system a while (seconds, minutes) to acknowledge a message. If the MLLP connection is broken whilst the sending application is still waiting for an
560 acknowledgement, the sending application shall initiate a new MLLP connection and resend the message.

The acknowledgement message is an application-level acknowledgement. (Note: HL7 commit/accept acknowledgement messages shall not be used). The application acknowledgement shall only be created by an application that is able to examine a message at the semantic /
565 business-process level. Intermediate message brokers do not have this capacity and therefore shall not be used to generate the contents of application acknowledgements.
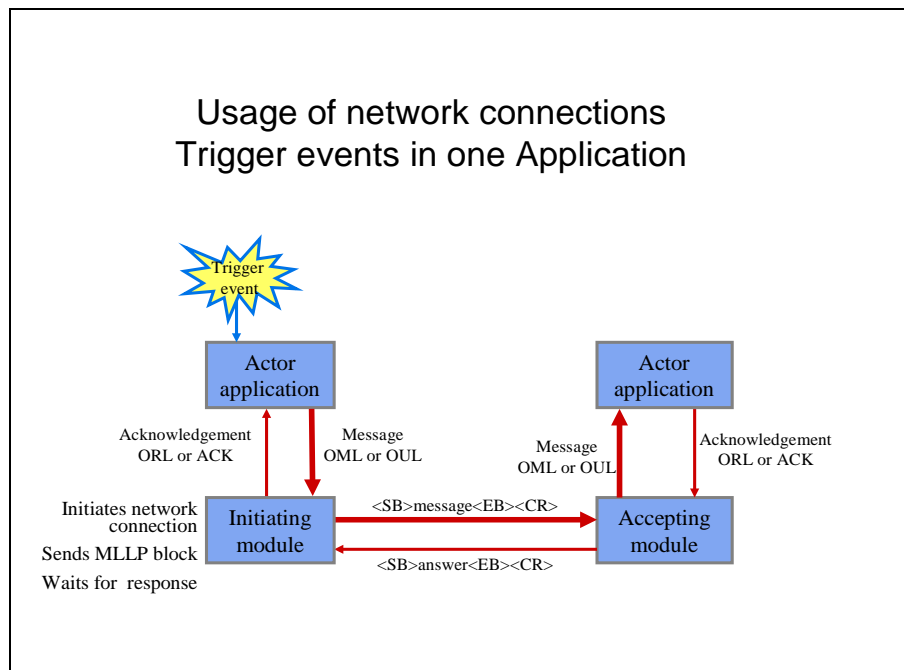
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Transactions between 2 applications which contain trigger events on both sides (such as LAB-1)
570   require at least two network connections between the Actors, one for each direction:
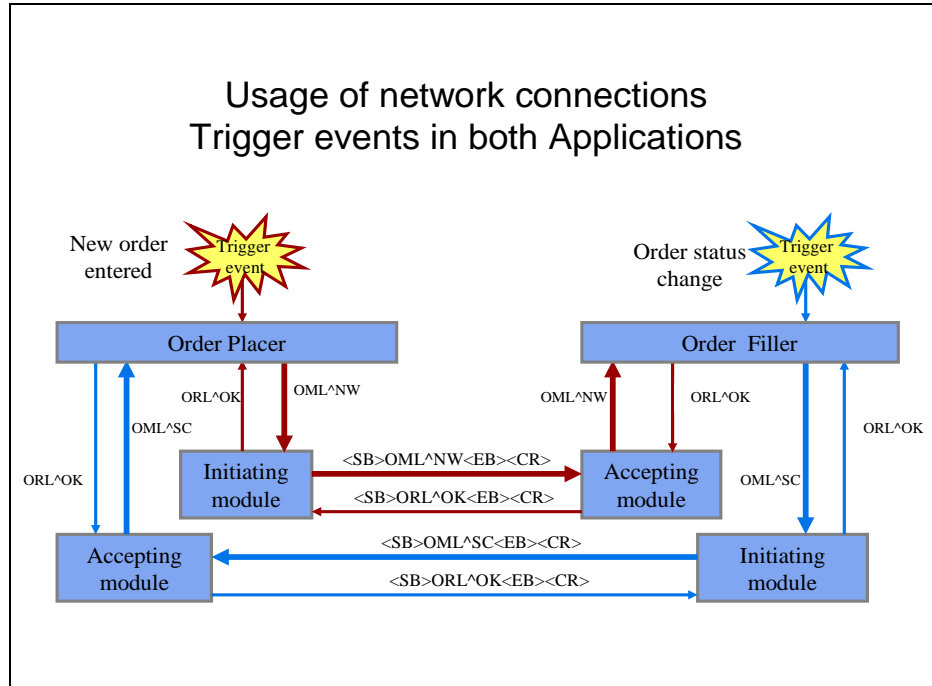
2.4.6 HL7 Data Types

575   This section describes the IHE constraints on some HL7 data types.

2.4.6.1 CX – Extended Composite ID with Check Digit

SEQ	LEN	DT	Usage	CARD	TBL#	COMPONENT NAME
1	15	ST	R	[1..1]		ID Number
2	1	ST	O	[0..1]		Check Digit
3	3	ID	O	[0..1]	0061	Check Digit Scheme
4	227	HD	R	[1..1]	0363	Assigning Authority
5	5	ID	RE	[0..1]	0203	Identifier Type Code
6	227	HD	O	[0..1]		Assigning Facility
7	8	DT	O	[0..1]		Effective Date
8	8	DT	O	[0..1]		Expiration Date
9	705	CWE	O	[0..1]		Assigning Jurisdiction
10	705	CWE	O	[0..1]		Assigning Agency or Department

The data type has been constrained because the IHE Framework regards the Assigning Authority and the Identifier Type Code as essential components.

580 ### 2.4.6.2 EI – Entity Identifier

The constraints below particularly apply to the following fields: placer order number, filler order number, placer group number and specimen number.

SEQ	LEN	DT	Usage	CARD	TBL#	COMPONENT NAME
1	16	ST	R	[1..1]		Entity Identifier
2	20	IS	C	[0..1]	0363	Namespace ID
3	199	ST	C	[0..1]		Universal ID
4	6	ID	C	[0..1]	0301	Universal ID Type

585 Component 1 is required. Either component 2 or both components 3 and 4 are required. Components 2, 3 and 4 may be all present.

The EI is appropriate for machine or software generated identifiers. The generated identifier goes in the first component. The remaining components, 2 through 4, are known as the assigning authority; they can also identify the machine/system responsible for generating the identifier in 590 component 1.

Example 1: AB12345^RiversideHospital

Example 2: AB12345^^1.2.840.45.67^ISO

Example 3: AB12345^RiversideHospital^1.2.840.45.67^ISO

IHE restrains the length of the first component to 16 characters. National extensions can extend 595 this length up to a maximum of 199.

IHE recommends to fill component 2 "Namespace ID" in all cases. Particularly when there are several concurrent assigning authorities within the healthcare enterprise, this Namespace ID will indicate which assigning authority provided this number.

This happens for instance, when there are several Order Placer actors within the enterprise, each 600 one assigning placer order numbers and placer group numbers.

Example 4: Placer order number and placer group number assigned by two different Order Placer actors.

> In message 1: ORC|NW|9876543^Nephro||777^Nephro|...
>
> In message 2: ORC|SC|9876543^Urology||555^Urology |...

605 This also commonly happens when there are several Order Filler actors within the enterprise, each one assigning its own filler order numbers and specimen numbers.

Example 6: Filler order number and specimen number assigned by the Order Filler Actor operated by the clinical laboratory of cytology.

```
      SPM|1|^45611&Cytology|...
610   ...
      OBR|1|456^Cytology|...
```

2.4.6.3 EIP – Entity Identifier Pair

HL7 Component Table - EIP – Entity Identifier Pair

SEQ	LEN	DT	Usage	CARD	TBL #	COMPONENT NAME
1	427	EI	C	[0..1]		Placer Assigned Identifier
2	427	EI	C	[0..1]		Filler Assigned Identifier

615

The IHE LAB-TF uses this data type for identifying specimens (see SPM-2 and SPM-3 in SPM segment static definition) and Order Groups (see ORC-4 in ORC segment static definition).

Condition predicate for specimens:

620

- In the context of transactions LAB-1, LAB-2, LAB-3, the first sub-component (EIP-1) is populated with the specimen ID assigned by the Order Placer Actor, if available. The second sub-component (EIP-2) is populated with the specimen ID assigned by the Order Filler Actor, if available.

625

- In the context of transactions LAB-4 and LAB-5, EIP-1 is populated with the specimen ID assigned by an Actor preceding the Automation Manager in the workflow, if available. EIP-2 is populated with the specimen ID assigned by the Automation Manager or by a Laboratory Device, if available.

630

- In the context of transactions LAB-21, LAB-22, LAB-26 (in LDA Profile), EIP-1 is populated with the specimen ID assigned by an Actor preceding the Laboratory Device, if available. EIP-2 is populated with the specimen ID assigned by a Laboratory Device, if available.

- In the context of transactions LAB-61 and LAB-62, EIP-1 is populated with the specimen ID assigned by the Label Information Provider Actor. EIP-2 is never populated.

635

- In the context of transactions LAB-27, LAB-28, LAB-29 (in LAW Profile), EIP-1 is populated with the specimen ID assigned by an Actor preceding the Analyzer, if available. EIP-2 is never populated.

Condition predicate for Order Groups:

- In the context of all transactions dealing with orders, the first sub-component (EIP-1) is populated with the Order Group identifier assigned by the Order Placer application, if

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640 known, and the second sub-component (EIP-2) is populated with the Order Group identifier accessioned by the Order Filler application, if known.

2.4.6.4 HD – Hierarchic Designator

SEQ	LEN	DT	Usage	CARD	TBL #	COMPONENT NAME
1	20	IS	R	[1..1]	0300	Namespace ID
2	199	ST	C			Universal ID
3	6	ID	C		0301	Universal ID Type

This Integration Profile requires that a field of Data Type HD be populated with:

- Either the first component "Namespace ID" alone, which in this case contains a local identifier of the object.

645
- Or with all three components, "Namespace ID" containing the name of the object, "Universal ID" containing its universal OID, and "Universal ID Type" containing the value **ISO**.

This data type is particularly used in this technical framework to identify facilities, applications and assigning authorities: sending and receiving applications, sending and receiving facilities,
650 last update facility, assigning authority of an identifier, etc.

3 IHE Transactions

3.1 Placer Order Management (LAB-1)

3.1.1 Scope

655 This transaction is used by the Order Placer to place an Order Group (i.e., a set of Orders to be tested together for a patient) or a standalone Order to the Order Filler. The transaction enables both Order Placer and Order Filler to notify all subsequent changes of status and/or content of each Order to the other side.

An Order contains a battery or a single test requested to a laboratory. The tests are to be
660 performed on one or more in vitro specimens collected from the patient.

An Order accepted by the Order Filler is acknowledged to the Order Placer as scheduled by the laboratory: Order Status ORC-5 = "SC" (scheduled)

When the accurate specimens for this Order are accepted or collected by the laboratory the Order Filler notifies the start of the process to the Order Placer: Order Status ORC-5 = "IP" (in
665 process).

When the first results of an Order are released the Order Filler notifies to the Order Placer the Order Status ORC-5 = "A" (some, but not all, results available).

When all results of an Order are released the Order Filler notifies to the Order Placer the Order Status ORC-5 = "CM" (completed).

670 Both Order Placer and Order Filler may update or cancel an existing Order. Update consists in replacing the ordered test or battery by another one.

An Order canceled ends with Order Status ORC-5 = "CA" (canceled).

To request an additional battery or test in an existing Order Group the Order Placer places a new Order added to this Order Group.

675 To generate an additional battery or test in an existing Order Group the Order Filler uses transaction LAB-2, not LAB-1.

In addition, if the "Report Facsimile For Order Group" Option is activated, this transaction MAY include into an Order Group placed, the request for the facsimile of the report related to that Order Group.

680 3.1.2 Use Case Roles
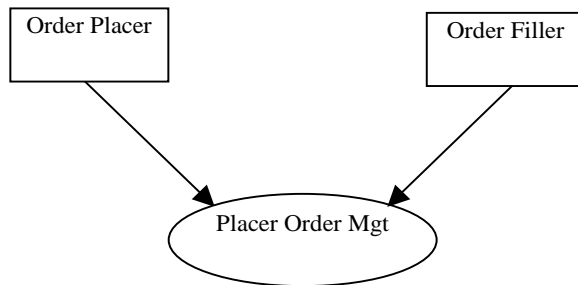
Actor: Order Placer

Roles: Places orders. Updates orders. Cancels orders. Nullifies orders. Receives acceptance or
685 rejection from the Order Filler. Receives Order content and status changes from the Order Filler.

Actor: Order Filler

Roles: Receives orders. Checks the specimens required, and notifies the Order Placer of
acceptance or refusal. Receives Order content changes from the Order Placer. Notifies content
updates (removed batteries/tests) to the Order Placer. Notifies status changes (scheduled, started,
690 cancelled, completed) to the Order Placer.

3.1.3 Referenced Standards

HL7 version 2.5:

- Chapter 2: "Control" --> generic segments and data types

- Chapter 3: "ADT" --> PID and PV1 segments

695 - Chapter 4: "Order Entry" --> OML and ORL messages

- Chapter 7: "Observation Reporting" --> SPM segment

- Chapter 13: "Clinical Laboratory Automation" --> SAC segment

3.1.4 Interaction Diagrams

Trigger events: In all interactions below, the initiator chooses the best OML message structure
700 appropriate to its orders. The responder SHALL respond with the related ORL message
structure:
OML^O21 → ORL^O22
OML^O33 → ORL^O34
OML^O35 → ORL^O36

705 An OML message shall be responded to with exactly one ORL message.

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International.**

The Filler Order Number is required in the ORL messages. ORL messages SHALL be created by the Order Filler application, and not by a message broker or a communication system. The message broker (an intermediary between the Order Placer and the Order Filler) has no knowledge of the tests being requested and can't accept/reject these test on behalf of the Order

710   Filler.

> Simplification of the message flow when Actors OP and ORT are grouped:
>
> The blue message flows "Order status change" notified by the Order Filler to the Order Placer in the figure below happen only when the Order Placer and the Order Results Tracker are different applications.
>
> 715   Whenever the Order Placer and the Order Results Tracker are grouped in the same application, the Transaction LAB-3 message carrying the status change and possible new results is sufficient to inform that application of the new status of the Order. An "Order status change" message in LAB-1 would be redundant in that case. Therefore, when exchanging with a grouped Order Placer/Order Results Tracker, the Order Filler SHALL NOT send the redundant message "Order
> 720   Status Change" from Transaction LAB-1 (marked in blue in the figure below).

3.1.4.1 Normal Process of a Placer Order

The figure below shows the flow of messages in the normal process of a placer order, from placing of the order by the Order Placer, to the "order completed" event notified by the Order Filler.

725
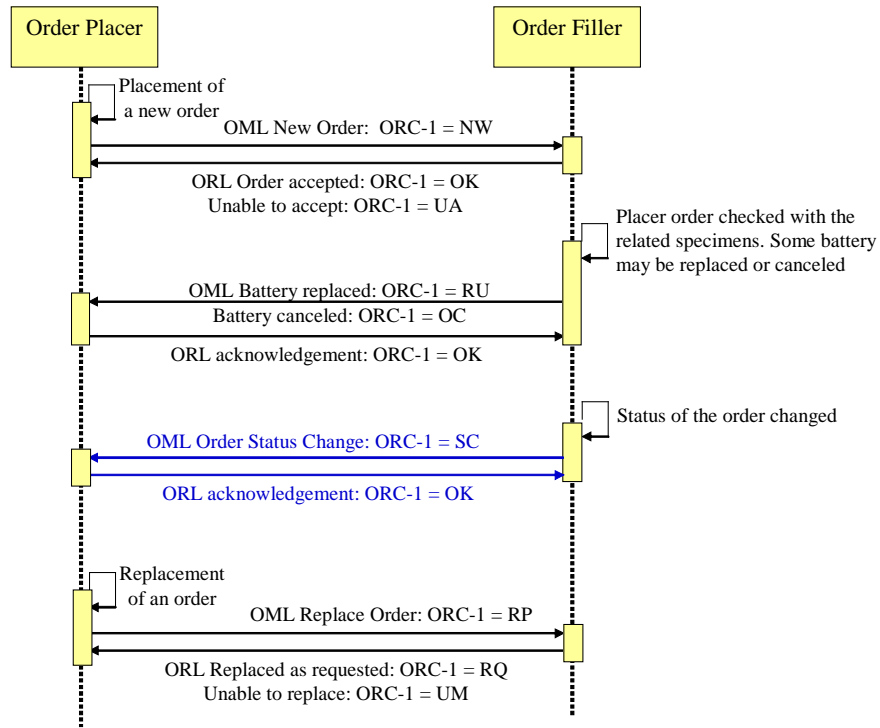
Figure 3.1.4.1-1: Normal process of a placer order

3.1.4.2 Cancellation of an Order by the Order Placer

730
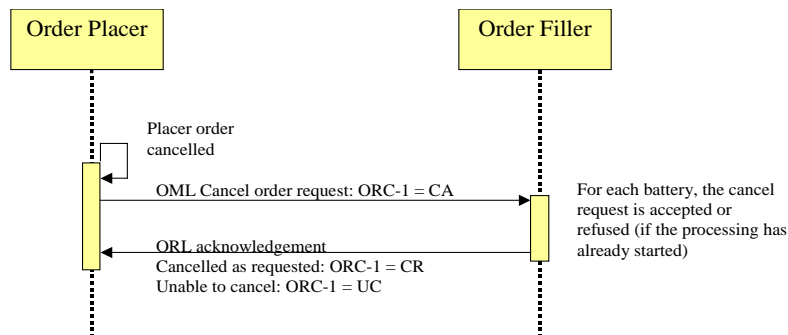
Figure 3.1.4.2-1: Cancellation of an order by the Order Placer

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The Order Filler accepts the cancellation only if the processing has not started yet, particularly if no work order has been sent to the Automation Manager (through transaction LAB-4).

735 ### 3.1.4.3 Cancellation of an Order Initiated by the Order Filler
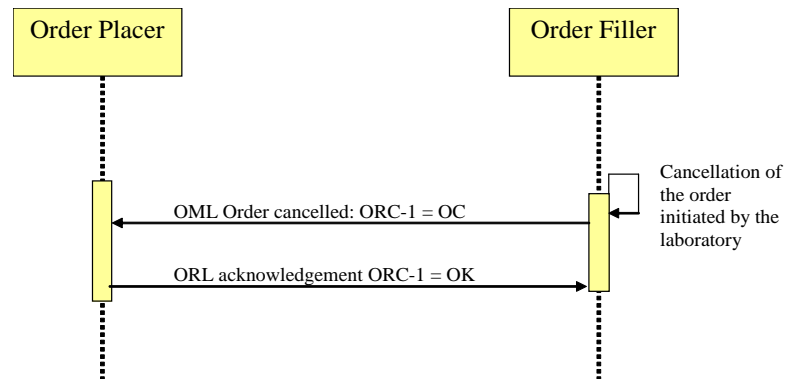
Figure 3.1.4.3-1: Cancellation by Order Filler

3.1.5 Messages Static Definitions

740 ### 3.1.5.1 Available HL7 2.5 Structures for OML Message

HL7 v2.5 chapter 4, offers three different message structures for the OML message type:

- OML^O21^OML_O21: **laboratory order message.** This is a battery-centric structure: It contains a list of ordered batteries, a list of specimens underneath each battery, and a list of containers underneath each specimen. This structure implies duplication of

745 specimen/container information whenever two batteries use the same specimen. It is more appropriate for ordering batteries that need several specimens (e.g., creatinine clearance, glucose tolerance test).

- OML^O33^OML_O33: **Laboratory order for multiple orders related to a single specimen**. This is a specimen-centric structure providing for each specimen a list of

750 containers and a list of batteries (ORC/OBR segment groups) using this specimen. The batteries are not related to the containers.

- OML^O35^OML_O35: **Laboratory order for multiple orders related to a single container of a specimen.** This message structure provides for each specimen a list of containers, and for each container the list of batteries that are to be performed on that

755 container. This structure is more appropriate when the ordered batteries are sorted by container.

3.1.5.2 Restrictions on OML Message for Transaction LAB-1

The Laboratory Technical Framework supports the three message structures defined above, and makes the following restrictions for transaction LAB-1:

760
- LAB-1 carries all clinical observations provided by the Care Unit, such as allergy, therapy, diagnosis, temperature, urine volume, blood pressure, within observation segments (OBX) that accompany the order. This choice has been made to simplify the building and parsing of the messages. All these specific patient observations are sent in the OML message, in OBX segments.

765
- LAB-1 restrains timing/quantity to one execution per order. The main reason for this choice is:

- The only operation that would have needed the iteration features provided by the segment TQ1 is the specimen collection. In this Laboratory Integration Profile this operation is not triggered by any message: It is an internal operation performed within the Order Placer
770 Actor or the Order Filler Actor, depending on the organization. All orders sent to laboratories require one single execution, even the studies based on a temporal series of specimens. For example a serum glucose tolerance study is an atomic order to be performed once, taking into account all the specimens to be tested.

3.1.5.3 OML^O21 Static Definition

775

Table 3.1.5.3-1: OML^O21 static definition for transaction LAB-1

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	RE	[0..1]	
PID	Patient Identification	R	[1..1]	3
[	--- PATIENT_VISIT begin	RE	[0..1]	
PV1	Patient Visit	R	[1..1]	3
]	--- PATIENT_VISIT end			
]	--- PATIENT end			
{	--- ORDER begin	R	[1..*]	
ORC	Common Order (for one battery)	R	[1..1]	4
[{	--- TIMING begin	RE	[0..1]	
TQ1	Timing Quantity	R	[1..1]	4
}]	--- TIMING end			
	--- OBSERVATION REQUEST begin	R	[1..1]	
OBR	Observation Request	R	[1..1]	4
{[NTE]}	Notes and Comments	O	[0..*]	2
[{	--- OBSERVATION begin	O	[0..*]	

Segment	Meaning	Usage	Card.	HL7 chapter
OBX	Observation Result	R	[1..1]	7
[{NTE}]	Comment of the result	O	[0..*]	2
}]	--- OBSERVATION end			
[{	--- SPECIMEN begin	O	[0..*]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Container	RE	[0..*]	13
}]	--- SPECIMEN end			
[{	--- PRIOR_RESULT begin	O	[0..*]	
PV1	Patient Visit – previous result	R	[1..1]	3
{	--- ORDER_PRIOR begin	R	[1..*]	
ORC	Common Order - previous result	R	[1..1]	4
OBR	Order Detail - previous result	R	[1..1]	4
{[NTE]}	Notes and Comments - previous result	O	[0..*]	2
{	--- OBSERVATION_PRIOR begin	R	[1..*]	
OBX	Observation/Result - previous result	R	[1..1]	7
{[NTE]}	Notes and Comments - previous result	O	[0..*]	2
}	--- OBSERVATION_PRIOR end			
}	--- ORDER_PRIOR end			
]}	--- PRIOR_RESULT end			
	--- OBSERVATION REQUEST end			
}	--- ORDER end			

Field MSH-9 - Message Type (MSG) shall have its three components respectively valued to "OML", "O21" and "OML_O21".

780   The triplet (ORC, TQ1, OBR) represents the Order (i.e., an ordered battery/test). In case of an Order Group, this triplet is repeated as many times as there are Orders in the Order Group.

The OBSERVATION repeatable segment group carries the observations provided by the orderer (patient temperature, blood pressure, weight, etc.) with eventual comments (NTE).

The PRIOR RESULT segment group provides the prior results obtained for the same patient.
785   Segment PID is not provided in this segment group because it is the same patient, and the laboratory is not concerned by the fact that this patient might have had a different identification when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory. The presence of this segment at this point in the message structure announces unambiguously a
790   set of prior orders with related prior observations. The segment PV1 represents the patient visit (or encounter) during which these prior observations were produced. The only field mandatory in the segment PV1 is PV1-2 "Patient Class" (as shown in Volume 2x, Appendix C). If the sender

of this message does not know the patient class, it SHALL value the field PV1-2 "U", which stands for "patient class unknown".

795 The ORC appearing in the PRIOR RESULT segment group is mandatory and SHALL have its first field "Order Control" populated with "PR" (Prior results).

The SAC segment should be used only to provide information specific of that segment, i.e., having no placeholder in the SPM segment.

3.1.5.4 ORL^O22 Static Definition

800

Table 3.1.5.4-1: ORL^O22 Message

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[{ERR}]	Error	C	[0..*]	2
[	--- RESPONSE begin	C	[0..1]	
[	--- PATIENT begin	R	[1..1]	
[PID]	Patient Identification	O	[0..1]	3
{	--- ORDER begin	R	[1..*]	
ORC	Common Order	R	[1..*]	4
[{	--- TIMING begin	RE	[0..1]	
TQ1	Timing/Quantity	R	[1..1]	4
}]	--- TIMING end			
	--- OBSERVATION REQUEST begin	R	[1..1]	
OBR	Observation Request	R	[1..1]	4
[{	--- SPECIMEN begin	O	[0..1]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Specimen Container Details	O	[0..*]	7
}]	--- SPECIMEN end			
	--- OBSERVATION REQUEST end			
}	--- ORDER end			
]	--- PATIENT end			
]	--- RESPONSE end			

MSH-9 - Message Type (MSG) shall have its three components respectively valued to "ORL", "O22" and "ORL_O22".

The ERR segment shall be used in case of negative acknowledgement (when MSA-1 = AE or 805 AR).

The RESPONSE segment group is mandatory unless in case of error (MSA-1 = AE or AR). This segment group carries the response of the Order Filler in the segments ORC and OBR.

The mandatory ORC and OBR segments in the repeatable ORDER segment group provide the response of the Order Filler for each order, in particular the ORC-1 Order Control field.

810 **3.1.5.5 OML^O33 Static Definition**

Table 3.1.5.5-1: OML^O33

Segment	Meaning	Usage	Card.	HL7
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	RE	[0..1]	
PID	Patient Identification	R	[1..1]	3
[	--- PATIENT_VISIT begin	RE	[0..1]	
PV1	Patient Visit	R	[1..1]	3
]	--- PATIENT_VISIT end	RE	[0..1]	
]	--- PATIENT end			
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..*]	7
[{SAC}]	Specimen Container	RE	[0..*]	13
{	--- ORDER begin	R	[1..*]	
ORC	Common Order (for one battery)	R	[1..*]	4
[	--- TIMING begin	RE	[0..1]	
TQ1	Timing Quantity	R	[1..1]	4
]	--- TIMING end	RE	[0..1]	
	--- OBSERVATION REQUEST begin	R	[1..1]	
OBR	Observation Request	R	[1..1]	4
[{	--- OBSERVATION begin	O	[0..*]	
OBX	Observation Result	R	[1..1]	7
[{NTE}]	Notes and comments for result	C	[0..1]	
}]	--- OBSERVATION end			
[{	--- PRIOR RESULT begin	O	[0..*]	
PV1	Patient Visit – previous result	R	[1..1]	3
{	--- ORDER PRIOR begin	R	[1*]	
ORC	Common order – previous result	R	[1..1]	4
OBR	Order detail – previous result	R	[1..1]	4
{	--- OBSERVATION PRIOR begin	R	[1..*]	
OBX	Observation/Result – previous result	R	[1..1]	
[{NTE}]	Comment of the result	O	[0..*]	2
}	--- OBSERVATION PRIOR end			
}	--- ORDER PRIOR end			
}]	--- PRIOR RESULT end			

Segment	Meaning	Usage	Card.	HL7
	--- OBSERVATION REQUEST end			
}	--- ORDER end			
}	--- SPECIMEN end			

MSH-9 - Message Type (MSG) shall have its three components respectively valued to "OML",
815   "O33", and "OML_O33".

The conditions on the OBSERVATION segment group are the same as for OML^O21.

The SAC segment should be used only to provide information specific of that segment, i.e.,
having no placeholder in the SPM segment. The PRIOR RESULT segment group provides the
prior results obtained for the same patient. Segment PID is not provided in this segment group
820   because it is the same patient, and the laboratory is not concerned by the fact that this patient
might have had a different identification when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory.
The presence of this segment at this point in the message structure announces unambiguously a
set of prior orders with related prior observations. The segment PV1 represents the patient visit
825   (or encounter) during which these prior observations were produced. The only field mandatory in
the segment PV1 is PV1-2 "Patient Class" (as shown in Volume 2x, Appendix C). If the sender
of this message does not know the patient class, it SHALL value the field PV1-2 "U", which
stands for "patient class unknown".

The ORC appearing in the PRIOR RESULT segment group is mandatory and SHALL have its
830   first field "Order Control" populated with "PR" (Prior results).

3.1.5.6 ORL^O34 Static Definition

Table 3.1.5.6-1: ORL^O34

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[{ERR}]	Error	O	[0..*]	2
[	--- RESPONSE begin	C	[0..1]	
[	--- PATIENT begin	R	[1..1]	
[PID]	Patient Identification	O	[0..1]	3
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Specimen Container	O	[0..*]	13
{	--- ORDER begin	R	[1..*]	

Segment	Meaning	Usage	Card.	HL7 chapter
ORC	Common Order	R	[1..1]	4
[{	--- TIMING begin	RE	[0..1]	
TQ1	Timing/Quantity	R	[1..1]	4
}]	--- TIMING end	RE	[0..1]	
OBR	Observation Request	R	[1..1]	4
}	--- ORDER end			
}	--- SPECIMEN end			
]	--- PATIENT end			
]	--- RESPONSE end			

835   MSH-9 - Message Type (MSG) shall have its three components respectively valued to "ORL",
"O34" and "ORL_O34".

The RESPONSE segment group is mandatory unless in case of error (MSA-1 = AE or AR). This
segment group carries the response of the Order Filler in the segments ORC and OBR.

The mandatory ORC and OBR segments in the repeatable ORDER segment group provide the
840   response of the Order Filler for each order, in particular the ORC-1 Order Control field.

3.1.5.7 OML^O35 Static Definition

Table 3.1.5.7-1: OML^O35 static definition for transaction LAB-1

Segment	Meaning	Usage	Card	HL7
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	RE	[0..1]	
PID	Patient Identification	R	[1..1]	3
[	--- PATIENT_VISIT begin		[0..1]	
PV1	Patient Visit	R	[1..1]	3
]	--- PATIENT_VISIT end			
]	--- PATIENT end			
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
{	--- CONTAINER begin	R	[1..*]	
SAC	Container detail	R	[1..1]	13
{	--- ORDER begin	R	[1..*]	
ORC	Common Order (for one battery)	R	[1..1]	4
[{	--- TIMING begin	RE	[0..1]	
TQ1	Timing Quantity	R	[1..1]	4
}]	--- TIMING end			

Segment	Meaning	Usage	Card	HL7
	--- OBSERVATION REQUEST begin	R	[1..1]	
OBR	Observation Request	R	[1..1]	4
[{	--- OBSERVATION begin	O	[0..*]	
OBX	Observation Result	R	[1..*]	7
[{NTE}]	Comment of the result	C	[0..*]	2
}]	--- OBSERVATION end			
[{	--- PRIOR_RESULT begin	O	[0..*]	
PV1	Patient Visit – previous result	R	[1..1]	3
{	--- ORDER_PRIOR begin	R	[1..*]	
ORC	Common Order - previous result	R	[1..1]	4
OBR	Order Detail - previous result	R	[1..1]	4
{[NTE]}	Notes and Comments - previous result	O	[0..*]	2
{	--- OBSERVATION_PRIOR begin	R	[1..*]	
OBX	Observation/Result - previous result	R	[1..1]	7
{[NTE]}	Notes and Comments - previous result	O	[0..*]	2
}	--- OBSERVATION_PRIOR end			
}	--- ORDER_PRIOR end			
}]	--- PRIOR_RESULT end			
	--- OBSERVATION REQUEST end			
}	--- ORDER end			
}	--- CONTAINER end			
}	--- SPECIMEN end			

845   Field MSH-9 - Message Type (MSG) shall have its three components respectively valued to
"OML", "O35" and "OML_O35".

The conditions on the OBSERVATION segment group are the same as for message OML^O21.

The SAC segment below the SPM segment is mandatory in OML^O35 message structure.

The PRIOR RESULT segment group provides the prior results obtained for the same patient.
850   Segment PID is not provided in this segment group because it is the same patient, and the
laboratory is not concerned by the fact that this patient might have had a different identification
when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory.
The presence of this segment at this point in the message structure announces unambiguously a
855   set of prior orders with related prior observations. The segment PV1 represents the patient visit
(or encounter) during which these prior observations were produced. The only field mandatory in
the segment PV1 is PV1-2 "Patient Class" (as shown in section Volume 2x, Appendix C). If the

sender of this message does not know the patient class, it SHALL value the field PV1-2 "U", which stands for "patient class unknown".

860 The ORC appearing in the PRIOR RESULT segment group is mandatory and SHALL have its first field "Order Control" populated with "PR" (Prior results).

3.1.5.8 ORL^O36 Static Definition

Table 3.1.5.8-1: ORL^O36

Segment	Meaning	Usage	Card.	HL7
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[{ERR}]	Error	C	[0..*]	2
[	--- RESPONSE begin	C	[0..1]	
[	--- PATIENT begin	R	[1..1]	
PID	Patient Identification	O	[0..1]	3
{	--- SPECIMEN begin			
SPM	Specimen	R	[1..*]	7
{	--- CONTAINER begin	R	[1..*]	
SAC	Specimen Container	R	[1..1]	13
{	--- ORDER begin	R	[1..*]	
ORC	Common Order	R	[1..*]	4
[{	--- TIMING begin	RE	[0..1]	
TQ1	Timing/Quantity	R	[1..1]	4
}]	--- TIMING end			
OBR	Observation Request	R	[1..1]	4
}	--- ORDER end			
}	--- CONTAINER end			
}	--- SPECIMEN end			
]	--- PATIENT end			
]	--- RESPONSE end			

865 MSH-9 - Message Type (MSG) shall have its three components respectively valued to "ORL", "O36" and "ORL_O36".

The RESPONSE segment group is mandatory unless in case of error (MSA-1 = AE or AR). This segment group carries the response of the Order Filler in the segments ORC and OBR.

The mandatory ORC and OBR segments in the repeatable ORDER segment group provide the
870 response of the Order Filler for each order, in particular the ORC-1 Order Control field.

3.1.5.9 Specific Segments Description for Transaction LAB-1

3.1.5.9.1OBR - Observation Request Segment

HL7 v2.5: chapter 4 (4.5.3)

875   **Table 3.1.5.9-1: OBR - Observation Request Segment**

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
2	22	EI	R	[1..1]		00216	Placer Order Number
3	22	EI	RE	[0..1]		00217	Filler Order Number
4	250	CE	R	[1..1]		00238	Universal Service Identifier
5	2	ID	X	[0..0]		00239	Priority – OBR
6	26	TS	X	[0..0]		00240	Requested Date/Time
7	26	TS	C	[0..1]		00241	Observation Date/Time #
8	26	TS	X	[0..0]		00242	Observation End Date/Time #
9	20	CQ	X	[0..0]		00243	Collection Volume *
10	250	XCN	RE	[0..*]		00244	Collector Identifier *
11	1	ID	RE	[0..1]	0065	00245	Specimen Action Code *
12	250	CE	X	[0..0]		00246	Danger Code
13	300	ST	X	[0..0]		00247	Relevant Clinical Information
14	26	TS	X	[0..0]		00248	Specimen Received Date/Time *
15	300	SPS	X	[0..0]		00249	Specimen Source
16	250	XCN	R	[1..1]		00226	Ordering Provider
17	250	XTN	RE	[0..2]		00250	Order Callback Phone Number
18	60	ST	X	[0..0]		00251	Placer Field 1
19	60	ST	X	[0..0]		00252	Placer Field 2
20	60	ST	X	[0..0]		00253	Filler Field 1 +
21	60	ST	X	[0..0]		00254	Filler Field 2 +
22	26	TS	X	[0..0]		00255	Results Rpt/Status Chng - Date/Time +
23	40	MOC	X	[0..0]		00256	Charge to Practice +
24	10	ID	C	[0..1]	0074	00257	Diagnostic Serv Sect ID
25	1	ID	C	[0..1]	0123	00258	Result Status +
26	400	PRL	X	[0..0]		00259	Parent Result +
27	200	TQ	X	[0..0]		00221	Quantity/Timing
28	250	XCN	RE	[0..*]		00260	Result Copies To
29	200	EIP	X	[0..0]		00261	Parent
30	20	ID	X	[0..0]	0124	00262	Transportation Mode
37	4	NM	X	[0..1]		01028	Number of Sample Containers *
40	250	CE	X	[0..0]		01031	Transport Arrangement Responsibility

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SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
41	30	ID	X	[0..0]	0224	01032	Transport Arranged
42	1	ID	X	[0..0]	0225	01033	Escort Required
43	250	CE	X	[0..0]		01034	Planned Patient Transport Comment
48	250	CWE	X	[0..0]	0476	01646	Medically Necessary Duplicate Procedure Reason.

OBR-2 Placer Order Number (EI), required in transaction LAB-1.

Each ordered battery/test should be assigned to a unique Order, identified by a unique Placer Order Number. The same identifier will never be used twice by the Order Placer. The Placer Order Number is generated by the Order Placer Actor and should be unique across all OBR segments across all messages. Please refer to Section 2.4.6.1 for the details of the data type.

OBR-3 Filler Order Number (EI), required if available.

Each Order should be assigned a unique Filler Order Number by the Order Filler Actor. The same identifier will never be used twice by the Order Filler. The filler order number generated by the Order Filler should be unique across all OBR segments across all messages. Please refer to Section 2.4.6.1 for the details of the data type.

OBR-4 Universal Service Identifier (CE), required.

This field contains one ordered battery or test. A battery is composed of one or more tests or batteries.

Additionally, when the "Report Facsimile For Order Group" Option is activated, when placing an Order Group, the Order Placer MAY request this service in an extra (ORC/OBR) segment group. In that case this requested service SHALL be identified in this field using either the LOINC code: `11502-2^ LABORATORY REPORT.TOTAL^LN` or one of the LOINC codes for laboratory specialties listed in LAB TF-3: Table 2.3.4.1.1-1. For instance, the request for a microbiology report facsimile shall populate OBR-4 with: `18725-2^ MICROBIOLOGY STUDIES^LN`

OBR-5 Priority and OBR-6 Requested Date/Time are not supported. See TQ1 segment.

Condition predicate for OBR-7: this field is a copy of SPM-17.1. The information is provided when the placer of the order knows the time of the specimen collection.

OBR-8, OBR-12, OBR-14, OBR-15 are not supported. See SPM segment that supersedes them.

OBR-10   Collector Identifier, required if available.

This repeatable field contains the specimen collectors' identification.

OBR-11   Specimen Action Code   (ID), required if available.

The value of this field is dependent on the use case as described in Volume 1.

The field identifies the action to be taken with respect to the specimens that accompany or
precede this order. The purpose of this field is to further qualify (when appropriate) the general
action indicated by the order control code contained in the accompanying ORC segment.

HL7 Table 0065 - Specimen Action Code gives the valid values:

HL7 Table 0065 - Specimen Action Code

Value	Description	Comment
A	Add ordered tests to the existing specimen	
G	Generated order; reflex order	
L	Lab to obtain specimen from patient	
O	Specimen obtained by service other than Lab	
P	Pending specimen; Order sent prior to delivery	
R	Revised order	
S	Schedule the tests specified below	

OBR-13   Relevant Clinical information (ST), not supported.

Transaction LAB-1 uses OBX segment to carry relevant clinical information, or a NTE segment
below the OBR for more comment orientated information.

OBR-16   Ordering Provider (XCN), required.

OBR-17 Order Callback Phone Number (XTN), required if available.

HL7 definition: This field contains the telephone number for reporting a status or a result using
the standard format with extension and/or beeper number when applicable.

One or two phone numbers.

OBR-22 Results Rpt/Status Chng - Date/Time (TS), not used in LAB-1: OBR-22 is related to the
RESULT, not to the ORDER. OBR-22 is related to OBR-25. ORC-9 contains the date/time of
the latest status change of the ORDER.

OBR-24 Diagnostic Serv Sect ID (ID), conditional

Condition predicate: This field may be valued in OML messages sent by the Order Filler. In
other words this field is RE for the Order Filler Actor. The valid values are defined in HL7 Table
0074 - Diagnostic Service Section ID. The table below presents a subset of these valid values as
identified in Volume 1.

HL7 Table 0074 - Diagnostic Service Section ID (subset)

Value	Description	Addressed by Laboratory TF 2003 - 2004
BG	Blood Gases	Yes

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Value	Description	Addressed by Laboratory TF 2003 - 2004
CH	Chemistry	Yes
CP	Cytopathology	
HM	Hematology	Yes
IMM	Immunology	Yes
LAB	Laboratory	Yes
MB	Microbiology	Yes
MCB	Mycobacteriology	Yes
MYC	Mycology	Yes
OSL	Outside Lab	
SR	Serology	Yes
TX	Toxicology	Yes
VR	Virology	Yes

930   OBR-25 Order Result Status (ID), Conditional.

Condition predicate: This field shall not be filled in messages sent by the Order Placer. This field shall be filled in messages sent by the Order Filler, according to HL7 Table 0123 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:

935

HL7 Table 0123 - Result Status

Value	Description	Comment
O	Order received; specimen not yet received	
I	No results available; specimen received, procedure incomplete	
S	No results available; procedure scheduled, but not done	
R	Results stored; not yet verified	
P	Preliminary: A verified early result is available, final results not yet obtained	
F	Final results; results stored and verified. Can only be changed with a corrected result.	
C	Correction to results	
X	No results available. Order canceled	

Note: For the conditions of use of these values, please read Appendix C in Volume 2x: "Correlations of status between ORC, OBR and OBX".

940   OBR-28 Result Copies To (XCN), required if available.

HL7 Definition: This field identifies the people who are to receive copies of the results. By local convention, either the ID number or the name may be absent.

The Order Placer shall fill this field when it sends a new order for which there are persons or care units declared for receiving a copy of the results.

945

3.2   Filler Order Management (LAB-2)

3.2.1 Scope

This transaction is supporting the general use case "*Filler order with specimens identified by third party or collected by the laboratory*" described in LAB TF-1:4.2.3.

950   This transaction is used by the Order Filler to inform the Order Placer that a new Order, standalone or embedded in an existing Order Group, has been generated on the laboratory side. By this transaction, the Order Filler Actor requests the Order Placer to assign a unique Placer Order Number to this new Order. The Order contains a battery or a test to be performed by the laboratory, using biological specimens collected from the subject.

955   ### 3.2.2 Use Case Roles
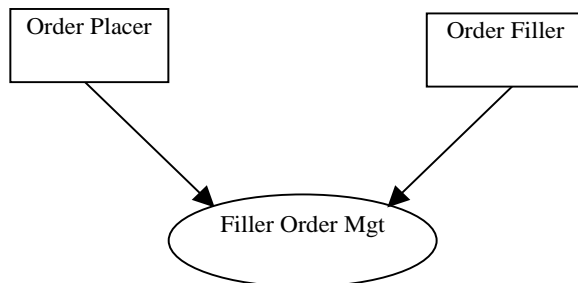
Actor: Order Placer

Roles: Receives filler orders. Notifies the Order Filler of acceptance or refusal. Notifies the
960   Order Filler of the placer order number if the filler order was accepted.

Actor: Order Filler

Roles: Notifies filler orders to the Order Placer. Receives acceptance or rejection from the Order Placer. Receives the Placer Order Number from the Order Placer if the Order was accepted.

3.2.3 Referenced Standards

965   HL7 version 2.5:

- Chapter 2: "Control" --> generic segments and data types

- Chapter 3: "ADT" --> PID and PV1 segments

- Chapter 4: "Order Entry" --> OML and ORL messages

- Chapter 7: "Observation Reporting" --> SPM segment

970   - Chapter 13: "Clinical Laboratory Automation" --> SAC segment

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3.2.4 Interaction Diagrams

Trigger events: In all interactions below, the initiator chooses the best OML message structure appropriate to its orders. The responder SHALL respond with the related ORL message structure:

975   OML^O21 → ORL^O22
OML^O33 → ORL^O34
OML^O35 → ORL^O36

An OML message shall be responded to with exactly 1 ORL message.

ORL messages SHALL be created by the Order Placer application, and not by a message broker.
980   The message broker (an intermediary between the Order Filler and the Order Placer) has no knowledge of the tests being requested and can't assign identification numbers on behalf of the Order Placer.

3.2.4.1 Process of a Filler Order

The figure below shows the flow of messages in the normal process of a filler order. A Filler
985   Order is placed, and responded to by either a rejection or acceptance.

Note that the creation of a filler order may be triggered by a prior placer order, e.g., if the results of one of the previously ordered tests triggers the laboratory to perform additional tests. The creation of a filler order could also happen during the quality control performed by the laboratory on a new order received from the Order Placer: the laboratory may then decide that some extra
990   battery that was not ordered should be added, e.g., regarding the pathology context.
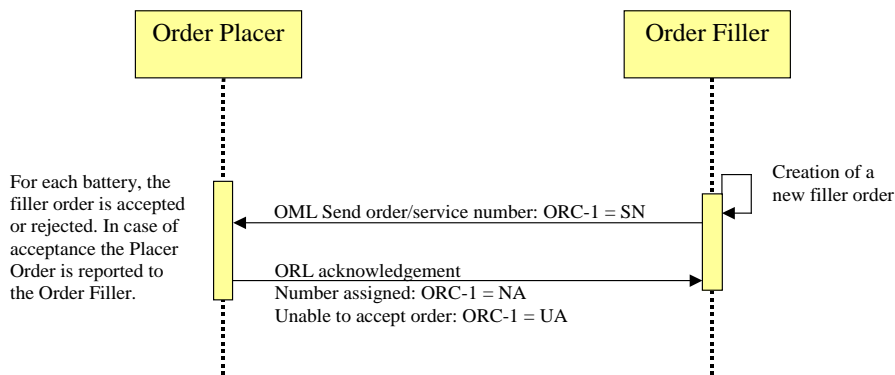
Figure 3.2.4.1-1: Process of a filler order

995   ### 3.2.5 Messages Static Definitions

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43

3.2.5.1 Restrictions on OML Messages for Transaction LAB-2

Transaction LAB-2 allows all message types used by transaction LAB-1. See paragraph 4.5.1 for a detailed description.

The following restriction is made for transaction LAB-2: Timing/quantity is limited to one
1000   instance per order (i.e., there is one iteration of the TQ1 segment related to an OBR). The main reason for this choice is that collecting the specimens is not delegated to a separate actor in this cycle of the IHE Laboratory Technical Framework. The collection process is part of either the Order Placer or the Order Filler. See the explanation given in LAB-1 section.

3.2.5.2 OML and ORL Messages Static Definitions

1005   The static definitions of the messages in LAB-2 are equal to the static definition for LAB-1. See paragraph 4.5.3 up to paragraph 4.5.8 for details.

3.2.5.3 Specific Segments Description for Transaction LAB-2

3.2.5.3.1 OBR - Observation Request Segment

HL7 v2.5: chapter 4 (4.5.3)

1010

Table 3.2.5.3-1: OBR - Observation Request Segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
2	22	EI	C	[0..1]		00216	Placer Order Number
3	22	EI	R	[1..1]		00217	Filler Order Number
4	250	CE	R	[1..1]		00238	Universal Service Identifier
5	2	ID	X	[0..0]		00239	Priority – OBR
6	26	TS	X	[0..0]		00240	Requested Date/Time
7	26	TS	C	[0..1]		00241	Observation Date/Time #
8	26	TS	X	[0..0]		00242	Observation End Date/Time #
9	20	CQ	X	[0..0]		00243	Collection Volume *
10	250	XCN	RE	[0..*]		00244	Collector Identifier *
11	1	ID	RE	[0..1]	0065	00245	Specimen Action Code *
12	250	CE	X	[0..0]		00246	Danger Code
13	300	ST	X	[0..0]		00247	Relevant Clinical Information
14	26	TS	X	[0..0]		00248	Specimen Received Date/Time *
15	300	SPS	X	[0..0]		00249	Specimen Source
16	250	XCN	RE	[0..1]		00226	Ordering Provider
17	250	XTN	RE	[0..2]		00250	Order Callback Phone Number
18	60	ST	X	[0..0]		00251	Placer Field 1
19	60	ST	X	[0..0]		00252	Placer Field 2
20	60	ST	X	[0..0]		00253	Filler Field 1 +

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SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
21	60	ST	X	[0..0]		00254	Filler Field 2 +
22	26	TS	X	[0..0]		00255	Results Rpt/Status Chng - Date/Time +
23	40	MOC	X	[0..0]		00256	Charge to Practice +
24	10	ID	RE	[0..1]	0074	00257	Diagnostic Serv Sect ID
25	1	ID	X	[0..0]	0123	00258	Result Status +
26	400	PRL	X	[0..0]		00259	Parent Result +
27	200	TQ	X	[0..0]		00221	Quantity/Timing
28	250	XCN	RE	[0..*]		00260	Result Copies To
29	200	EIP	X	[0..0]		00261	Parent
30	20	ID	X	[0..0]	0124	00262	Transportation Mode
37	4	NM	X	[0..1]		01028	Number of Sample Containers *
40	250	CE	X	[0..0]		01031	Transport Arrangement Responsibility
41	30	ID	X	[0..0]	0224	01032	Transport Arranged
42	1	ID	X	[0..0]	0225	01033	Escort Required
43	250	CE	X	[0..0]		01034	Planned Patient Transport Comment
48	250	CWE	X	[0..0]	0476	01646	Medically Necessary Duplicate Procedure Reason.

OBR-2 Placer Order Number (EI), conditional.

Condition predicate: Used only in the ORL message sent back by the Order Placer to acknowledge an accepted filler order. In that case ORC-1 = "NA" (number assigned). Not used in OML messages of LAB-2.

OBR-3 Filler Order Number (EI), required.

Note that all batteries/tests contained in the filler order should be assigned a unique identifier. The same identifier will never be used twice. The filler order number should be unique across all OBR segments across all messages ever sent by the order filler. Please refer to Section 2.4.6.1 for the details of the data type.

OBR-4 Universal Service Identifier (CE), required

This field contains one ordered battery or test. A battery is composed of one or more tests or one or more batteries.

OBR-5 Priority and OBR-6 Requested Date/Time

These two fields are not supported. See TQ1 segment.

Condition predicate for OBR-7: this field is a copy of SPM-17.1. The information is provided when the placer of the order knows the time of the specimen collection.

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OBR-8, OBR-12, OBR-14, OBR-15 These fields are not supported. See SPM segment for fields
1030   that supersedes them.

OBR-10   Collector Identifier, required if available.

This repeatable field contains the specimen collectors' identification.

OBR-11   Specimen Action Code   (ID), required if available.

The value of this field is dependent on the use case as described in volume 1.

1035   The field identifies the action to be taken with respect to the specimens that accompany or
precede this order. The purpose of this field is to further qualify (when appropriate) the general
action indicated by the order control code contained in the accompanying ORC segment.

HL7 Table 0065 - Specimen Action Code gives the valid values:

HL7 Table 0065 - Specimen Action Code

Value	Description	Comment
G	Generated order; filler order	

1040

OBR-13   Relevant Clinical information (ST), not supported.

Instead of OBR-13, transaction LAB-2 uses OBX segment to carry relevant clinical information,
or a NTE segment below the OBR for more comment orientated information.

OBR-16   Ordering Provider (XCN), required if available.

1045   OBR-17 Order Callback Phone Number (XTN), required if available. One or two phone
numbers.

OBR-24 Diagnostic Serv Sect ID (ID), required if available.

The valid values are defined in HL7 Table 0074 - Diagnostic Service Section ID. The table
below presents a subset of these valid values as identified in volume 1.

1050

HL7 Table 0074 - Diagnostic Service Section ID (subset)

Value	Description	Addressed by Laboratory TF 2003 - 2004
BG	Blood Gases	Yes
CH	Chemistry	Yes
CP	Cytopathology	
HM	Hematology	Yes
IMM	Immunology	Yes
LAB	Laboratory	Yes
MB	Microbiology	Yes
MCB	Mycobacteriology	Yes

MYC	Mycology	Yes
OSL	Outside Lab	
SR	Serology	Yes
TX	Toxicology	Yes
VR	Virology	Yes

OBR-28 Result Copies To (XCN), required if available.

HL7 Definition: This field identifies the persons who are to receive copies of the results. By local convention, either the ID number or the name may be absent.

1055

If there are known individuals or care units that should receive a copy of results related to this order, they should be listed here.

3.3 Order Results Management (LAB-3)

1060 **3.3.1 Scope**

This transaction notifies the Order Result Tracker of requested tests upon creation of an order or reception of a specimen in the laboratory. It transmits the observation results from the Order Filler to the Order Result Tracker, when a result is acquired, clinically validated, modified or deleted at the Order Filler level. Another goal of this transaction is to provide the Order Result 1065 Tracker with the complete sorted set of results related to an Order Group or to an Order. The Order Result Tracker shall store these results in the sorting order given by the Order Filler. In addition, if the "Report Facsimile For Order Group" Option is activated, this transaction MAY provide in the results messages related to an Order Group a PDF report built by the OF presenting the releasable results of this Order Group.

1070 In order to maintain consistency between order and result messages, the result messages of transaction T3 should refer to primary specimen even in the case where some of the observations are performed on secondary samples that are derived from primary specimen after specific preparation.

3.3.2 Use Case Roles
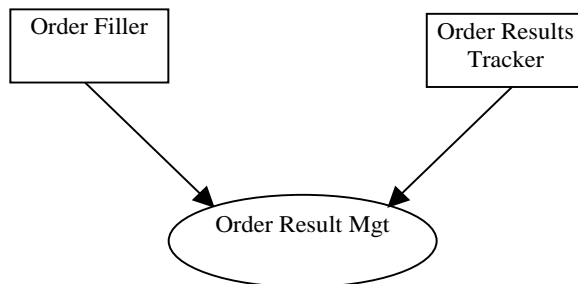
1075

Actor: Order Filler

Roles: Provides notification to the Order Result Tracker for specimen arrival, acquisition of technically validated results, clinical validation of results, modification/cancellation of results and deletion of tests. Provides the complete sorted set of results related to an Order Group or to 1080 an Order.

In case the "Report Facsimile For Order Group" Option is in use, upon request from the OP the OF complements its results messages related to an Order Group and carrying some clinically validated results, with a link to the PDF report recapitulating the set of clinically validated results completed for this Order Group.

1085 **Actor**: Order Result Tracker

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Roles: Receives test order and results from the Order Filler, gives access to this order and results to the healthcare enterprise, respects the sorting order of the results as received from the Order Filler. In case the "Report Facsimile For Order Group" Option is in use, when receiving a result message related to an Order Group providing a link to the PDF report, the ORT imports this PDF file immediately, and integrates it with the set of results received.

3.3.3 Referenced Standards

HL7 version 2.5:

- Chapter 2: "Control" --> generic segments and data types

- Chapter 3: "Patient Administration" --> PID and PV1 segments

- Chapter 4: "Order Entry" --> OBR segment

- Chapter 7: "Observation Reporting" --> OUL and ORU message structures

3.3.4 Interaction Diagrams

3.3.4.1 Normal Process for Management of Results of a Filler Order

The figures below show the flow of messages that occurs during normal process of a filler order, from the reception of specimen or entry of the order in the laboratory, up to the completion of this order and visualization of results by an end user on the Order Result Tracker. For each triggering event of an OUL or ORU message, the value of the result status of the OBR (OBR-25) is indicated.
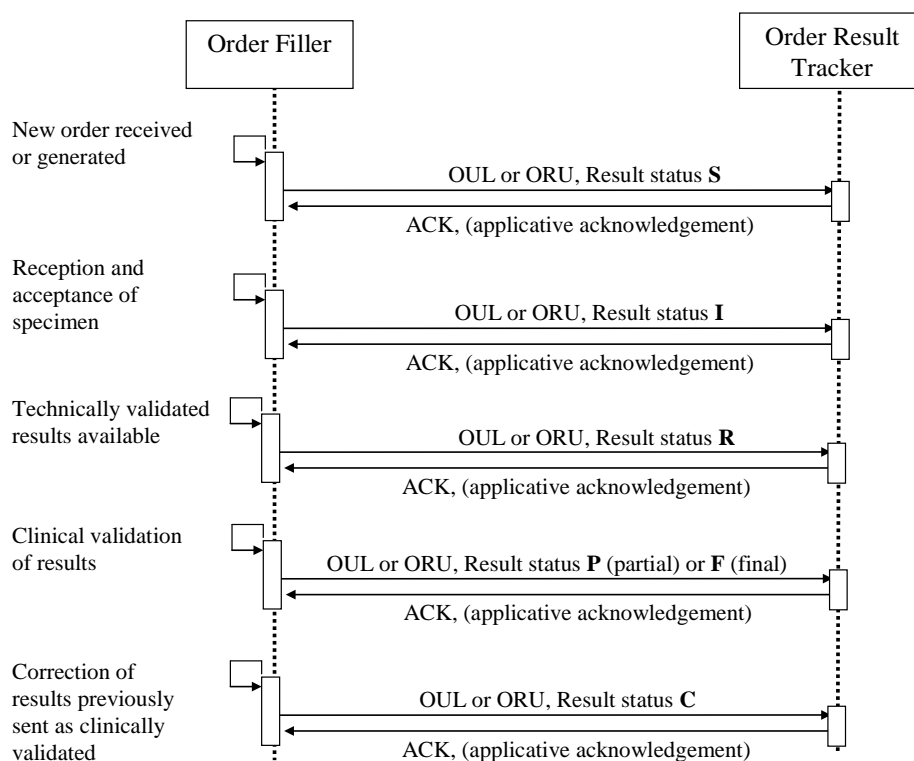
1105

Figure 3.3.4.1-1: Normal process for management of results of a filler order

The first interaction appearing in this diagram is triggered by the accession of the Order or of the Order Group by the Order Filler application. The Order Result Status (OBR-25) is valued:

- "S" (Scheduled) if the specimen is not received or collected yet.

1110 - "I" if the specimen is available in lab.

In this first message, the date/time of transaction for the Order (ORC-9) is a good approximation of the date/time of accession of the Order by the Order Filler application. For an Order Group identified by ORC-4 and comprising several orders, the minimum value of all ORC-9 in the corresponding ORC segments is the approximation of the date/time of accession of the Order
1115 Group by the Order Filler application.

The decision whether to deliver or not technically validated results (using OBR-25 "Result Status" "R") to the Order Result Tracker is driven by organization rules specific to each healthcare enterprise. These rules may take account of the order priority (TQ1-9), the ordering provider, the particular ordered battery, the executing laboratory, the observation result itself…
1120 The IHE Laboratory Technical Framework does not make any assertion on these rules. It only states that an Order Filler MUST be able to send all the result statuses mentioned in the above

diagram, and doing so, MUST conform to the correlation diagrams and transition diagrams presented in Appendix C of Volume 2x.

The same remark applies to the sending of partial clinically validated results (using OBR-25
1125 "Result Status" "P").

3.3.4.2 Deletion of Battery/Test in a Filler Order

At any time during the process, an ordered test/battery of the order can be deleted from the filler order by the laboratory, which should trigger a message to the Order Result Tracker, with OBR-25 "Result Status" set to "X" for this particular Order, as shown below.

1130
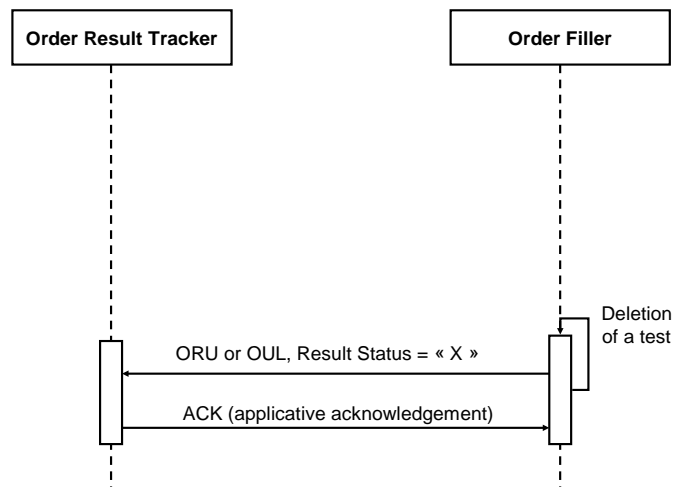
Figure 3.3.4.2-1: Deletion of a test by the Order Filler

3.3.4.3 Summary of Events Triggering LAB-3 Messages

The following events detected by the Order Filler application (LIS) will trigger the sending of an
1135 OUL or of an ORU message to the Order Result Tracker:

- Entry of an Order at the laboratory level for an already collected specimen

- Reception and acceptance of a specimen for an existing Order

- Acquisition of some technically validated results, in the context where transmission of such results is expected by the ward staff.

1140
- Clinical validation of results

- Correction of results previously transmitted

- Cancellation of results previously transmitted

- Deletion of tests

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3.3.5 Messages Static Definitions

1145 Transaction LAB-3 offers two message profiles:

- The OUL^R22 message is designed for Specimen centered result reporting.

- The ORU^R01 message is designed for Order centered result reporting.

In both message structures the order in which the OBX segments appear defines the sorting order for the presentation of the results for a given battery or specimen. In this respect, the Order Filler

1150 shall transmit all available results for the battery or specimen in recapitulative mode no matter whether they have already been transmitted or not.

An Order Filler chooses whichever message profile to use depending upon its own business rules. The Order Filler is not mandated to be able to use both message profiles.

An Order Result Tracker must be able to receive both message structures.

1155 The OUL^R24 message profile designed for multi-specimen batteries was usable in release 1 of the Laboratory Technical Framework. However, the HL7 OUL^R24 message structure is ambiguous in that it gives no clue to the receiver to distinguish between the results (OBX) related to the order and the observations (OBX) related to the last specimen of that order. Therefore, as of its release 2, this Laboratory Technical Framework deprecates OUL^R24

1160 message profile, kept for backward compatibility only, and viewable in:
ftp://ftp.ihe.net/Laboratory/Tech_Framework/V2/ihe_lab_TF_2.0_Vol1_FT_2006-12-04.doc

3.3.5.1 OUL^R22 Static Definition

Table 3.3.5.1-1: OUL^R22 static definition

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	RE	[0..1]	
PID	Patient Identification	R	[1..1]	3
[	--- VISIT begin	RE	[0..1]	
PV1	Patient Visit	R	[1..1]	3
]	--- VISIT end			
]	--- PATIENT end			
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
[{OBX}]	Observation related to specimen	O	[0..*]	
[{SAC}]	Container information	O	[0..*]	13
{	--- ORDER begin	R	[1..*]	
OBR	Observation Request	R	[1..*]	4
ORC	Common Order (for one specimen)	R	[1..1]	4

Segment	Meaning	Usage	Card.	HL7 chapter
[{NTE}]	Comments on the order	O	[0..*]	2
[	--- TIMING begin	RE	[0..1]	
TQ1	Timing Quantity	R	[1..1]	4
]	--- TIMING end			
[{	--- RESULT begin	O	[0..*]	
OBX	Observation related to OBR	R	[1..*]	7
[{NTE}]	Comment of the result	C	[0..*]	2
}]	--- RESULT end			
}	--- ORDER end			
}	--- SPECIMEN end			

1165

Field MSH-9 – Message Type shall have its three components valued as follows:
OUL^R22^OUL_R22

For specimen oriented observation message, additional parameters that are related to the
specimen (e.g., Anatomic origin, Collection procedure) should be transmitted in OBX segments
1170   that immediately follow the SPM segment.

For each set of observations (e.g., Microscopy; Culture; Antibiotic Susceptibility) the Order
Filler should generate an OBR segment that identifies the Observation followed by a series of
OBX segments, each of them carrying the result of an individual test/observation.

Following the SPM segment, the Order Filler should systematically transmit in the OUL
1175   message, all OBR and OBX segments related to this SPM. This systematic transmission of all
observations linked to an SPM segment and their respective status may help the Order Result
Tracker to recover from an error situation, when for some hazardous reasons a previous OUL
message for the same request could not have been properly processed. For the same reason the
"U" value should not be used in the Observation Result Status field of an OBX segment (see
1180   description of this segment in appendix C of Volume 2x.

In case an observation previously transmitted is deleted, the Order Filler should transmit all OBX
segments linked to the OBR to which the deleted observation relates to; and it should indicate the
current status of each OBX segment. The Observation Result Status field of the OBX that
correspond to the deleted observation should be valued with a "D".

1185   Unless the Report Status field (OBR-25) of the OBR is valued with an "X" (deleted battery), the
OBR segment shall always be followed by one or several OBX segments.

TQ1 and ORC segments shall be transmitted because they contain important information such as
the priority of the order and the order group number.

3.3.5.2 ORU^R01 Static Definition

1190

Table 3.3.5.2-1: ORU^R01 static definition

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
{	--- PATIENT_RESULT begin	R	[1..1]	
[	--- PATIENT begin	RE	[0..1]	
PID	Patient Identification	R	[1..1]	3
[	--- PATIENT_VISIT begin	RE	[0..1]	
PV1	Patient Visit	R	[1..1]	3
]	--- PATIENT_VISIT end			
]	--- PATIENT end			
{	--- ORDER_OBSERVATION begin	R	[1..*]	
ORC	Common Order (for one battery)	R	[1..1]	4
OBR	Observation Request	R	[1..1]	4
[{NTE}]	Comments on the order	O	[0..*]	2
[{	--- TIMING begin	RE	[0..1]	
[{TQ1}]	Timing Quantity	R	[1..1]	4
}]	--- TIMING end			
[{	--- OBSERVATION begin	C	[0..*]	
OBX	Observation related to OBR	R	[1..1]	7
[{NTE}]	Comment of the result	RE	[0..*]	2
}]	--- OBSERVATION end			
[{	--- SPECIMEN begin	RE	[0..*]	
SPM	Specimen	R	[1..1]	7
[{OBX}]	Observation related to specimen	O	[0..*]	
}]	--- SPECIMEN end			
}	--- ORDER_OBSERVATON end			
}	--- PATIENT_RESULT end			

Field MSH-9 – Message Type shall have its three components valued as follows:
ORU^R01^ORU_R01

1195   Condition predicate for the OBSERVATION segment group: This group is present (one or more occurrence) only when OBR-25 from the preceding OBR segment is not in { "X", "O", "I", "S"}.

The observations and notes produced to fulfill an order are reported as OBX and NTE segments in the OBSERVATION segment group following the ORC/OBR pair representing this order.

1200   Each specimen used by this order is described as a SPM segment in an instance of the SPECIMEN segment group following the results of the order. Pre-analytical observations

qualifying the usability or characteristics (e.g., volume, collection duration, defect …) of the specimen may be reported in OBX attached to the SPM segment.

1205   Following the ORC/OBR, the Order Filler should systematically transmit in the message, all OBX and SPM segments related to this ORC/OBR. This systematic transmission of all observations linked to an OBR and their respective status may help the Order Result Tracker to recover from error situations.

For the same reason the "U" value should not be used in the Observation Result Status field of an OBX segment (see description of this segment in Chapter 3.11 earlier in this document).

1210   In case an observation previously transmitted is deleted, the Order Filler should transmit all OBX segments linked to the OBR to which the deleted observation relates to; and it should indicate the current status of each OBX segment. The Observation Result Status field of the OBX that correspond to the deleted observation should be valued with a "D".

Unless the Report Status field (OBR-25) of the OBR is valued with an "X" (deleted battery), the
1215   OBR segment shall always be followed by one or several SPM and OBX segments.

TQ1 and ORC segments shall be transmitted because they contain important information such as the priority of the order and the Order Group Number.

3.3.5.3 OBR Segment

This section describes the OBR segment usage in ORU and OUL messages described above.

1220   The OUL/ORU message corresponding to an Order Group should contain as many OBR segments as Orders involved by the triggering event of the message. For example, upon reception of a specimen in the laboratory, the Order Filler application (the LIS) will generate a message that contains as many OBR segments as batteries or tests requested for this specimen. The modification of a result of an observation will trigger an OUL message that contains the
1225   OBR segment describing the related Order.

Table 3.3.5.3-1: OBR segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
2	22	EI	RE	[0..1]		00216	Placer Order Number
3	22	EI	R	[1..1]		00217	Filler Order Number
4	250	CE	R	[1..1]		00238	Universal Service Identifier
5	2	ID	X	[0..0]		00239	Priority – OBR
6	26	TS	X	[0..0]		00240	Requested Date/Time
7	26	TS	C	[0..1]		00241	Observation Date/Time
8	26	TS	X	[0..0]		00242	Observation End Date/Time
9	20	CQ	X	[0..0]		00243	Collection Volume
10	250	XCN	RE	[0..1]		00244	Collector Identifier
11	1	ID	RE	[0..1]	0065	00245	Specimen Action Code

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
12	250	CE	X	[0..0]		00246	Danger Code
13	300	ST	X	[0..0]		00247	Relevant Clinical Information
14	26	TS	X	[0..0]		00248	Specimen Received Date/Time
15	300	SPS	X	[0..0]		00249	Specimen Source or Segment SPM
16	250	XCN	RE	[0..1]		00226	Ordering Provider
17	250	XTN	X	[0..0]		00250	Order Callback Phone Number
18	60	ST	X	[0..0]		00251	Placer Field 1
19	60	ST	X	[0..0]		00252	Placer Field 2
20	60	ST	X	[0..0]		00253	Filler Field 1
21	60	ST	X	[0..0]		00254	Filler Field 2
22	26	TS	X	[0..0]		00255	Results Rpt/Status Chng – Date/Time
23	40	MOC	X	[0..0]		00256	Charge to Practice
24	10	ID	RE	[0..1]	0074	00257	Diagnostic Serv Sect ID
25	1	ID	R	[1..1]	0123	00258	Order Result Status
26	400	PRL	C	[0..1]		00259	Parent Result
27	200	TQ	X	[0..0]		00221	Quantity/Timing
28	250	XCN	RE	[0..*]		00260	Result Copies To
29	200	EIP	C	[0..1]		00261	Parent
30	20	ID	X	[0..0]	0124	00262	Transportation Mode
31	250	CE	X	[0..0]		00263	Reason for Study
32	200	NDL	C	[0..1]		00264	Principal Result Interpreter
33	200	NDL	X	[0..0]		00265	Assistant Result Interpreter
34	200	NDL	X	[0..0]		00266	Technician
35	200	NDL	O	[0..1]		00267	Transcriptionist +
36	26	TS	O	[0..1]		00268	Scheduled Date/Time +
37	4	NM	X	[0..0]		01028	Number of Sample Containers *
38	250	CE	X	[0..0]		01029	Transport Logistics of Collected Sample
39	250	CE	X	[0..0]		01030	Collector's Comment *
40	250	CE	X	[0..0]		01031	Transport Arrangement Responsibility
41	30	ID	X	[0..0]	0224	01032	Transport Arranged
42	1	ID	X	[0..0]	0225	01033	Escort Required
43	250	CE	X	[0..0]		01034	Planned Patient Transport Comment
44	250	CE	X	[0..0]	0088	00393	Procedure Code
45	250	CE	X	[0..0]	0340	01316	Procedure Code Modifier
46	250	CE	X	[0..0]	0411	01474	Placer Supplemental Service Information

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SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
47	250	CE	X	[0..0]	0411	01475	Filler Supplemental Service Information
48	250	CWE	X	[0..0]	0476	01646	Medically Necessary Duplicate Procedure Reason.
49	2	IS	X	[0..0]	N	01647	Result Handling

OBR-2 Placer Order Number (EI), required if available

1230   This field is required if the value is known to the sender. See Section 2.4.6.1 for the details of the data type. In case of a Filler Order, the value of this field will be known to the sender after transaction LAB-2 Filler Order Management (Section 3.2.4.1) has taken place.

OBR-3 Filler Order Number (EI), required

This field is required. It allows the Order Result Tracker to link all the Tests/results of a
1235   request together. It also identifies the order at the Order Filler level. Please refer to Section 2.4.6.1 for the details of the data type.

OBR-4 Universal Service Identifier (CE), required

The first three sub-fields "Identifier", "Text" and "Name of Coding System" are required.

The second sub-field "Text" allows the Order Result Tracker to manage the results without
1240   the help of Battery Master File.

The last three sub-fields are optional.

OBR-7 Observation Date/Time (TS), conditional

Condition predicate: If the order is related to one single specimen, then OBR-7 SHALL be populated with the content of SPM-17.1, which represents the physiologically relevant date-
1245   time (i.e., the time the specimen was collected from the patient). In all other situations this field OBR-7 SHALL be populated with a null value: ""

OBR-9 Collection Volume (CQ)

Since when it is needed by the laboratory and reported, the volume of collection is the result of an observation (sometimes done by the Order Placer) that can be used for calculation of
1250   other results (e.g., Creatinine Clearance); this information should be transferred in an OBX segment as all other results of observation. This field OBR-9 should consequently not be used in this transaction.

OBR-10 Collector Identifier (XCN)

This field identifies the person, department or facility that collected the specimen(s).

1255   OBR-11 Specimen Action Code (ID)

This field is only required in the following events:

- The order is entered at the Order Filler (LIS) level as described in LAB TF-1:4.2.3. The value of the Action Code is A in this case.

1260
- The battery or test has been added by the Order Filler (LIS) for confirmation of a diagnostic (reflex testing); value G in this case.

In all other triggering events of this transaction, this Action Code field is meaningless.

OBR-12 Danger Code (CE)

This field should not be used in this first version of Laboratory Technical Framework.

OBR-13 Relevant Clinical Information (ST)

1265 Since it is stated in the HL7 V2.5 Chapter 7 that "for some orders this information may be sent on a more structured form as a series of OBX segments (see HL7 V2.5 Chapter 7) that immediately follow the order segment", it is preferable and more consistent to systematically use OBX segments in OUL message for sending Clinical Information.

OBR-14 Specimen Received Date/Time (TS)

1270 This field should not be used; this information should be transmitted in an SPM segment.

OBR-15 Specimen Source (SPS)

As for OBR-13, if this information needs to be transmitted to the Order Result Tracker it is more consistent to transfer it in an OBX segment. This field should not be used.

OBR-16 Ordering Provider (XCN)

1275 This field is required if it was part of the order sent by the Order Placer.

OBR-24 Diagnostic Serv Sect ID (ID)

This field is required if available. In case the Order Result Tracker receives part of the results of an entire order at different time, the Order Result Tracker can use this field for presenting all the batteries/test with the same Diagnostic Serv. Sect. ID together.

1280 OBR-25 Result Status (ID)

This field is required and should be filled according to HL7 Table 0123 described in Chapter 4. Depending on the triggering event of the OUL or ORU message the possible values for this field are:

- Value I is used to indicate reception of specimen(s) at the laboratory. In case a battery or
1285 test requires more than one specimen (e.g., Creatinine clearance) this I status has to be used when all the required specimens have been received. An OBR segment with this I status may be followed by OBX segments that contains result of observations performed at specimen collection time (e.g., Volume of collected specimen).

- Value R, to indicate that some results are available and technically validated but not yet
1290 clinically validated.

- • Value P, to indicate that some of the results, but not all, are available and have been clinically validated. The identity of the Clinical Expert should in this case be indicated in the OBR-32 field.

1295
- • Value F, to indicate that all results are available and have been clinically validated. The identity of the Clinical Expert should in this case be indicated in the OBR-32 field.

- • Value C, to indicate that at least one result contained in one of the following OBX segments has been modified after the results have been transmitted with the F status. This C value should never be used before results have been transmitted with the F status. Since a Corrected result is supposed to be clinically validated, the identity of the Clinical
1300
    Expert should be indicated in the OBR-32 field when the value of the Result Status is C.

- • Value X, to indicate that the battery/test has been deleted. This deletion could have been, either received from the Order Placer for an already received specimen and accepted by the Order Filler, or decided by the laboratory. This value X should not be used if some results for this test have already been transmitted.

1305
- • Value S, although the usage of this value is mainly in response to a Query message. It can be used in OUL messages for tests that have been added to the original request by the Order Filler (LIS). In this case, the value of the OBR-11 field (Action Code) should be either A, or G.

Note: For the conditions of use of these values, please read Volume 2x, Appendix C "Correlations of status between ORC,
1310   OBR and OBX".

OBR-26 Parent Result (PRL), conditional

This field is used to report spawned orders in microbiology. See Section 3.11 for detailed specification of usage.

Condition predicate: Populated if OBR-11 (Specimen Action code) is valued "G".

1315 OBR-28 Result Copies To (XCN)

This field may be used to indicate the list of recipients who will receive a hard copy of the results report, which may be useful information for users who have access to these results.

OBR-29 Parent (EIP), conditional

This field is used to report spawned orders in microbiology. See Section 3.11 for detailed
1320   specification of usage.

Condition predicate: Populated if OBR-11 (Specimen Action code) is valued "G".

OBR-32 Principal Result Interpreter (NDL)

This field is required when the value of the Results Status field (OBR-25) is P, F or C (corrected results are supposed to be verified). The field identifies who validated the results,
1325   where, and when this clinical validation was performed. It describes completely the "Clinical Validation" step.

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OBR-33 Assistant Result Interpreter (NDL)

This field is meaningless when the value of the Result Status field is different from P, F or C.

OBR-34 Technician (NDL)

1330   This field should not be used, as all observations linked to the battery have not necessarily been performed by the same Technician. The OBX-16 (Responsible Observer) should be used instead.

OBR-35 Transcriptionist (NDL)

This field is only applicable when the final report has been dictated and transcribed, which is
1335   frequent for Histology and Cytology reports.

OBR-36 Scheduled - Date/Time (TS)

This field is optional and only applies when the value of the Result Status field (OBR-25) is S.

3.3.5.4 Use of the Option Report Facsimile For Order Group

1340   **3.3.5.4.1 PDF Report Provided By Reference**

When this option is activated, if the Order Placer requested this facsimile report service with an Order Group, then messages OUL^R22 and ORU^R01 carrying clinically validated results related to an Order Group SHALL provide the link to the PDF report recapitulating all clinically validated and reportable results obtained by the sending laboratory for this Order Group.

1345   **3.3.5.4.2 OF Actor Sending Responsibilities Extended for this Option**

If the OP requested the facsimile of the report in an Order Group, when the OF prepares a message containing some clinically validated results for this Order Group, it SHALL construct the PDF report recapitulating all results obtained by the sending laboratory validated and releasable for this Order Group and SHALL include a link to this PDF report in the results
1350   message.

When canceling some results previously transmitted to ORT with a PDF report facsimile, if after this cancellation occurs, no result from the sending laboratory remains releasable for this Order Group, then OF SHALL provide a nullified link in the results message, to request the cancellation without replacement of the report facsimile.

1355   **3.3.5.4.3 ORT Actor Receiving Responsibilities Extended for this Option**

Upon reception of a results message carrying such a link, the ORT Actor SHALL follow the link, retrieve the PDF report immediately, and store it attached to the Order Group and its current set of results, replacing any previous report facsimile for this Order Group with this new one.

Upon reception of a results message carrying a nullified link (meaning the previous report
1360 transmitted for this Order Group is canceled and not replaced), the ORT Actor SHALL mark the
report facsimile as canceled and no longer usable for care purpose.

3.3.5.4.4 Segment Group Dedicated to the Report Facsimile

Message ORU^R01 provides this link in a dedicated ORDER_OBSERVATION segment group,
appearing at the bottom of the message. This last ORDER_OBSERVATION segment group,
1365 which was requested by the Order Placer when the Order Group was placed, is composed of only
3 segments: ORC, OBR, OBX.

Message OUL^R22 provides this link through in a dedicated ORDER segment group appearing
at the end of the last SPECIMEN segment group of the message. This last ORDER segment
group is composed of only 3 segments: OBR, ORC, OBX.

1370 In both message structures the 3 segments introducing the PDF report are populated as follows:

3.3.5.4.5 ORC Segment Introducing the Laboratory Report for the Order Group

This segment is populated with at least these 3 fields:

Field	DT	Element name	Value	comment
ORC-1	ID	Order Control	SC	*A results message is always a **S**tatus **C**hange.*
ORC-4	EI	Placer Group Number	*The Order Group number*	*The identifier assigned by the Order Placer to this Order Group.*
ORC-9	TS	Date/Time of Transaction	*Date time of the triggering event*	*Date/time of this release of the laboratory report produced for this Order Group.*

3.3.5.4.6 OBR Segment Introducing the Laboratory Report for the Order Group

This segment is populated with at least these 4 fields:

Field	DT	Element name	Value	comment
OBR-2	EI	Placer Order Number	As assigned by OP	
OBR-3	EI	Filler Order Number	As assigned by OF	
OBR-4	CE	Universal Service Identifier		
OBR-4.1	ST	Code	(1)	*This code announces the laboratory report*
OBR-4.2	ST	Text	(1)	*The LOINC name of this code*
OBR-4.3	ID	Name of Coding System	LN	*Coding system LOINC*
OBR-25	ID	Result Status	P, F, C, X	*The report is **P**reliminary, **F**inal, **C**orrected (after final) or canceled (**X**). When existing, it contains only verified results (i.e., clinically validated).*

1375 **Notes**

(1): Use either the LOINC code "11502-2" and the corresponding name "LABORATORY
REPORT.TOTA" or one of the LOINC codes for laboratory specialties listed in LAB TF-3:
Table 2.3.4.1.1-1, and the corresponding name.

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3.3.5.4.7 OBX Segment Carrying the Link to the Laboratory Report

1380   This segment is populated with these 6 fields:

Field	DT	Element name	Value	comment
OBX-1	SI	Set ID – OBX	1	
OBX-2	ID	Value Type	RP	*Reference Pointer*
OBX-3		Observation Identifier		
OBX-3.1	ST	Code	(1)	*The observation is the laboratory report itself*
OBX-3.2	ST	Text	(1)	*The LOINC name of this code*
OBX-3.3	ID	Name of Coding System	LN	*Coding system LOINC*
OBX-5	RP	Observation Value		
OBX-5.1	ST	Pointer	*URL of the laboratory report*	*The syntax of the URL SHALL be conformant with RFC 1738 and RFC 1808.*
OBX-5.2	HD	Application ID	*unique ID assigned to the OF application*	
OBX-5.3	ID	Type Of Data	AP	*Other application data. The report is not to be interpreted by a HL7 parser.*
OBX-5.4	ID	Subtype	PDF *or* JPG	*The laboratory report is in pdf or jpeg format*
OBX-11	ID	Observation Result Status	P, F, C, D	*The report is **P**reliminary, **F**inal, **C**orrected , **D**eleted, or cannot be produced (**X**). In the two latter cases (D or X) OBX-5.1 SHALL be nullified (, populated with two double quotes)*
OBX-13	ST	User Defined Access Checks	P *or* empty	*P means this report should be viewed only by privileged users.*

<u>Notes</u>

(1): Use either the LOINC ® code "11502-2" and the corresponding name "LABORATORY REPORT.TOTA" or one of the LOINC codes for laboratory specialties listed in LAB TF-3: Table 2.3.4.1.1-1, and the corresponding name.

1385

3.3.5.4.8 Example of ORDER_OBSERVATION Segment Group in ORU

```
…
ORC|SC|||777^Nephro|||||200805191100
OBR||||11502-2^LABORATORY REPORT.TOTAL^LN||||||||||||||||||||||||F
OBX|1|RP|11502-2^LABORATORY REPORT.TOTAL^LN||file://hserv/lr/lr12345678.pdf||||||F||P
…
ORC|SC|||777^Nephro|||||200805191100
OBR||||11502-2^LABORATORY REPORT.TOTAL^LN||||||||||||||||||||||||F
OBX|1|RP|11502-2^LABORATORY REPORT.TOTAL^LN||file:///C:/lr/lr12345678.pdf||||||F||P
```
1390

1395

3.3.6 Acknowledgement of OUL and ORU Messages

OUL and ORU messages received by the Order Result Tracker shall generate a logical acknowledgement message from the Order Result Tracker to the Order Filler. This General Acknowledgement Message 'ACK' shall be built according to HL7 V2.5 standard.

1400 3.4 Work Order Management (LAB-4)

3.4.1 Scope

This transaction is used if the Order Filler issues a new order to the Automation Manager.

In addition, this transaction is used to cancel and/or modify an order that was previously sent to the Automation Manager.

1405 It is also possible to cancel a previous order and send a new order to modify it.

3.4.2 Use Case Roles
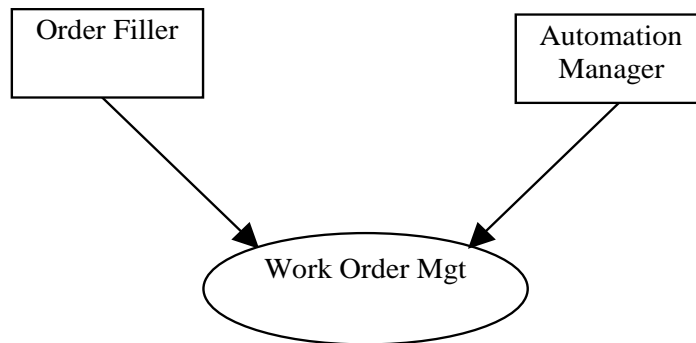
1410 Actor: Order Filler

The role: manages orders and takes care of the routing to the appropriate Automation Manager.

Actor: Automation Manager

The role: receives the orders from the order filler and manages the preprocessing, the analysis, and the post processing of the order.

1415 3.4.3 Referenced Standards

HL7 version 2.5 Chapter 4

3.4.4 Interaction Diagrams

ORL messages SHALL be created by the Automation Manager application, and not by a message broker. The message broker (an intermediary between the Order Filler and the
1420 Automation Manager) has no knowledge of the tests being requested and can't accept/reject these test on behalf of the Automation Manager.

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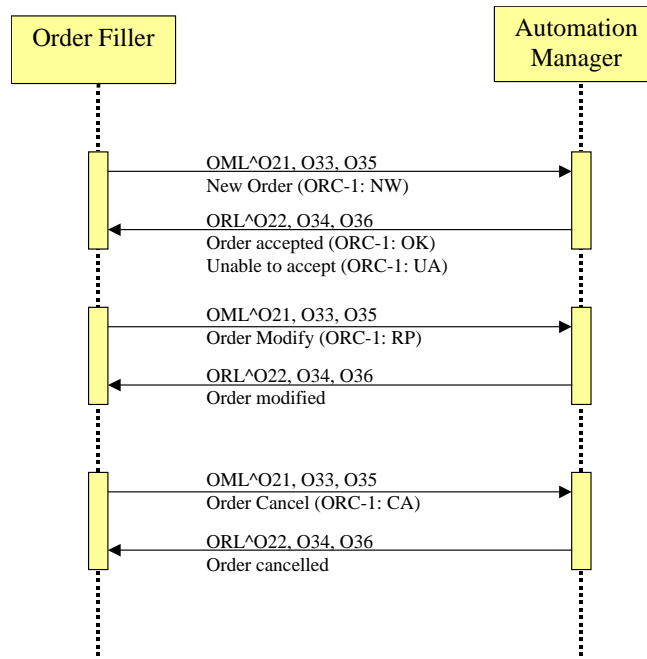
Figure 3.4.4-1: Normal process of ordering to Automation Manager

1425

3.4.5 Messages Static Definitions

3.4.5.1 Laboratory Order Message (OML^O21, ORL^O22)

The following message is used for analytical messages where it is required that the Specimen/Container information is within ORC/OBR segment group.

1430 **3.4.5.1.1 Trigger Events**

OML(O21): Work order sent by the Order Filler.

ORL (O22): Acknowledgement of the Work Order sent by the Automation Manager.

3.4.5.1.2 Message Semantics

Refer to the HL7 standard for the OML message of HL7 2.5 Chapter 4 and the general message
1435 semantics.

In addition, when the Order Filler sends a new work order to the Automation Manager, ORC-1 "Order Control Code" is valued with "NW". When the work order is canceled, ORC-1 is valued with "CA". The correction of the work order uses value "RP".

The OBX segments are used to convey the patient's previous results, as well as some observation
1440 provided by the Order Placer or by the Order Filler, such as: blood pressure, patient's temperature, specimen collection volume… &

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Table 3.4.5.1-1: OML^021 Message

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	O	[0..1]	
PID	Patient Identification	R	[1..1]	3
[PV1]	Patient Visit	RE	[0..1]	3
]	--- PATIENT end			
{	--- ORDER begin	R	[1..*]	
ORC	Common Order (for one battery)	R	[1..1]	4
[{TQ1}]	Timing Quantity	RE	[0..1]	4
[	--- OBSERVATION REQUEST begin	O	[0..1]	
OBR	Observation Request	R	[1..1]	4
[TCD]	Test Code Details	O	[0..1]	13
[{	--- OBSERVATION begin	O	[0..*]	
OBX	Observation Result	R	[1..1]	7
[{NTE}]	Comment of the result	C	[0..*]	2
}]	--- OBSERVATION end			
[{	--- SPECIMEN begin	C	[0..*]	
SPM	Specimen	R	[1..1]	7
[{	--- CONTAINER begin	C	[0..*]	
SAC	Specimen Container	R	[1..1]	13
[{OBX}]	Additional specimen characteristics	O	[0..*]	7
}]	--- CONTAINER end			
}]	--- SPECIMEN end			
[{	--- PRIOR_RESULT begin	O	[0..*]	
PV1	Patient Visit – previous result	R	[1..1]	3
{	--- ORDER_PRIOR begin	R	[1..*]	
[ORC]	Common Order - previous result	R	[1..1]	4
OBR	Order Detail - previous result	R	[1..1]	4
{[NTE]}	Notes and Comments - previous result	O	[0..*]	2
{	--- OBSERVATION_PRIOR begin	R	[1..*]	
OBX	Observation/Result - previous result	R	[1..1]	7
{[NTE]}	Notes and Comments - previous result	O	[0..*]	2

Segment	Meaning	Usage	Card.	HL7 chapter
}	--- OBSERVATION_PRIOR end			
}	--- ORDER_PRIOR end			
] }	--- PRIOR_RESULT end			
]	--- OBSERVATION REQUEST end			
}	--- ORDER end			

1445 The PRIOR RESULT segment group provides the prior results obtained for the same patient. Segment PID is not provided in this segment group because it is the same patient, and the laboratory is not concerned by the fact that this patient might have had a different identification when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory.
1450 The presence of this segment at this point in the message structure announces unambiguously a set of prior orders with related prior observations. The segment PV1 represents the patient visit (or encounter) during which these prior observations were produced. The only field mandatory in the segment PV1 is PV1-2 "Patient Class" (as shown in appendix C of Volume 2x). If the sender of this message does not know the patient class, it SHALL value the field PV1-2 "U", which
1455 stands for "patient class unknown".

The ORC appearing in the PRIOR RESULT segment group is mandatory and SHALL have its first field "Order Control" populated with "PR" (Prior results).

Field MSH-9 – Message Type shall have its three components valued as follows: OML^O21^OML_O21

1460 PV1 is optional in the LAB-4/LAB-5 segments since Automation manager and analytical instruments do not usually need the outpatient information.

The SPECIMEN group is required when the specimen has already been collected and prepared, and is registered in the Order Filler application. In this case, there is at least one SPM segment present in this group. Below each SPM segment, the condition of use of the SAC segment is the
1465 one described in the paragraph describing this segment, Section 3.10.

If neither Automation Manager nor analytical instruments compare the test result with the previous result, ORC, OBR, and OBX for the previous result are not necessary.

The OBX segment in the OBSERVATION group is used for the vital signs if it is necessary for technical validation.

1470 The OBX segment in the CONTAINER group is used when a rerun is ordered.

Table 3.4.5.1-2: ORL^O22 Message

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[{ERR}]	Error	O	[0..*]	2
[	--- RESPONSE begin	X	[0..0]	
[	--- PATIENT begin	O	[0..1]	
PID	Patient Identification	R	[1..1]	3
{	--- ORDER begin	R	[1..*]	
ORC	Common Order	R	[1..*]	4
[{TQ1}]	Timing/Quantity	RE	[0..1]	4
[	--- OBSERVATION REQUEST begin	O	[0..1]	
OBR	Observation Request	R	[1..1]	4
[{	--- SPECIMEN begin	C	[0..*]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Specimen Container Details	C	[0..*]	7
}]	--- SPECIMEN end			
]	--- OBSERVATION end			
}]	--- OBSERVATION REQUEST end			
]	--- ORDER end			
]	--- PATIENT end			
]	--- RESPONSE end			

1475 Field MSH-9 – Message Type shall have its three components valued as follows:
ORL^O22^ORL_O22

This message never carries the RESPONSE segment group. It is therefore limited to the first two
or three segments.

3.4.5.2 Multiple Orders Related to a Single Specimen (OML^O33, ORL^O34)

1480 **3.4.5.2.1 Trigger Events**

OML (O33): Work order sent by the Order Filler.

ORL (O34): Acknowledgement of the Work Order sent by the Automation Manager.

The trigger event for this message is "any status change of a work order". Such changes include
submission of new orders, cancellations, updates, etc., where multiple orders are associated with
1485 a single specimen, which may be carried in multiple containers.

3.4.5.2.2 Message Semantics

Refer to the HL7 standard for the OML message of HL7 2.5 Chapter 4 and the general message semantics.

1490

In addition, when the Order Filler sends a new work order to the Automation Manager, ORC-1 "Order Control Code" is valued with "NW". When the work order is canceled, ORC-1 is valued with "CA". The correction of the work order uses value "RP".

The OBX segments are used to convey the patient's previous results, as well as some observation provided by the Order Placer or by the Order Filler, such as: blood pressure, patient's temperature, specimen collection volume, etc.

1495

Table 3.4.5.2-1: OML^O33

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	O	[0..1]	
PID	Patient Identification	R	[1..1]	3
[PV1]	Patient Visit	RE	[0..1]	3
]	--- PATIENT end			
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Specimen Container	O	[0..*]	
{	--- ORDER begin	R	[1..*]	
ORC	Common Order (for one battery)	R	[1..1]	4
[{TQ1}]	Timing Quantity	RE	[0..1]	4
[	--- OBSERVATION REQUEST begin	O	[O..1]	
OBR	Observation Request	R	[1..1]	4
[TCD]	Test Code Details	O	[0..1]	13
[{OBX}]	Observation Result	C	[0..*]	7
{	--- PRIOR RESULT start	O	[0..*]	
[PV1]	Patient Visit	R	[1..1]	3
[ORC]	Common order – prior result	R	[1..1]	4
OBR	Order detail – prior result	R	[1..1]	4
{OBX}	Observation/Result – prior result	R	[1..*]	
[{NTE}]	Comment of the result	C	[0..*]	2
}	--- PRIOR RESULT end			
]	--- OBSERVATION REQUEST end			
}	--- ORDER end			
}	--- SPECIMEN end			

Field MSH-9 – Message Type shall have its three components valued as follows:
OML^O33^OML_O33

1500 The PRIOR RESULT segment group provides the prior results obtained for the same patient.
Segment PID is not provided in this segment group because it is the same patient, and the
laboratory is not concerned by the fact that this patient might have had a different identification
when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory.
1505 The presence of this segment at this point in the message structure announces unambiguously a
set of prior orders with related prior observations. The segment PV1 represents the patient visit
(or encounter) during which these prior observations were produced. The only field mandatory in
the segment PV1 is PV1-2 "Patient Class" (as shown in appendix C of Volume 2x). If the sender
of this message does not know the patient class, it SHALL value the field PV1-2 "U", which
1510 stands for "patient class unknown".

The ORC appearing in the PRIOR RESULT segment group is mandatory and SHALL have its
first field "Order Control" populated with "PR" (Prior results).

Table 3.4.5.2-2: ORL^O34

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[{ERR}]	Error	O	[0..*]	2
[	--- RESPONSE begin	X	[0..0]	
[	--- PATIENT begin	R	[1..1]	
[PID]	Patient Identification	R	[1..1]	3
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Specimen Container	O	[0..*]	13
[{	--- ORDER begin	O	[0..*]	
ORC	Common Order	R	[1..1]	4
[{TQ1}]	Timing/Quantity	RE	[0..1]	4
[OBR]	Observation Request	R	[1..1]	4
}]	--- ORDER end			
}	--- SPECIMEN end			
]	--- PATIENT end			
]	--- RESPONSE end			

1515

MSH-9 - Message Type (MSG) shall have its three components respectively valued to "ORL",
"O34" and "ORL_O34".

This message never carries the RESPONSE segment group. It is therefore limited to the first two or three segments.

1520 3.4.5.3 Multiple Orders for a Single Container/Specimen (OML^O35, ORL^O36)

3.4.5.3.1 Trigger Events

OML (O35): Work order sent by the Order Filler.

ORL (O36): Acknowledgement of the Work Order sent by the Automation Manager.

The trigger event for this message is any change to a laboratory order. Such changes include
1525 submission of new orders, cancellations, updates, etc., where multiple orders are associated with a single container of a specimen.

> Notes HL7 V2.5 Chapter 4 describes "The trigger event for this message is any change to a laboratory order. Such changes include submission of new orders, cancellations, updates, etc., where multiple orders are associated with a single sample which may be carried in a multiple container". This is same as OML^O33, and it seems a miss of typing.

1530 3.4.5.3.2 Message Semantics

Refer to the HL7 standard for the OML message of HL7 2.5 Chapter 4 and the general message semantics.

In addition, when the Order Filler sends a new work order to the Automation Manager, ORC-1 "Order Control Code" is valued with "NW". When the work order is canceled, ORC-1 is valued
1535 with "CA". The correction of the work order uses value "RP".

The OBX segments are used to convey the patient's previous results, as well as some observation provided by the Order Placer or by the Order Filler, such as: blood pressure, patient's temperature, specimen collection volume, etc.

1540   **Table 3.4.5.3-1: OML^O35**

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
[	--- PATIENT begin	O	[0..1]	
PID	Patient identification	R	[1..1]	3
[PV1]	Patient visit	RE	[0..1]	3
]	--- PATIENT end			
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
{	--- CONTAINER begin	R	[1..*]	
SAC	Specimen Container	R	[1..1]	13
{	--- ORDER begin	R	[1..*]	
ORC	Common order	R	[1..1]	4

Segment	Meaning	Usage	Card.	HL7 chapter
[{TQ1}]	Timing/Quantity Order Sequence	RE	[0..1]	4
[	--- OBSERVATION REQUEST begin	O	[0..1]	
OBR	Observation Request	R	[1..1]	4
[TCD]	Test Code Details	O	[0..1]	13
[{OBX}]	Additional specimen characteristics	O	[0..*]	7
{	--- PRIOR RESULT begin	O	[0..*]	
[PV1]	Patient Visit	R	[1..1]	3
[ORC]	Common order – prior result	O	[0..1]	4
OBR	Order detail – prior result	R	[1..1]	4
{OBX}	Observation/Result - prior result	R	[1..*]	7
}	--- PRIOR RESULT end			
]	--- OBSERVATION REQUEST end			
}	--- ORDER end			
}	--- CONTAINER end			
}	--- SPECIMEN end			

Field MSH-9 – Message Type shall have its three components valued as follows:
OML^O35^OML_O35

The PRIOR RESULT segment group provides the prior results obtained for the same patient.
1545   Segment PID is not provided in this segment group because it is the same patient, and the
laboratory is not concerned by the fact that this patient might have had a different identification
when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory.
The presence of this segment at this point in the message structure announces unambiguously a
1550   set of prior orders with related prior observations. The segment PV1 represents the patient visit
(or encounter) during which these prior observations were produced. The only field mandatory in
the segment PV1 is PV1-2 "Patient Class" (as shown in appendix C of Volume 2x). If the sender
of this message does not know the patient class, it SHALL value the field PV1-2 "U", which
stands for "patient class unknown"

1555

Table 3.4.5.3-2: ORL^O36

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R		2
MSA	Message Acknowledgement	R		2
[{ERR}]	Error	O		2
[	--- RESPONSE begin	X	[0..0]]	
[	--- PATIENT begin	R	[1..1]	

Segment	Meaning	Usage	Card.	HL7 chapter
[PID]	Patient Identification	O	[0..1]	3
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
{	--- CONTAINER begin	R	[1..*]	
SAC	Specimen Container	R	[1..1]	13
[{	--- ORDER begin	O	[0..*]	
ORC	Common Order	R	[1..1]	4
[{TQ1}]	Timing/Quantity	RE	[0..1]	4
[OBR]	Observation Request	R		4
}]	--- ORDER end			
}	--- CONTAINER end			
}	--- SPECIMEN END			
]	--- PATIENT end			
]	--- RESPONSE end			

Field MSH-9 – Message Type shall have its three components valued as follows:
ORL^O36^ORL_O36

1560   This message never carries the RESPONSE segment group. It is therefore limited to the first two or three segments.

3.4.5.3.3 OBR Segment

All fields are optional except those listed in table below.

1565   **Table 3.4.5.3-3: OBR Segment**

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	4	SI	O	[0..1]		00237	Set ID – OBR
2	22	EI	R	[1..1]		00216	Placer Order Number
3	22	EI	RE	[0..1]		00217	Filler Order Number
4	250	CE	R	[1..1]		00238	Universal Service Identifier
5	2	ID	X	[0..0]		00239	Priority – OBR
6	26	TS	X	[0..0]		00240	Requested Date/Time
7	26	TS	X	[0..0]		00241	Observation Date/Time #
8	26	TS	X	[0..0]		00242	Observation End Date/Time #
9	20	CQ	X	[0..0]		00243	Collection Volume *
10	250	XCN	O	[0..*]		00244	Collector Identifier *
11	1	ID	RE	[0..1]	0065	00245	Specimen Action Code *
12	250	CE	X	[0..0]		00246	Danger Code

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SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
13	300	ST	X	[0..0]		00247	Relevant Clinical Information
14	26	TS	X	[0..0]		00248	Specimen Received Date/Time *
15	300	SPS	X	[0..0]		00249	Specimen Source
16	250	XCN	R	[1..1]		00226	Ordering Provider
17	250	XTN	RE	[0..2]		00250	Order Callback Phone Number
18	60	ST	X	[0..0]		00251	Placer Field 1
19	60	ST	X	[0..0]		00252	Placer Field 2
20	60	ST	X	[0..0]		00253	Filler Field 1 +
21	60	ST	X	[0..0]		00254	Filler Field 2 +
22	26	TS	X	[0..0]		00255	Results Rpt/Status Chng - Date/Time +
23	40	MOC	X	[0..0]		00256	Charge to Practice +
24	10	ID	C	[0..1]	0074	00257	Diagnostic Serv Sect ID
25	1	ID	X	[0..0]	0123	00258	Result Status +
26	400	PRL	X	[0..0]		00259	Parent Result +
27	200	TQ	X	[0..0]		00221	Quantity/Timing
28	250	XCN	O	[0..*]		00260	Result Copies To
29	200	EIP	X	[0..0]		00261	Parent
30	20	ID	X	[0..0]	0124	00262	Transportation Mode
31	250	CE	O	[0..1]		00263	Reason for Study
32	200	NDL	O	[0..1]		00264	Principal Result Interpreter +
33	200	NDL	O	[0..1]		00265	Assistant Result Interpreter +
34	200	NDL	O	[0..1]		00266	Technician +
35	200	NDL	O	[0..1]		00267	Transcriptionist +
36	26	TS	O	[0..1]		00268	Scheduled Date/Time +
37	4	NM	O	[0..1]		01028	Number of Sample Containers *
38	250	CE	O	[0..1]		01029	Transport Logistics of Collected Sample *
39	250	CE	O	[0..1]		01030	Collector's Comment *
40	250	CE	X	[0..0]		01031	Transport Arrangement Responsibility
41	30	ID	X	[0..0]	0224	01032	Transport Arranged
42	1	ID	X	[0..0]	0225	01033	Escort Required
43	250	CE	X	[0..0]		01034	Planned Patient Transport Comment
44	250	CE	O	[0..1]	0088	00393	Procedure Code
45	250	CWE	O	[0..1]	0340	01316	Procedure Code Modifier
46	250	CE	O	[0..1]	0411	01474	Placer Supplemental Service Information
47	250	CE	O	[0..1]	0411	01475	Filler Supplemental Service

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SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
							Information
48	250	CWE	X	[0..0]	0476	01646	Medically Necessary Duplicate Procedure Reason.
49	2	IS	O	[0..1]	0507	01647	Result Handling

OBR-2 Placer Order Number shall be reflected in a test result (LAB-5:OUL message), and it is used to in order that Order Filler or Order Placer use it to pull out the corresponding order record.

1570 OBR-3 If Filler Order Number present, it should be filled in.

3.4.5.3.4 TCD Segment

All fields are optional except those listed in table below.

Table 3.4.5.3-4: TCD Segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	250	CE	R	[1..1]		00238	Universal Service Identifier
2	20	SN	O	[0..1]		01420	Auto-Dilution Factor
3	20	SN	O	[0..1]		01421	Rerun Dilution Factor
4	20	SN	O	[0..1]		01422	Pre-Dilution Factor
5	20	SN	O	[0..1]		01413	Endogenous Content of Pre-Dilution Diluent
6	1	ID	O	[0..1]	0136	01416	Automatic Repeat Allowed
7	1	ID	O	[0..1]	0136	01424	Reflex Allowed
8	250	CE	O	[0..1]	0389	01425	Analyte Repeat Status

1575

3.4.5.4 Expected Action

If the OML message of the Order Control Code NW is received from Order Filler, the Automation Manager will receive and register the order information, then it will transmit the result either "Accept" or "Reject" to Order Filler by the ORL message.

1580 If the OML message of the Order Control Code CA is received from Order Filler, Automation Manager will cancel the existing previous order information, and will not try to schedule or execute the command. Moreover, the command that has already started at the Automation Manager is not canceled. The result either Accept or Reject is transmitted to Order Filler by the ORL message.

1585 Automation Manager will change and register record of the command, if the OML message of the Order Control Code RP is received from Order Filler. However, Automation Manager does

not change the command that has already started. The result either Accept or Reject is transmitted to Order Filler by the ORL message.

3.5   Test Results Management (LAB-5)

1590   This section corresponds to transaction LAB-5 of IHE Laboratory Technical Framework. The actors using this transaction are the Order Filler and the Automation Manager.

3.5.1 Scope

This transaction is used when Automation Manager transmits test results to Order Filler.

3.5.2 Use Case Roles
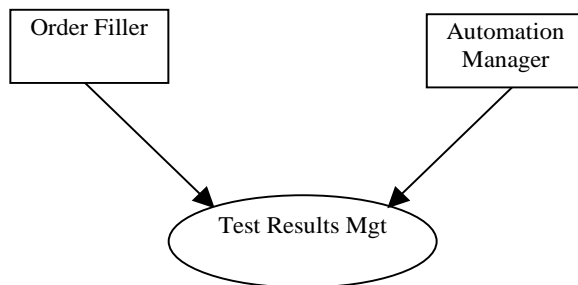
1595

Actor: Order Filler

Role: The Order Filler manages the test results notified by the Automation Manager.

Actor: Automation Manager

Role: Handles the preprocessing and the analysis processing to fulfill the Work Order, performs
1600   the technical validation and sends the results technically validated to the Order Filler.

3.5.3 Referenced Standards

HL7 Version 2.5--mainly referred to in Chapter 7.

3.5.4 Interaction Diagrams
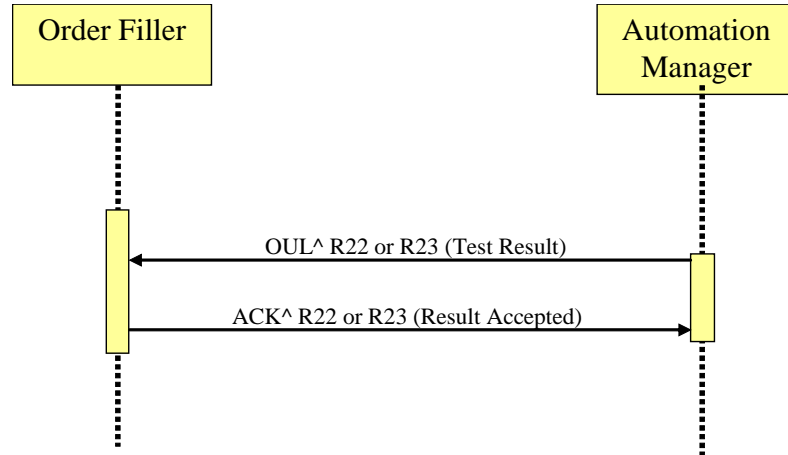
Figure 3.5.4-1: Unsolicited Observation Message from Automation Manager

3.5.5 Messages Static Definitions

3.5.5.1 Trigger Events

OUL (R22 or R23): Automation Manager transmits test results.

1610 The use of R22 is recommended when transferring multiple results related to a specimen from a patient.

The use of R23 is recommended when transferring multiple results related to one or more specific containers with one or more specimens from a patient.

The use of R24 is deprecated, since this HL7 message structure is ambiguous. OUL^R24 can be viewed in:

1615 ftp://ftp.ihe.net/Laboratory/Tech_Framework/V2/ihe_lab_TF_2.0_Vol2_FT_2006-12-04.doc

ACK (R22 or R23): Order Filler response acknowledgements.

3.5.5.2 Message Semantics (R22)

Refer to HL7 2.5 Chapter 7, Section 7.3.7 for the general semantics of this message structure.

1620

Table 3.5.5.2-1: OUL^R22

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
[PID]	Patient Identification	RE	[0..1]	3
[PV1]	Patient Visit	O	[0..1]	3
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen information	R	[1..1]	7

Segment	Meaning	Usage	Card.	HL7 chapter
[{ OBX }]	Observation Result (for Specimen)	O	[0..*]	7
[{	--- CONTAINER begin	0	[0..*]	
SAC	Container information	R	[1..1]	13
[INV]	Detailed Substance information (e.g., id, lot, manufacturer, … of QC specimen)	O	[0..1]	13
}]	--- CONTAINER end			
{	--- ORDER begin	R	[1..*]	
OBR	Observation Order	R	[1..1]	7
[ORC]	Common Order	O	[0..1]	4
[{NTE}]	Comment on the Work Order	O	[0..*]	2
[{	--- RESULT begin	O	[0..*]	
OBX	Observation Result	R	[1..1]	7
[TCD]	Test Code Detail	O	[0..1]	13
[{SID}]	Substance Identifier (e.g., reagents used for testing)	O	[0..*]	13
[{NTE}]	Notes and comments	O	[0..*]	
}]	--- RESULT end			
}	--- ORDER end			
}	--- SPECIMEN end			

The carrier information in the case of notifying the test results of a patient's specimen uses SAC.

Table 3.5.5.2-2: ACK^R22

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[ERR]	Error	O	[0..1]	2

Field MSH-9 – Message Type shall have its three components valued as follows: OUL^R22^OUL_R22

3.5.5.3 Message Semantics (R23)

Refer to HL7 2.5 Chapter 7, Section 7.3.8 for the general semantics of this message structure.

Table 3.5.5.3-1: OUL^R23

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2

Segment	Meaning	Usage	Card.	HL7 chapter
[PID]	Patient Identification	RE	[0..1]	3
[PV1]	Patient Visit	O	[0..1]	3
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen information	R	[1..1]	7
[{ OBX }]	Observation Result (for Specimen)	O	[0..*]	7
{	--- CONTAINER begin	R	[1..*]	
SAC	Container information	R	[1..1]	13
[INV]	Detailed Substance information (e.g., id, lot, manufacturer, … of QC specimen)	O	[0..1]	13
{	--- ORDER begin	R	[1..*]	
OBR	Observation Order	R	[1..1]	7
[ORC]	Common Order	O	[0..1]	4
[{NTE}]	Comment on the Work Order	O	[0..*]	2
[{	--- RESULT begin	O	[0..*]	
OBX	Observation Result	R	[1..1]	7
[TCD]	Test Code Detail	O	[0..1]	13
[{SID}]	Substance Identifier (e.g., reagents used for testing)	O	[0..*]	13
[{NTE}]	Notes and comments	O	[0..*]	
}]	--- RESULT end			
}	--- ORDER end			
}	--- CONTAINER end			
}	--- SPECIMEN end			

Field MSH-9 – Message Type shall have its three components valued as follows:
OUL^R23^OUL_R23.

The carrier information in the case of notifying the test results of a patient's sample uses SAC.

Refer to HL7 Chapter 13 for INV, SID segments and refer to HL7 Chapter 7 for CTI segment.

Table 3.5.5.3-1: ACK^R23

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[ERR]	Error	O	[0..1]	2

1640

Field MSH-9 - Message Type (MSG) shall have its two first components respectively valued to "OUL" and "R23".

Refer to HL7 Chapter 13 for INV, SID segments and refer to HL7 Chapter 7 for CTI segment.

3.5.5.4 Expected Action

1645 The Automation Manager notifies test results with the OUL message to the Order Filler. The Order Filler accepts and registers information, and responds to the Automation Manager with the ACK message.

3.5.5.5 OBR Segment

All fields are optional except those listed in table below.

1650

Table 3.5.5.5-1: OBR segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	4	SI	O	[0..1]		00237	Set ID – OBR
2	22	EI	RE	[0..1]		00216	Placer Order Number
3	22	EI	RE	[0..1]		00217	Filler Order Number
4	250	CE	R	[1..1]		00238	Universal Service Identifier
5	2	ID	X	[0..0]		00239	Priority – OBR
6	26	TS	X	[0..0]		00240	Requested Date/Time
7	26	TS	RE	[0..1]		00241	Observation Date/Time #
8	26	TS	RE	[0..1]		00242	Observation End Date/Time #
9	20	CQ	O	[0..1]		00243	Collection Volume *
10	250	XCN	O	[0..*]		00244	Collector Identifier *
11	1	ID	RE	[0..1]	0065	00245	Specimen Action Code *
12	250	CE	X	[0..0]		00246	Danger Code
13	300	ST	X	[0..0]		00247	Relevant Clinical Information
14	26	TS	X	[0..0]		00248	Specimen Received Date/Time *
15	300	SPS	X	[0..0]		00249	Specimen Source
16	250	XCN	R	[1..1]		00226	Ordering Provider
17	250	XTN	RE	[0..2]		00250	Order Callback Phone Number
18	60	ST	X	[0..0]		00251	Placer Field 1
19	60	ST	X	[0..0]		00252	Placer Field 2
20	60	ST	X	[0..0]		00253	Filler Field 1 +
21	60	ST	X	[0..0]		00254	Filler Field 2 +
22	26	TS	C	[0..1]		00255	Results Rpt/Status Chng - Date/Time +
23	40	MOC	X	[0..0]		00256	Charge to Practice +
24	10	ID	C	[0..1]	0074	00257	Diagnostic Serv Sect ID

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
25	1	ID	R	[1..1]	0123	00258	Result Status +
26	400	PRL	C	[0..1]		00259	Parent Result +
27	200	TQ	X	[0..0]		00221	Quantity/Timing
28	250	XCN	O	[0..*]		00260	Result Copies To
29	200	EIP	C	[0..1]		00261	Parent
30	20	ID	X	[0..0]	0124	00262	Transportation Mode
31	250	CE	O	[0..1]		00263	Reason for Study
32	200	NDL	O	[0..1]		00264	Principal Result Interpreter +
33	200	NDL	O	[0..1]		00265	Assistant Result Interpreter +
34	200	NDL	O	[0..1]		00266	Technician +
35	200	NDL	O	[0..1]		00267	Transcriptionist +
36	26	TS	O	[0..1]		00268	Scheduled Date/Time +
37	4	NM	O	[0..1]		01028	Number of Sample Containers *
38	250	CE	O	[0..1]		01029	Transport Logistics of Collected Sample *
39	250	CE	O	[0..1]		01030	Collector's Comment *
40	250	CE	X	[0..0]		01031	Transport Arrangement Responsibility
41	30	ID	X	[0..0]	0224	01032	Transport Arranged
42	1	ID	X	[0..0]	0225	01033	Escort Required
43	250	CE	X	[0..0]		01034	Planned Patient Transport Comment
44	250	CE	O	[0..1]	0088	00393	Procedure Code
45	250	CWE	O	[0..1]	0340	01316	Procedure Code Modifier
46	250	CE	O	[0..1]	0411	01474	Placer Supplemental Service Information
47	250	CE	O	[0..1]	0411	01475	Filler Supplemental Service Information
48	250	CWE	X	[0..0]	0476	01646	Medically Necessary Duplicate Procedure Reason.
49	2	IS	O	[0..1]	0507	01647	Result Handling

All field data should reflect LAB-4 transaction's OBR, except:

OBR-26 Parent Result (PRL)

1655   This field is used to report spawned orders in microbiology. See Section 3.11 for detailed specification of usage.

OBR-29 Parent (EIP)

This field is used to report spawned orders in microbiology. See Section 3.11 for detailed specification of usage.

1660 ### 3.5.5.6 TCD Segment

All fields are optional except those listed in table below.

Table 3.5.5.6-1: TCD segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	250	CE	R	[1..1]		00238	Universal Service Identifier

1665

3.6   Work Order Step Download to LD (LAB-21)

3.6.1 Scope

This transaction is used between an Automation Manager and a Laboratory Device working in download mode. It enables the AM to issue a new WOS to the LD, or cancel or modify an existing WOS previously sent to the LD. Modification may also be achieved by combining cancellation and sending of a new WOS.

1670

3.6.2 Use Case Roles
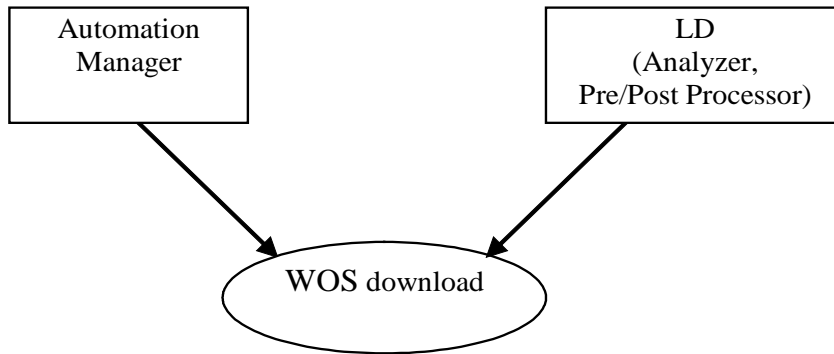
Actor: Automation Manager

1675   **Role**: Translates a Work Order into a series of WOS assigned to the LDs. Downloads a WOS related to a specimen to the appropriate LD.

Actor: (LD) Pre/Post-processor, Analyzer

Role: Performs the WOS on the specimen

3.6.3 Referenced Standard

1680   HL7 v2.5, Chapter 4

3.6.4 Interaction Diagram
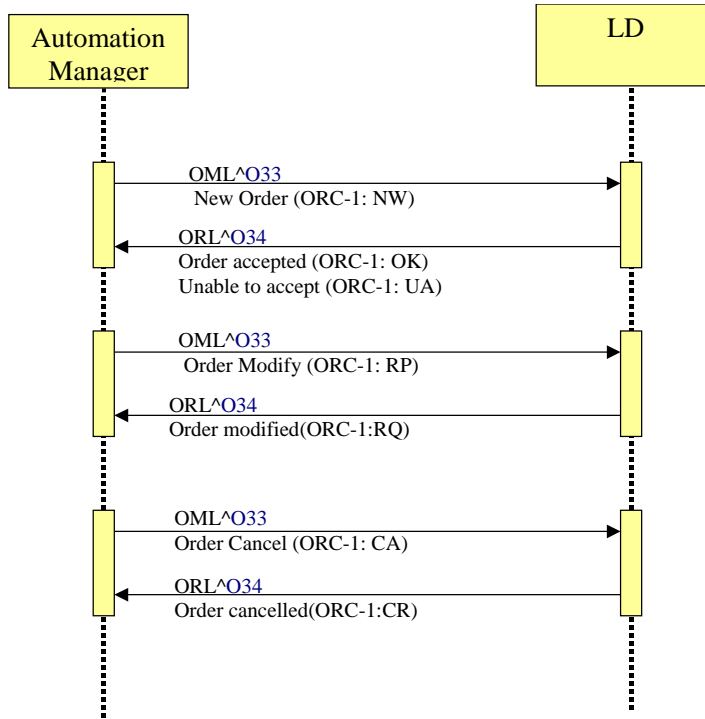
Figure 3.6.4-1: WOS management on LD in download mode

1685 ### 3.6.5 Message Static Definitions

This transaction contains the messages used to download a Work Order Step (WOS) from the Automation Manager to the Analyzer or Pre/Post-processor. It includes "new WOS", "update WOS", "cancel WOS" and the related application acknowledgements.

3.6.6 Trigger Events

1690 OML (O33): Event on WOS sent by the Automation Manager.

ORL (O34): Acknowledgement sent by the LD.

3.6.7 Message Semantics

Table 3.6.7-1: OML^O33

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message Header	R	[1..1]	2
[	--- PATIENT begin	O	[0..1]	
PID	Patient Identification	R	[1..1]	3
[{ NTE }]	Notes and Comments (for Patient)	O	[0..*]	2

Segment	Meaning	Usage	Card.	HL7 chapter
[PV1]	Patient Visit	RE	[0..1]	3
]	--- PATIENT end			
{	--- SPECIMEN begin	R	[1..1]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Specimen Container	O	[0..1]	
{	--- ORDER begin	R	[1..1]	
ORC	Common Order (for one battery)	R	[1..1]	4
[{TQ1}]	Timing Quantity	RE	[0..1]	4
	--- OBSERVATION REQUEST begin	R	[1..1]	
OBR	Observation Request	R	[1..1]	4
[TCD]	Test Code Details	O	[0..1]	13
[{	--- OBSERVATION begin	O	[0..*]	
OBX	Observation Result	R	[1..*]	7
[TCD]	Test Code Detail	O	[0..*]	13
[{ NTE }]	Notes and Comments (for Results)	O	[0..*]	2
}]	--- OBSERVATION end			
[{	--- PRIOR RESULT begin	O	[0..*]	
PV1	Patient Visit – previous result	R	[1..1]	3
{	--- ORDER PRIOR begin	R	[1..*]	
ORC	Common order – prior result	R	[1..1]	4
OBR	Order detail – prior result	R	[1..1]	4
{	--- OBSERVATION PRIOR begin	R	[1..*]	
OBX	Observation/Result – prior result	R	[1..*]	
[{NTE}]	Comment of the result	C	[0..*]	2
}	--- OBSERVATION PRIOR end			
}	--- ORDER PRIOR end			
}]	--- PRIOR RESULT end			
	--- OBSERVATION REQUEST end			
}	--- ORDER end			
}	--- SPECIMEN end			

1695

MSH-9 - Message Type (MSG) shall have its three components respectively valued to "OML", "O33" and "OML_O33"

SPM-11 Specimen Role (CWE) in SPM segment shall be coded ncel WOS" and the related application acknowledThe PRIOR RESULT segment group provides the prior results obtained
1700   for the same patient. Segment PID is not provided in this segment group because it is the same

patient, and the laboratory is not concerned by the fact that this patient might have had a different identification when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory. The presence of this segment at this point in the message structure announces unambiguously a
1705 set of prior orders with related prior observations. The segment PV1 represents the patient visit (or encounter) during which these prior observations were produced. The only field mandatory in the segment PV1 is PV1-2 "Patient Class". If the sender of this message does not know the patient class, it SHALL value the field PV1-2 "U", which stands for "patient class unknown".

The ORC appearing in the PRIOR RESULT segment group is mandatory and SHALL have its
1710 first field "Order Control" populated with "PR" (Prior results).

Some LD need 'Observation OBX,TCD,NTE segments' (ex: analyzer). Therefore, the message carries optional OBSERVATION segment group to provide the analyzer with results related to the tests to be performed.

1715
Table 3.6.7-2: ORL^O34

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[{ERR}]	Error	O	[0..*]	2
[	--- RESPONSE begin	O	[0..1]	
[	--- PATIENT begin	R	[1..1]	
[PID]	Patient Identification	R	[1..1]	3
{	--- SPECIMEN begin	R	[1..*]	
SPM	Specimen	R	[1..1]	7
[{SAC}]	Specimen Container	O	[0..*]	13
[{	--- ORDER begin	O	[0..*]	
ORC	Common Order	R	[1..1]	4
[{TQ1}]	Timing/Quantity	RE	[0..1]	4
[OBR]	Observation Request	R	[1..1]	4
}]	--- ORDER end			
}	--- SPECIMEN end			
]	--- PATIENT end			
]	--- RESPONSE end			

MSH-9 - Message Type (MSG) shall have its three components respectively valued to "ORL", "O34" and "ORL_O34".

3.6.8 Expected Actions

1720   If the OML message with the Order Control Code NW is received from the Automation
Manager, the LD will receive and register the order information, then it will transmit the result
either "Accept" or "Reject" to the Automation Manager in an ORL message.

3.6.9 OBR Segment

All fields are optional except those listed in table below.

1725

Table 3.6.9-1: OBR Segment

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
2	22	EI	R	[1..1]		00216	Placer Order Number
3	22	EI	RE	[0..1]		00217	Filler Order Number
4	250	CE	R	[1..1]		00238	Universal Service Identifier
5	2	ID	X	[0..0]		00239	Priority – OBR
6	26	TS	X	[0..0]		00240	Requested Date/Time
7	26	TS	X	[0..0]		00241	Observation Date/Time #
8	26	TS	X	[0..0]		00242	Observation End Date/Time #
9	20	CQ	X	[0..0]		00243	Collection Volume *
11	1	ID	RE	[0..1]	0065	00245	Specimen Action Code *
12	250	CE	X	[0..0]		00246	Danger Code
13	300	ST	X	[0..0]		00247	Relevant Clinical Information
14	26	TS	X	[0..0]		00248	Specimen Received Date/Time *
15	300	SPS	X	[0..0]		00249	Specimen Source
16	250	XCN	R	[1..1]		00226	Ordering Provider
17	250	XTN	RE	[0..2]		00250	Order Callback Phone Number
18	60	ST	X	[0..0]		00251	Placer Field 1
19	60	ST	X	[0..0]		00252	Placer Field 2
20	60	ST	X	[0..0]		00253	Filler Field 1 +
21	60	ST	X	[0..0]		00254	Filler Field 2 +
22	26	TS	X	[0..0]		00255	Results Rpt/Status Chng - Date/Time +
23	40	MOC	X	[0..0]		00256	Charge to Practice +
24	10	ID	C	[0..1]	0074	00257	Diagnostic Serv Sect ID
25	1	ID	X	[0..0]	0123	00258	Result Status +
26	400	PRL	X	[0..0]		00259	Parent Result +
27	200	TQ	X	[0..0]		00221	Quantity/Timing
29	200	EIP	X	[0..0]		00261	Parent
30	20	ID	X	[0..0]	0124	00262	Transportation Mode
40	250	CE	X	[0..0]		01031	Transport Arrangement Responsibility

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SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
41	30	ID	X	[0..0]	0224	01032	Transport Arranged
42	1	ID	X	[0..0]	0225	01033	Escort Required
43	250	CE	X	[0..0]		01034	Planned Patient Transport Comment
48	250	CWE	X	[0..0]	0476	01646	Medically Necessary Duplicate Procedure Reason.

3.6.10 TCD Segment

1730

Table 3.6.10-1: TCD Segment

SEQ	LEN	DT	Usage	Card.	TBL #	ITEM#	Element name
1	250	CE	R	[1..1]		00238	Universal Service Identifier
2	20	SN	O	[0..1]		01420	Auto-Dilution Factor
3	20	SN	O	[0..1]		01421	Rerun Dilution Factor
4	20	SN	O	[0..1]		01422	Pre-Dilution Factor
5	20	SN	O	[0..1]		01413	Endogenous Content of Pre-Dilution Diluent
6	1	ID	O	[0..1]	0136	01416	Automatic Repeat Allowed
7	1	ID	O	[0..1]	0136	01424	Reflex Allowed
8	250	CE	O	[0..1]	0389	01425	Analyte Repeat Status

Note: Universal Service Identifier is a copy of OBR-4.

3.7 WOS Query (LAB-22)

This transaction is used between an Automation Manager and a Laboratory Device working in query mode. It enables the AM to issue a new WOS to the LD, or cancel or modify an existing WOS previously sent to the LD. Modification may also be achieved by combining cancellation and sending of a new WOS.

This transaction is used by the LD to get the WOS to perform for each specimen by querying the Automation Manager after specimen recognition. The transaction provides a query for multiple specimens and the reply will carry zero or one container and one WOS for each specimen. The Automation Manager and the LD preserve the conformity between the specimen and the WOS by checking the Specimen Information (Specimen ID and the like) within the message.

3.7.1 Scope

This transaction is used by the general use case "Query for the WOS after specimen arrival on the LD" It is used by the Automation Manager (Laboratory Automation System) and the LD which supports "Query Mode".

3.7.2 Use Case Roles
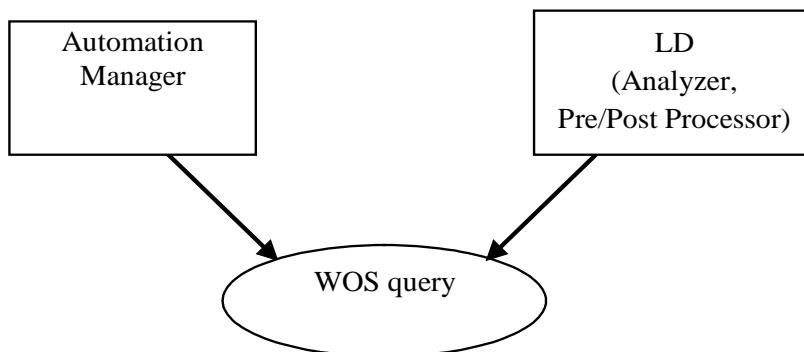
Actor: Automation Manager

Role: Manages the Work Orders and WOS. Responds with the appropriate WOS to a query from the LD.

Actor: (LD) Pre/Post-processor, Analyzer

Role: Queries the Automation Manager for a WOS related to the specimen, and receives the WOS as the response.

3.7.3 Referenced Standard

HL7 version 2.5:

- Chapter5: "Query" --> QBP and RSP messages

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- Chapter5: "Query" --> QPD, RCP and QAK segments

1760 **3.7.4 Interaction Diagram**
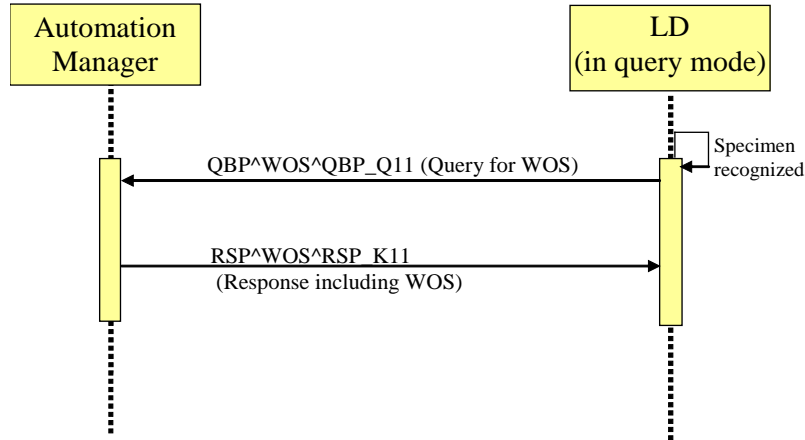
Figure 3.7.4-1: WOS management on LD in download mode

3.7.5 Message Static Definitions

1765 After the LD working in query mode recognizes one or more specimens, the LD sends "WOS Query Message"(QBP^WOS^QBP_Q11) with one or more Specimen IDs or other IDs to the Automation Manager.

The Automation Manager replies with the response message (RSP^WOS^RSP_K11) containing one or more WOS for each specimen identified in the query.

1770 ### 3.7.5.1 Trigger Events

QBP(Q11) : Query for the WOS sent by the LD.
RSP(K11) : Response including the WOS sent by the Automation Manager.

3.7.5.2 Message Semantics

1775 **Table 3.7.5.2-1: QBP^WOS^QBP_Q11**

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
[{SFT}]	Software Segment	O	[0..*]	2
QPD	Query Parameter Definition	R	[1..1]	5
RCP	Response Control Parameter	R	[1..1]	5

Segment	Meaning	Usage	Card.	HL7 chapter
[DSC]	Continuation Pointer	O	[0..1]	2

MSH-9 - Message Type (MSG) shall have its two first components respectively valued to "QBP" and "Q11".

1780

Table 3.7.5.2-2: RSP^WOS^RSP_K11

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
[{SFT}]	Software Segment	O	[0..*]	2
MSA	Message Acknowledgement	R	[1..1]	2
[ERR]	Error	O	[0..1]	2
QAK	Query Acknowledgement	R	[1..1]	5
QPD	Query Parameter Definition	R	[1..1]	5
{	--- SPECIMEN begin	C	[0..*]	
SPM	Specimen	R	[1..1]	7
[{OBX}]	Observation related to specimen	O	[0..*]	7
[{SAC}]	Specimen Container	RE	[0..1]	13
[	--- PATIENT begin	O	[0..1]	
PID	Patient Identification	R	[1..1]	3
[{NTE}]	Notes and Comments (for Patient)	O	[0..*]	2
[{OBX}]	Observation related to the patient	O	[0..*]	7
]	--- PATIENT end			
{	--- ORDER begin	R	[1..1]	
ORC	Common Order	R	[1..1]	4
[{NTE}]	Notes and Comments (for Common Order)	O	[0..*]	2
[{TQ1}]	Timing/Quantity	RE	[0..1]	4
[	--- OBSERVATION REQUEST begin	O	[0..1]	
OBR	Observation Request	R	[1..1]	4
[TCD]	Test Code Details	O	[0..1]	13
[{NTE}]	Notes and Comments (for ordered test code)	O	[0..*]	2
[{	--- OBSERVATION begin	O	[0..*]	
OBX	Observation/Result	R	[1..*]	7
[TCD]	Test Code Detail	O	[0..*]	13
[{ NTE }]	Notes and Comments (for Results)	O	[0..*]	2

Segment	Meaning	Usage	Card.	HL7 chapter
}]	--- OBSERVATION end			
]	--- OBSERVATION REQUEST end			
[{	--- PRIOR RESULT begin	O	[0..*]	
PV1	Patient Visit – previous result	R	[1..1]	3
{	--- ORDER PRIOR begin	R	[1*]	
ORC	Common order – previous result	R	[1..1]	4
OBR	Order detail – previous result	R	[1..1]	4
{	--- OBSERVATION PRIOR begin	R	[1..*]	
OBX	Observation/Result – previous result	R	[1..1]	
[{NTE}]	Comment of the result	C	[0..*]	2
}	--- OBSERVATION PRIOR end			
}	--- ORDER PRIOR end			
}]	--- PRIOR RESULT end			
}	--- ORDER end			
}	--- SPECIMEN end			

MSH-9 - Message Type (MSG) shall have its two first components respectively valued to "RSP" and "K11".

SPM-11 Specimen Role (CWE) in SPM segment shall be coded "Q" (Control specimen) in the case of a QC AWOS.

If the query was not based on the specimen ID, the response shall contain a SAC segment.

Some LD need 'Observation OBX,TCD,NTE segments' (ex: analyzer). Therefore, the response message carries optional OBSERVATION segment group to provide the analyzer with results related to the tests to be performed.

The SPECIMEN segment group is not present in case of an erroneous query (e.g., barcode read error).

The PRIOR RESULT segment group provides the prior results obtained for the same patient. Segment PID is not provided in this segment group because it is the same patient, and the laboratory is not concerned by the fact that this patient might have had a different identification when the prior results were produced.

Segment PV1, which is the first segment of the segment group PRIOR RESULT, is mandatory. The presence of this segment at this point in the message structure announces unambiguously a set of prior orders with related prior observations. The segment PV1 represents the patient visit

1800 (or encounter) during which these prior observations were produced. The only field mandatory in the segment PV1 is PV1-2 "Patient Class". If the sender of this message does not know the patient class, it SHALL value the field PV1-2 "U", which stands for "patient class unknown".

The ORC appearing in the PRIOR RESULT segment group is mandatory and SHALL have its first field "Order Control" populated with "PR" (Prior results).

3.7.5.3 Expected Actions

1805 When specimen arrives on the LD which supports "Query Mode", the LD sends a QBP message to the Automation Manager to get WOS. This QBP message may have one or more Specimen IDs/Container IDs.

The Automation Manager receives the QBP message and prepares the appropriate WOS by checking IDs contained in the QBP message. The Automation Manager returns the RSP message
1810 with WOS to the LD immediately. The LD receives WOS and performs processing for the specimen.

Even if the Automation Manager could not prepare WOS for one or more IDs, the RSP message must have SPM segments of the same number as IDs contained in the QBP message. OBR/TCD segments can be omitted.

1815 ### 3.7.5.4 QPD Segment

Table 3.7.5.4-1: QPD segment

SE Q	LEN	DT	Usage	Car d.	TBL#	ITEM#	Element name
1	60	CE	R	[1..1]		01375	Message Query Name
2	32	ST	R	[1..1]		00696	Query Tag
3	80	EIP	C	[0..*]		01756	SPM-2:Specimen Identification
4	80	EI	C	[0..*]		01331	SAC-3:Container Identification
5	80	EI	C	[0..1]		01337	SAC-10:Carrier Identification
6	80	NA	C	[0..1]		01338	SAC-11:Position in Carrier
7	80	EI	C	[0..1]		01340	SAC-13:Tray Identification
8	80	NA	C	[0..1]		01341	SAC-14:Position in Tray
9	250	CE	C	[0..*]		01342	SAC-15:Location

QPD-1 Message Query Name (CE), required.
1820 Must be valued "**WOS^Work Order Step^IHE_LABTF**"

QPD-2 Query Tag (ST), required.
Unique to each query message instance.

QPD-3 Specimen Identification (EIP), conditional.

As for the 1st component "Placer Assigned Identifier"(EI), contains the placer assigned identifier
1825 and its assigning authority.

As for the 2nd component "Filler Assigned Identifier"(EI), contains the filler assigned identifier
and its assigning authority.

If this field is valued all other query fields shall be empty.

QPD-4 Container Identification (EI), conditional.
1830 Contains the identification of the container.

QPD-5 Carrier Identification (EI), conditional.

Contains the identification of the carrier (also known as Rack).

If this field is valued, then the field "QPD-6:Position in Carrier" shall also be valued.

If these 2 fields(QPD-5,6) are valued all other query fields shall be empty, with the possible
1835 exception of the Location field(QPD-9).

QPD-6 Position in Carrier (NA), conditional.

Contains the positions of the specimen/aliquot on the carrier (rack).

If this field is valued, then the field "QPD-5: Carrier Identification" shall also be valued.

QPD-7 Tray Identification (EI), conditional.
1840 Contains the identification of the Tray.

QPD-8 Position in Tray (NA), conditional.

Contains the position of the carrier on the tray.

QPD-9 Location (CE), conditional.

Contains the physical location of the specimen.
1845 This field cannot be valued in isolation, it must always be combined with the physical
location/position of the specimen on either a carrier or a tray.

This field shall never be used in combination with either the specimen identification or the
container identification fields.

3.7.5.5 RCP Segment

1850

Table 3.7.5.5-1: RCP segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	1	ID	O	[0..1]	0091	00027	Query Priority
2	10	CQ	O	[0..1]	0126	00031	Quantity Limited Request
		NM					
		CE					
3	60	CE	O	[0..1]	0394	01440	Response Modality
7	256	ID	O	[0..*]		01594	Segment group inclusion

RCP-1 Query Priority(ID), optional. Fixed to "I" (=Immediate). If no value is given, the default is "**I**".

1855 RCP-2 Quantity Limited Request(CQ), optional. As for the 1st component "Quantity"(NM), Number of Records which will be returned in each increment of the response. If no value is given, the entire response will be returned in a single increment.
As for the 2nd component "Units"(CE), "RD"(=Records) is always set. If no value is given, the default is RD.

1860 RCP-3 Response Modality(CE), optional. Fixed to "R" (=Realtime). If no value is given, the default is "R".

RCP-7 Segment group inclusion(ID), optional. Specifies those optional segment groups which are to be included in the response. If this field is not valued, all segment groups will be included.

1865 ## 3.8 AWOS Status Change (LAB-23)

3.8.1 Scope

This transaction is used by the Analyzer to send test results to the Automation Manager.

3.8.2 Use Case Roles
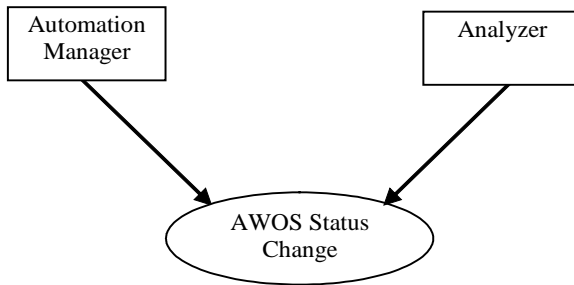
1870 **Actor**: Automation Manager

Role: Manages Analyzer in order to implement the AWOS. Receives the test results from Analyzer, performs technical validation, then sends the validated results to Order filler

Actor: Analyzer

Role: Analyzes the specimen and outputs the test results.

1875 ### 3.8.3 Referenced Standard

HL7 Version 2.5--mainly referred to in Chapter 7.

3.8.4 Interaction Diagram
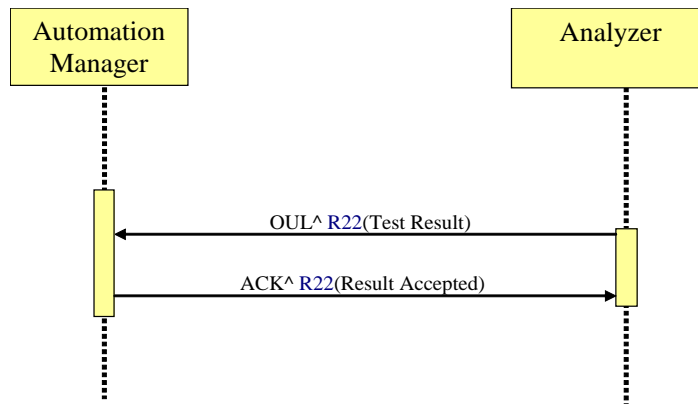
Figure 3.8.4-1: AWOS Status change

1880 ### 3.8.5 Message Static Definitions

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This transaction contains the messages used by the Analyzer to report the status of an AWOS (such as "specimen arrived", "first run failed", "second run started", "AWOS complete"…) and to send the tests results when the AWOS is complete. It also includes the related applicative acknowledgements from the Automation Manager.

3.8.5.1 Trigger Events

Analyzer sends test results. Automation Manager returns acknowledgement.

3.8.5.2 Message Semantics

Table 3.8.5.2-1: OUL^R22

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
[	PATIENT begin	RE	[0..1]	
PID	Patient Identification	R	[1..1]	3
[{NTE}]	Notes and Comments (for patient)	O	[0..*]	2
]	PATIENT end			
[	VISIT begin	O	[0..1]	
PV1	Patient Visit	R	[1..1]	3
]	VISIT end			
{	--- SPECIMEN begin	R	[1..1]	
SPM	Specimen information	R	[1..1]	7
[{ OBX }]	Observation Result (for Specimen)	O	[0..*]	7
[{	--- CONTAINER begin	0	[0..1]	
SAC	Container information	R	[1..1]	13
[INV]	Detailed Substance information (e.g., id, lot, manufacturer, … of QC specimen)	O	[0..1]	13
}]	--- CONTAINER end			
{	--- ORDER begin	R	[1..1]	
OBR	Observation Order	R	[1..1]	7
[ORC]	Common Order	O	[0..1]	4
[{NTE}]	Comment on the Work Order Step	O	[0..*]	2
[{	--- RESULT begin	O	[0..*]	
OBX	Observation Result	R	[1..1]	7
[TCD]	Test Code Detail	C[*1]	[0..1]	13
[{SID}]	Substance Identifier (e.g., reagents used for testing)	C[*1]	[0..*]	13

[*1] If it is patient sample, this is Optional. If it is a QC sample it is Mandatory if it is available.

Segment	Meaning	Usage	Card.	HL7 chapter
[{NTE}]	Notes and comments	O	[0..*]	
}]	--- RESULT end			
}	--- ORDER end			
}	--- SPECIMEN end			

1890

Table 3.8.5.2-2: ACK^R22

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[ERR]	Error	O	[0..1]	2

MSH-9 - Message Type (MSG) shall have its three components respectively valued to "OUL", "R22" and "OUL_R22".

SPM-11 Specimen Role (CWE) in SPM segment shall be coded "Q" (Control specimen) in the
1895   case of a QC AWOS.

3.8.5.3 Expected Actions

Analyzer notifies Automation Manager of the test results using the OUL message . Automation Manager accepts and registers information, and responds to the Analyzer with the ACK message.

3.8.5.4 OBR Segment

1900   All fields are optional except those listed in table below.

Table 3.8.5.4-1: OBR segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
2	22	EI	RE	[0..1]		00216	Placer Order Number
3	22	EI	RE	[0..1]		00217	Filler Order Number
4	250	CE	R	[1..1]		00238	Universal Service Identifier
5	2	ID	X	[0..0]		00239	Priority – OBR
6	26	TS	X	[0..0]		00240	Requested Date/Time
7	26	TS	RE	[0..1]		00241	Observation Date/Time #
8	26	TS	RE	[0..1]		00242	Observation End Date/Time #
11	1	ID	RE	[0..1]	0065	00245	Specimen Action Code *
12	250	CE	X	[0..0]		00246	Danger Code
13	300	ST	X	[0..0]		00247	Relevant Clinical Information
14	26	TS	X	[0..0]		00248	Specimen Received Date/Time *
15	300	SPS	X	[0..0]		00249	Specimen Source

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
16	250	XCN	R	[1..1]		00226	Ordering Provider
17	250	XTN	RE	[0..2]		00250	Order Callback Phone Number
18	60	ST	X	[0..0]		00251	Placer Field 1
19	60	ST	X	[0..0]		00252	Placer Field 2
20	60	ST	X	[0..0]		00253	Filler Field 1 +
21	60	ST	X	[0..0]		00254	Filler Field 2 +
22	26	TS	C	[0..1]		00255	Results Rpt/Status Chng - Date/Time +
23	40	MOC	X	[0..0]		00256	Charge to Practice +
24	10	ID	C	[0..1]	0074	00257	Diagnostic Serv Sect ID
25	1	ID	R	[1..1]	0123	00258	Result Status +
27	200	TQ	X	[0..0]		00221	Quantity/Timing
30	20	ID	X	[0..0]	0124	00262	Transportation Mode
40	250	CE	X	[0..0]		01031	Transport Arrangement Responsibility
41	30	ID	X	[0..0]	0224	01032	Transport Arranged
42	1	ID	X	[0..0]	0225	01033	Escort Required
43	250	CE	X	[0..0]		01034	Planned Patient Transport Comment
48	250	CWE	X	[0..0]	0476	01646	Medically Necessary Duplicate Procedure Reason.

All field data should reflect LAB-21,22 transaction's OBR.

3.8.5.5 TCD Segment

All fields are optional except those listed in table below.

Table 3.8.5.5-1: TCD segment

SEQ	LEN	DT	Usage	Card.	TBL#	ITEM#	Element name
1	250	CE	R	[1..1]		00238	Universal Service Identifier

3.9   SWOS Status Change (LAB-26)

3.9.1 Scope

This transaction is used when the Pre/Post Processor transmits a Process Results to the Automation Manager.

1915   **3.9.2 Use Case Roles**
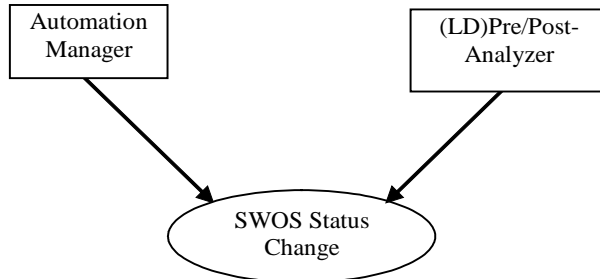
Actor: Automation Manager

Role: Manages the SWOS

Actor: *(LD) Pre/Post Processor*

1920   **Role:** Manages the Pre/Post-analysis process on the specimen and generates a Process Result or Specimen Status Message.

3.9.3 Referenced Standard

HL7 Version 2.5--mainly referred to in Chapter 7 and Chapter13.

3.9.4 Interaction Diagram

1925
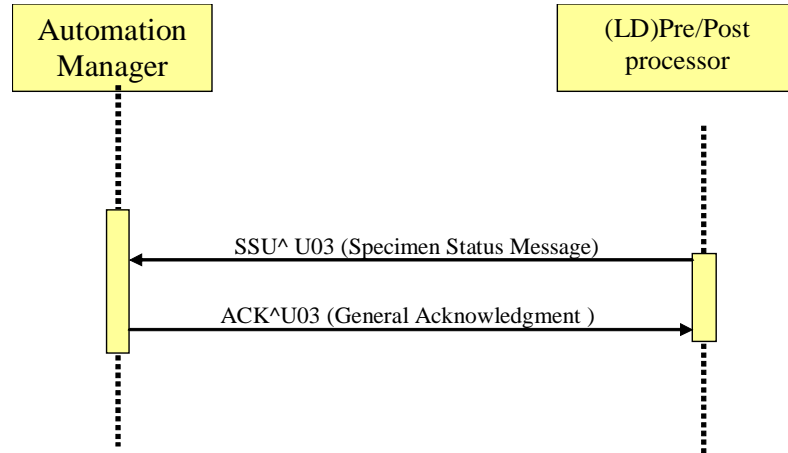
Figure 3.9.4-1: Unsolicited SWOS Status Change from Pre/Post Processor

3.9.5 Message Static Definitions

1930 This transaction contains the messages used by the Pre or Post-Processor to report all the status changes of the SWOS, and the related application acknowledgements. Status changes include: "specimen arrived", "SWOS complete", "SWOS failed"…

3.9.5.1 Trigger Events

SSU (U03): Pre/Post Processor transmits a Specimen Status Update Message.

1935 ACK (U03): Automation Manager sends the affirmative response.

3.9.5.2 Message Semantics

Table 3.9.5.2-1: SSU^U03

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
EQU	Equipment Detail	R	[1..1]	13
{	--- SPECIMEN_CONTAINER begin	R	[1..1]	
SAC	Specimen Container Detail	R	[1..1]	13
{ [OBX] }	Additional specimen characteristics	O	[0..*]	7
[{	--- SPECIMEN begin	O	[0..1]	
SPM	Specimen information	R	[1..1]	7
{ [OBX] }	Observation Result (for Specimen)	O	[0..*]	7
}]	--- SPECIMEN end			

Segment	Meaning	Usage	Card.	HL7 chapter
}	--- SPECIMEN_CONTAINER end			

1940

Table 3.9.5.2-2: ACK^U03

Segment	Meaning	Usage	Card.	HL7 chapter
MSH	Message header	R	[1..1]	2
MSA	Message Acknowledgement	R	[1..1]	2
[ERR]	Error	O	[0..1]	2

3.9.5.3 Expected Actions

The Pre/Post Processor sends a Process Result using the SSU message to the Automation Manager. The Automation Manager accepts and registers the Process Result, and responds to the
1945 Pre/Post Processor using the ACK message.

Note: The SSU message might appear too restrictive to meet future needs for carrying the output data of a SWOS, brought along by specific pre or post processing devices. If such a use case appears in the future for a specific device, alternative messages will be studied to extend this profile.

1950 ## 4 Real World Use Cases

4.1 Guidelines

Each of the real world use cases in this section are to be considered as a template for handling a category of laboratory testing throughout all the transactions of the Laboratory Technical Framework. Only the major steps and interactions are described.

1955 Each use case is described by a storyboard that describes the complete workflow in chronological order, completed by an interaction diagram, and illustrated by the most significant messages of this workflow.

The message descriptions are abbreviated, to focus on the main points of interest.

For brevity, only some of the application acknowledgements are shown.

1960 The actors' names are abbreviated with their initials (OP, OF, AM, ORT). These abbreviations are also used in the MSH-3 (sending application) and MSH-5 (receiving application) fields.

All use cases assume that the placer order is related to a placer group number (ORC-4).

All tests are identified in OBX segments by their LOINC code when available.

Colors point out key information in the messages.

1965 ## 4.2 Two Hematology Batteries on a Blood Specimen

4.2.1 Storyboard

This example corresponds to the use case described in Volume 1 as "Externally placed order with specimens unidentified or to be collected by the laboratory". The specimen is not identified by the ordering care unit.

1970 Dr. Physician orders two batteries of tests on the same specimen: blood count and differential blood count.

Human actors and organizations participating to the process:

Assigning authority:	Abbeville Hospital
Placer:	Urology department
1975 Filler:	Cytology laboratory
Ordering facility:	Urology
Patient:	John Ill, Patient hospital identifier: 6543210, Patient visit number: 999888, class = inpatient
Orderer:	Dr. Uro
1980 Placer order enterer:	Janet Nurse
Specimen collector:	John Collect
Technician:	Marc Techos
Clinical expert:	Jane Cyto

ID numbers used by the workflow:

ID number	Value	Assigned by
Patient hospital ID	6543210	Admission office (ADT)
Patient visit number	9998888	Admission office (ADT)
Care unit order group	555	Urology department (OP)
Care unit order (1st battery)	9876543	Urology department (OP)
Care unit order (2nd battery)	9876544	Urology department (OP)
Laboratory order (1st battery) idem for work order	456	Cytology laboratory (OF)
Laboratory order (2nd battery) idem for work order	457	Cytology laboratory (OF)
Work Order Step Code (1st battery)	456	Cytology laboratory (AM)
Work Order Step Code (2nd battery)	457	Cytology laboratory (AM)
Specimen	456_1	Cytology laboratory (OF)

1985

LAB-1 interaction: The Care Unit collects a specimen related to an order for a blood count and a differential count, and sends the specimen to the chemistry laboratory. The Order Placer sends a message "new order" (NW) accompanying the specimen, to let the laboratory start the testing.

LAB-4, LAB-1 and LAB-3 interactions: The laboratory checks the specimen and schedules the work. An identifier is assigned to the specimen by the Order Filler and the corresponding identification label is printed out. The Order Filler sends a unique work order to the Automation Manager. The Order Filler notifies both Order Placer and Order Result Tracker of the scheduled work.

LAB-5, LAB-1 and LAB-3 interactions: After technical validation by a laboratory technician (Marc Techos), the Automation Manager sends back all the observations to the Order Filler.

LAB-1 and LAB-3 interactions: After clinical validation, the Order Filler notifies the results to the Order Result Tracker, and notifies the status change to the Order Placer.

4.2.2 Interaction Diagram
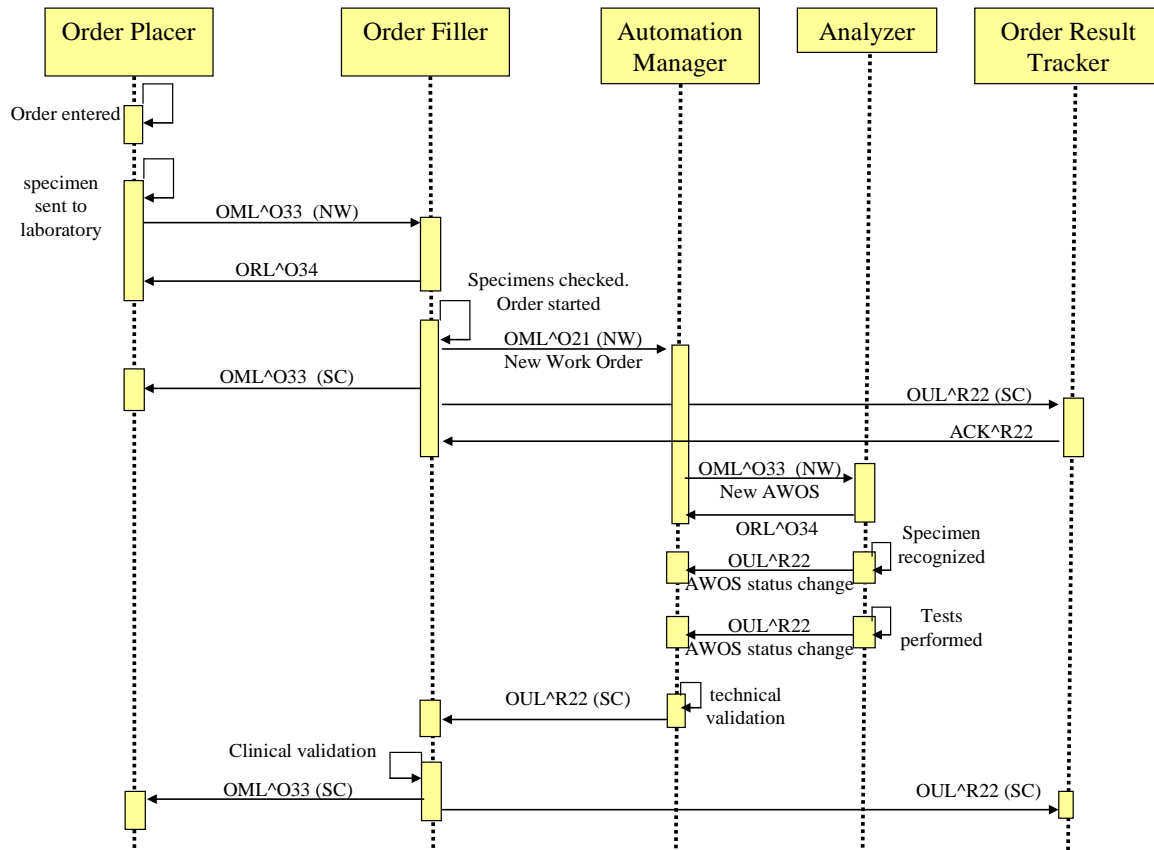
4.2.3 Messages

4.2.3.1 LAB-1 (OP → OF): Message "New order" with one Specimen

A new placer order sent to the Order Filler:
```
MSH|^~\&|OP|Urology|OF|Cytology|200310060820||OML^O33^OML_O33|001|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I||||||||||||||||||||9998888
SPM|1|||BLD|||||||P||||||200310060735|||||||||1
ORC|NW|9876543^Urology||555^Urology
|||||200310060710|^NURSE^JANET||||||||||||Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|9876543^Urology||85027^Hemogram and platelet count, automated^C4|
||||||^COLLECT^JOHN||||||^URO^^^^DR
ORC|NW|9876544^Urology||555^Urology
|||||200310060710|^NURSE^JANET||||||||||||Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|9876544^Urology||85009^Differential WBC Count, buffy coat^C4|
||||||^COLLECT^JOHN||||||^URO^^^^DR
```

The related acknowledgement message isn't shown.

4.2.3.2 LAB-4 (OF → AM): Message "New order"

A new work order is sent to the Automation Manager:
```
MSH|^~\&|OF|Cytology|AM|Automation|200310060825||OML^O33^OML_O33|101|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I||||||||||||||||||||9998888
SPM|1|456_1^Cytology||BLD|||||||P||||||200310060735|200310060821|||||||||1
ORC|NW|||555^Urology|||||200310060710|^NURSE^JANET||||||||||||Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|456^Cytology||85027^Hemogram and platelet count, automated^C4|
||||||^COLLECT^JOHN||||||^URO^^^^DR
ORC|NW|||555^Urology|||||200310060710|^NURSE^JANET||||||||||||Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|457^Cytology||85009^Differential WBC Count, buffy coat^C4|
||||||^COLLECT^JOHN||||||^URO^^^^DR
```

Acknowledgement sent by the Automation Manager:

```
MSH|^~\&|AM|Automation|OF|Cytology|200310060826||ORL^O34^ORL_O34|301|T|2.5|||||USA||EN
MSA|AA|101
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
SPM|1|456_1^Cytology||BLD|||||||P||||||200310060735|200310060821|||||||||1
ORC|OK|||555^Urology|SC||||200310060710|^NURSE^JANET||||||||||||
Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|456^Cytology||85027^Hemogram and platelet count, automated^C4|
||||||^COLLECT^JOHN|S|||||^URO^^^^DR
ORC|OK|||555^Urology|SC||||200310060710|^NURSE^JANET||||||||||||
Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|457^Cytology||85009^Differential WBC Count, buffy coat^C4|
```

```
|||||^COLLECT^JOHN|S|||||^URO^^^^DR
```

4.2.3.3 LAB-1 (OF → OP): Message "Status changed"

The placer order has been assigned a filler order number, the specimen is available and
2055 **identified by the laboratory:**

```
MSH|^~\&|OF|Cytology|OP|Urology|200310060825||OML^O33^OML_O33|108|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||||9998888
SPM|1|456_1^Cytology||BLD|||||||P||||||200310060735|200310060821||Y||||||1
ORC|SC|9876543^Urology||555^Urology|IP||||200310060710|^NURSE^JANET||||||||||||
Urology^^^^^^FI^^^UR01
TQ1|1|||||||||R
OBR|1|9876543^Urology|456^Cytology|85027^Hemogram and platelet count, automated^C4|
|||||^COLLECT^JOHN|P|||||^URO^^^^DR|||||||||I
ORC|SC|9876544^Urology||555^Urology|IP||||200310060710|^NURSE^JANET||||||||||||
Urology^^^^^^FI^^^UR01
TQ1|1|||||||||R
OBR|1|9876544^Urology|457^Cytology|85009^Differential WBC Count, buffy coat^C4|
|||||^COLLECT^JOHN|P|||||^URO^^^^DR|||||||||I
```
2070

The related acknowledgement message isn't shown.

4.2.3.4 LAB-3 (OF->ORT): Message "Order Status Change"

The Order Result Tracker is informed that a new order is being performed:

2075
```
MSH|^~\&|OF|Cytology|ORT||200310060825||OUL^R22^OUL_R22|122|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||||9998888
SPM|1|456_1^Cytology||BLD|||||||P||||||200310060735|200310060821||Y||||||1
OBR|1|9876543^Urology|456^Cytology|85027^Hemogram and platelet count, automated^C4|
|||||^COLLECT^JOHN|P|||||^URO^^^^DR|||||||||I
ORC|SC|9876543^Urology||555^Urology|IP||||200310060710|^NURSE^JANET||||||||||||
Urology^^^^^^FI^^^UR01
TQ1|1|||||||||R
OBR|2|9876544^Urology|457^Cytology|85009^Differential WBC Count, buffy coat^C4|
|||||^COLLECT^JOHN|P|||||^URO^^^^DR|||||||||I
ORC|SC|9876544^Urology||555^Urology|IP||||200310060710|^NURSE^JANET||||||||||||
Urology^^^^^^FI^^^UR01
TQ1|1|||||||||R
```

2090 Acknowledgement sent by the Order Results Tracker:

```
MSH|^~\&|ORT||OF|Cytology|200310060826||ACK^R22^ACK |401|T|2.5|||||USA||EN
MSA|AA|122
```

2095 **4.2.3.5 LAB-21 (AM→ Analyzer): New AWOS**

```
MSH|^~\&|AM|Cytology|LD|Cytology|200506121348||OML^O33^OML_O33|001|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||||9998888
SPM|1|456_1||BLD|||||||P|||||200506121330|||||||||1
ORC|NW|9876543^Urology|||||||200506121315|66622^NURSE^JANET|||||||||||Urology
TQ1||||||||||R
OBR||9876543||85027^Hemogram and platelet count, automated^C4||||||||||||||14788^URO
ORC|NW|9876544^Urology|||||||200506121315|66622^NURSE^JANET|||||||||||Urology
TQ1||||||||||R
OBR||9876544||85009^Differential WBC count, buffy coat^C4||||||||||||||14788^URO
```

Acknowledgement sent by the Analyzer:

```
MSH|^~\&|LD|Cytology|AM|Cytology|200506121349||ORL^O34^ORL_O34|101|T|2.5|||||USA||EN
MSA|AA|001
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||||9998888
SPM|1|456_1||BLD
ORC|OK|9876543^Urology|||||||200506121349
OBR||9876543||85027^Hemogram and platelet count, automated^C4
ORC|OK|9876544^Urology|||||||200506121349
OBR||9876544||85009^Differential WBC count, buffy coat^C4
```

4.2.3.6 LAB-23 (Analyzer → AM): Specimen for AWOS Arrived

```
MSH|^~\&|LD|Cytology|AM|Cytology|200506121400||OUL^R22^OUL_R22|102|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||||9998888
SPM|1|456_1||BLD
OBR||9876543||85027^Hemogram and platelet count, automated^C4|||||||||||||||||||||||I
ORC|SC|9876543^Urology|||||||200506121400
OBR||9876544||85009^Differential WBC count, buffy coat^C4|||||||||||||||||||||||I
```

2125 Acknowledgement not shown.

4.2.3.7 LAB-23 (Analyzer → AM): Tests Performed

```
MSH|^~\&|LD|Cytology|AM|Cytology|200506121410||OUL^R22^OUL_R22|102|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||||9998888
SPM|1|456_1||BLD
OBR||9876543||85027^Hemogram and platelet count, automated^C4|||||||||||||||||||||||R
ORC|SC|9876543^Urology|||||||200506121410
OBX|1|NM|11156-7^LEUKOCYTES^LN||8.2|10*3/mm3|||||R|||200506121410
OBX|2|NM|11273-0^ERYTHROCYTES^LN||4.08|10*3/mm3|||||R|||200506121410
OBX|3|NM|20509-6^HEMOGLOBIN^LN||13.4|10*3/mm3|||||R|||200506121410
OBX|4|NM|20570-8^HEMATOCRIT^LN||39.7|10*3/mm3|||||R|||200506121410
OBX|5|NM|30428-7^MVC^LN||97|10*3/mm3|||||R|||200506121410
OBX|6|NM|28539-5^MCH^LN||33.0|10*3/mm3|||||R|||200506121410
OBX|7|NM|28540-3^MCHC^LN||33.8|10*3/mm3|||||R|||200506121410
OBX|8|NM|11125-2^PLATELETS^LN||220|10*3/mm3|||||R|||200506121410
OBR||9876544||85009^Differential WBC count, buffy coat^C4|||||||||||||||||||||||R
ORC|SC|9876544^Urology|||||||200506121410
```

```
2145   OBX|1|NM|23761-0^NEUTROPHILS/100 LEUKOCYTES^LN||72|%|||||R|||200506121410
       OBX|2|NM|26450-7^EOSINOPHILS/100 LEUKOCYTES ^LN||2|%|||||R|||200506121410
       OBX|3|NM|26478-8^LYMPHOCYTES/100 LEUKOCYTES ^LN||20|%|||||R|||200506121410
       OBX|4|NM|26485-3^MONOCYTES/100 LEUKOCYTES ^LN||6|%|||||R|||200506121410
       OBX|5|NM|30180-4^BASOPHILS/100 LEUKOCYTES ^LN||0|%|||||R|||200506121410
```

2150 4.2.3.8 LAB-5 (AM->OF): Message "New Results"

The Automation Manager sends the final results for the work order:
```
       MSH|^~\&|AM|Automation|OF|Urology|200310060900||OUL^R22^OUL_R22|308|T|2.5|||||USA||EN
       PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
       PV1|1|I||||||||||||||||||9998888
2155   SPM|1|456_1^Cytology||BLD|||||||P||||||200310060735|200310060821||Y||||||1
       OBR|1|456^Cytology||85027^Hemogram and platelet count, automated^C4|
       |||||^COLLECT^JOHN|P|||||^URO^^^^DR|
       |||||||200310060832|||F|||||||&TECHOS&MARC^200310060833
       ORC|SC||||CM||||200310060710|^NURSE^JANET||||||||||||Urology^^^^^^FI^^^UR01
2160   OBX|1|NM|11156-7^LEUKOCYTES^LN||8.2|10*3/mm3|4-10|N|||F|||200310060830
       OBX|2|NM|11273-0^ERYTHROCYTES^LN||4.08|10*6/mm3|10-12|N|||F|||200310060830
       OBX|3|NM|20509-6^HEMOGLOBIN^LN||13.4|g/dL|11.5-14.5|N|||F|||200310060830
       OBX|4|NM|20570-8^HEMATOCRIT^LN||39.7|%|37-47|N|||F|||200310060830
       OBX|5|NM|30428-7^MCV^LN||97|fL|80-95|N|||F|||200310060830
2165   OBX|6|NM|28539-5^MCH^LN||33.0|pg|27-32|N|||F|||200310060830
       OBX|7|NM|28540-3^MCHC^LN||33.8|%|30-36|N|||F|||200310060830
       OBX|8|NM|11125-2^PLATELETS^LN||220|10*9/L|150-400|N|||F|||200310060830
       OBR|2|457^Cytology||85009^Differential WBC Count, buffy coat^C4|
       |||||^COLLECT^JOHN|P|||||^URO^^^^DR
2170   |||||||200310060832|||F|||||||&TECHOS&MARC^200310060833
       ORC|SC||||CM||||200310060710|^NURSE^JANET||||||||||||Urology^^^^^^FI^^^UR01
       OBX|1|NM|23761-0^NEUTROPHILS/100 LEUKOCYTES^LN||72|%||N|||F|||200310060830
       OBX|2|NM|26450-7^EOSINOPHILS/100 LEUKOCYTES^LN||2|%||N|||F|||200310060830
       OBX|3|NM|26478-8^LYMPHOCYTES/100 LEUKOCYTES^LN||20|%||N|||F|||200310060830
2175   OBX|4|NM|26485-3^MONOCYTES/100 LEUKOCYTES^LN||6|%||N|||F|||200310060830
       OBX|5|NM|30180-4^BASOPHILS/100 LEUKOCYTES^LN||0|%||N|||F|||200310060830
```

The related acknowledgement message isn't shown.

2180 4.2.3.9 LAB-1 (OF->OP): Message "Status Changed"

The clinical expert has performed the clinical validation at 09h29. The order is completed:
```
       MSH|^~\&|OF|Urology| OP|Urology|200310060930||OML^O33^OML_O33|181|T|2.5|||||USA||EN
       PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
       PV1|1|I|||||||||||||||||9998888
2185   SPM|1|456_1^Cytology||BLD|||||||P||||||200310060735|200310060821||Y||||||1
       ORC|SC|9876543^Urology|555^Urology|CM||||200310060710|^NURSE^JANET||||||||||||
       Urology^^^^^^FI^^^UR01
       TQ1|1|||||||||R
       OBR|1|9876543^Urology|456^Cytology|85027^Hemogram and platelet count, automated^C4|
       |||||^COLLECT^JOHN|P|||||^URO^^^^DR|||||||||F|||||||&CYTO&JANE^200310060929
2190   ORC|SC|9876544^Urology|555^Urology|CM||||200310060710|^NURSE^JANET||||||||||||
       Urology^^^^^^FI^^^UR01
```

```
     TQ1|1||||||||R
     OBR|1|9876544^Urology|457^Cytology|85009^Differential WBC Count, buffy coat^C4|
2195 ||||||^COLLECT^JOHN|P||||||^URO^^^^DR|||||||||||F|||||||&CYTO&JANE^200310060929
```

The related acknowledgement message isn't shown.

4.2.3.10   LAB-3 (OF->ORT): Message "Status Changed"

2200   The clinical expert has performed the clinical validation at 09h29. The order is completed. The
results are final:
```
     MSH|^~\&|OF|Cytology|ORT||200310060931||OUL^R22^OUL_R22|182|T|2.5|||||USA||EN
     PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
     PV1|1|I||||||||||||||||||9998888
2205 SPM|1|456_1^Cytology|BLD|||||||P||||||200310060735|200310060821||Y||||||1
     OBR|1|9876543^Urology|456^Cytology|85027^Hemogram and platelet count, automated^C4|
     ||||||^COLLECT^JOHN|P|||||^URO^^^^DR|
     ||||||200310060929|||F|||||||&CYTO&JANE^200310060929
     ORC|SC|9876543^Urology||555^Urology|CM||||200310060710|^NURSE^JANET||||||||||||
2210 Urology^^^^^^FI^^^UR01
     TQ1|1||||||||R
     OBX|1|NM|11156-7^LEUKOCYTES^LN||8.2|10*3/mm3|4-10|N|||F|||200310060830
     OBX|2|NM|11273-0^ERYTHROCYTES^LN||4.08|10*6/mm3|10-12|N|||F|||200310060830
     OBX|3|NM|20509-6^HEMOGLOBIN^LN||13.4|g/dL|11.5-14.5|N|||F|||200310060830
2215 OBX|4|NM|20570-8^HEMATOCRIT^LN||39.7|%|37-47|N|||F|||200310060830
     OBX|5|NM|30428-7^MCV^LN||97|fL|80-95|N|||F|||200310060830
     OBX|6|NM|28539-5^MCH^LN||33.0|pg|27-32|N|||F|||200310060830
     OBX|7|NM|28540-3^MCHC^LN||33.8|%|30-36|N|||F|||200310060830
     OBX|8|NM|11125-2^PLATELETS^LN||220|10*9/L|150-400|N|||F|||200310060830
2220 OBR|2|9876544^Urology|457^Cytology|85009^Differential WBC Count, buffy coat^C4|
     ||||||^COLLECT^JOHN|P|||||^URO^^^^DR|
     ||||||200310060929|||F|||||||&CYTO&JANE^200310060929
     ORC|SC|9876544^Urology||555^Urology|CM||||200310060710|^NURSE^JANET||||||||||||
     Urology^^^^^^FI^^^UR01
2225 TQ1|1||||||||R
     OBX|1|NM|23761-0^NEUTROPHILS/100 LEUKOCYTES^LN||72|%||N|||F|||200310060830
     OBX|2|NM|26450-7^EOSINOPHILS/100 LEUKOCYTES^LN||2|%||N|||F|||200310060830
     OBX|3|NM|26478-8^LYMPHOCYTES/100 LEUKOCYTES^LN||20|%||N|||F|||200310060830
     OBX|4|NM|26485-3^MONOCYTES/100 LEUKOCYTES^LN||6|%||N|||F|||200310060830
2230 OBX|5|NM|30180-4^BASOPHILS/100 LEUKOCYTES^LN||0|%||N|||F|||200310060830
```

The related acknowledgement message isn't shown.

4.3 Test on a Series of Specimens: Glucose Tolerance Study

4.3.1 Storyboard

This use case is in the context given by the first general use case presented in Volume 1 "3.1.1: Externally placed order with identified specimens". The ordering care unit thus identifies the specimens.

Dr. Physician orders one battery and provides a series of specimen collected at different times. The battery consists of one single test: glucose concentration on blood serum, repeated on a number of specimens, to be performed by the chemistry laboratory. The order is assumed to be part of a group of placer orders identified by the placer group number '666'.

Glucose tolerance is ordered as a single battery requesting for glucose test on an unspecified number of blood serum drawn at different intervals, after initial glucose ingestion". The SPM segments in the order message indicate the number of specimens, which can vary. The result consists of all the observation performed on each related individual specimen. All specimens produce results, except one unfortunately broken.

Human actors and organizations participating to the process:

Assigning authority: Memphis Hosp.

Placer: Entero-gastric department

Filler: Chemistry laboratory

Ordering facility: Entero-gastric

Patient: Adam Everyman Jr., account number: 12345 (check-digit 5 modulo 10), class = outpatient.

Orderer: Dr. Physician, phone number 821, ID number in the hospital 222222

Placer order enterer: Nancy Nurse, ID number 222221

Specimen collector: M. Bleeder, ID number 1234

Technician: Suzy Technician, ID number 333333

Clinical expert: Jane Chemistry-Expert, ID number 444444

ID numbers used by the workflow:

ID number	Value	Assigned by
Patient ID	12345	Admission office (ADT)
Care unit order	12345678	Entero-gastric department (OP)
Care unit order group	666	Entero-gastric department (OP)
1st specimen	123456781	Entero-gastric department (OP)
2nd specimen	123456782	Entero-gastric department (OP)

ID number	Value	Assigned by
3rd specimen	123456783	Entero-gastric department (OP)
4th specimen	123456784	Entero-gastric department (OP)
5th specimen	123456785	Entero-gastric department (OP)
Laboratory order	555	Chemistry laboratory (OF)
1st work order	555_1	Chemistry laboratory (OF)
2nd work order	555_2	Chemistry laboratory (OF)
3rd work order	555_3	Chemistry laboratory (OF)
4th work order	555_4	Chemistry laboratory (OF)

LAB-1 interaction: The Care Unit collects the first three specimens related to an order for glucose tolerance, with the high priority 'ASAP', and sends these specimens to the chemistry laboratory. The Order Placer sends a message "new order" (NW) accompanying the first three specimens, to let the laboratory start the testing. OBR-11 "Specimen action code" is valued to "P" (pending specimen) indicating that some specimens for this order are still pending (i.e., not yet collected). The order placer provides an observation reporting the initial quantity of sugar absorbed by the patient.

LAB-4, LAB-1 and LAB-3 interactions: The laboratory checks the specimens and schedules the work. The Order Filler sends the first work orders to the Automation Manager. The Order Filler notifies both Order Placer and Order Result Tracker of the scheduled work, notifying that the third specimen being broken, won't produce any observation. SPM-20 (specimen availability) = 'N' and SPM-21 (specimen reject reason) = 'RB' (broken container). Since this is a timing series, the Order Placer won't replace this specimen. There will simply be a missing point in the final observation graph.

LAB-5, LAB-1 and LAB-3 interactions: After technical validation, the Automation Manager sends back the first two observations to the Order Filler. Given that the order priority is "ASAP", the Order Filler notifies these partial results to the Order Result Tracker, and notifies the status change to the Order Placer, without waiting for the clinical validation.

LAB-1 interaction: Later on, as the two last specimens are sent to the laboratory, the Order Placer sends an additional message for that order, with the order control "change order request" (XO). This message contains the complete list of specimens. OBR-11 "Specimen action code" is valued to "S", indicating that the specimen collection is complete, and that the laboratory can achieve its work.

LAB-4, LAB-1 and LAB-3 interactions: The laboratory checks the last specimens. The Order Filler sends the last work orders to the Automation Manager. The Order Filler notifies both Order Placer and Order Result Tracker with the progress of the order.

LAB-5 interaction: After technical validation, the Automation Manager sends the last results to the Order Filler.

2290 **LAB-1 and LAB-3 interactions:** After clinical validation, the Order Filler notifies the final results to the Order Result Tracker, and notifies the status change to the Order Placer.

4.3.2 Interaction Diagram
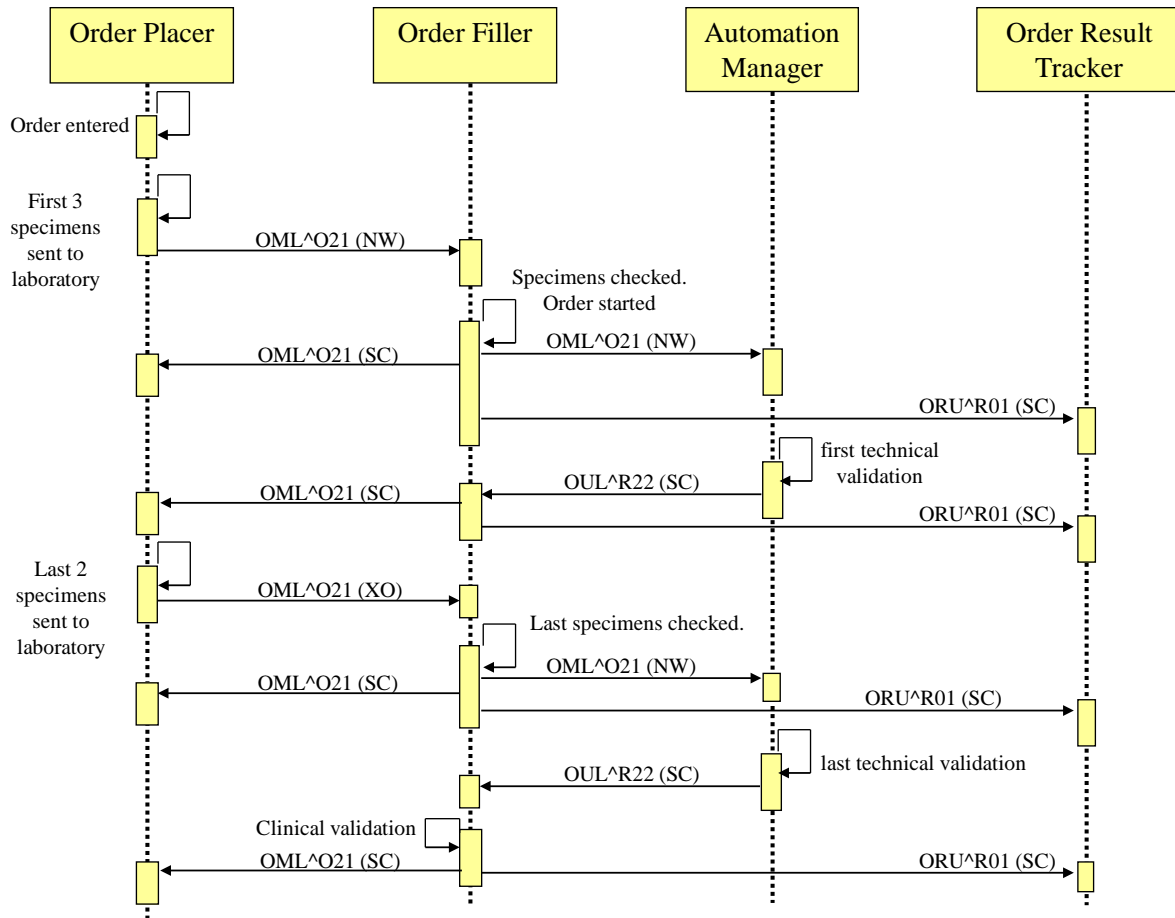
4.3.3 Messages

4.3.3.1 LAB-1 (OP → OF): Message "New order" with the first 3 Specimens

A new placer order sent to the Order Filler: Priority "ASAP" for this placer order. One observation provided by the placer. Three first specimens collected. The other specimens are pending.

```
MSH|^~\&|OP|Entero-gastric|OF|Chemistry|200309060820||OML^O21^OML_O21|
msgOP123|T|2.5|123| |||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||||12345
ORC|NW|12345678^gastric||666^gastric|||||200309060710|222221^NURSE^NANCY|||||||||||||Ent
ero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
```

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```
OBR||12345678^gastric||82951^Glucose Tolerance Test^C4||||||1234^BLEEDER|
P|||||222222^PHYSICIAN^^^^DR|821
OBX|1|NM|GLUCOSE||75|g|||||F|||200309060735
SPM|1|123456781^gastric||SER|||||||P||||||200309060735|||||||||1
SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|||||||||1
SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|||||||||1
```

2310

The related acknowledgement message isn't shown.

4.3.3.2 LAB-4 (OF → AM): Message "New order" with the first 2 Specimens

2315

Two new work orders sent to the Automation Manager: Priority ASAP. One observation provided.

```
MSH|^~\&|OF|Chemistry|AM|Automation|200309060825||OML^O21^OML_O21|msgOF101|T|2.5|123||
|||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||||12345
ORC|NW|||666^gastric||||||200309060824|222221^NURSE^NANCY|||||||||||
Entero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
OBR||555_1^chemistry||GLUC^GLUCOSE^L||||||1234^BLEEDER|S|||||222222^PHYSICIAN^^^^DR|82
1
SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821|||||||||1
ORC|NW|||666^gastric||||||200309060710|222221^NURSE^NANCY|||||||||||
Entero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
OBR||555_2^chemistry||GLUC^GLUCOSE^L||||||1234^BLEEDER|S|||||
222222^PHYSICIAN^^^^DR|821
SPM|1|123456782^gastric||SER|||||||P||||||200309060755|200309060821|||||||||1
```

2320

2325

2330

2335

The related acknowledgement message isn't shown.

4.3.3.3 LAB-1 (OF → OP): Message "Status changed" with the first 3 Specimens

The placer order has been assigned a filler order number. One specimen is rejected:

```
MSH|^~\&|OF|Chemistry|OP|Entero-gastric|200309060825||OML^O21^OML_O21|msgOF102|
T|2.5|123| |||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||||12345
ORC|SC|12345678^gastric| 666^gastric|IP||||200309060824|222221^NURSE^NANCY ||||||||||||
Entero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
OBR||12345678^gastric|555^chemistry|82951^Glucose Tolerance Test^C4||||||
1234^BLEEDER|P|||||222222^PHYSICIAN^^^^DR|821|||||||||I
SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821||Y||||||1
SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|200309060821||Y||||||1
SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|200309060821||N|RB|||||1
```

2340

2345

2350

The related acknowledgement message isn't shown.

4.3.3.4 LAB-3 (OF → ORT): Message first Specimens accepted for an order

The Order Result Tracker is informed that a new order is in process: The observation related to
2355   the 3rd specimen (unavailable) is canceled.

```
MSH|^~\&|OF|Chemistry|ORT||200309060825||ORU^R01^ORU_R01|msgOF103|T|2.5|123||||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward||||||||||||||||12345
ORC|SC|12345678^gastric||666^gastric|IP||||200309060824|222221^NURSE^NANCY
||||||||||||Entero-gastric^^^^^^FI^^^EG02
OBR||12345678^gastric|555^chemistry|82951^Glucose Tolerance Test^C4|||||||
1234^BLEEDER|P|||||222222^PHYSICIAN^^^^DR|821|||||||||I
TQ1||||||||||A
OBX|1|NM|GLUCOSE|||75|g|||||F|||200309060735
OBX|2|NM|30264-6^GLUCOSE 40M POST DOSE GLUCOSE^LN|||||||||X
SPM|1|123456781^gastric ||SER||||||||P||||||200309060735|200309060821||Y||||||1
SPM|2|123456782^gastric ||SER||||||||P||||||200309060755|200309060821||Y||||||1
SPM|3|123456783^gastric ||SER||||||||P||||||200309060815|200309060821||N|RB|||||1
```

The related acknowledgement message isn't shown.

2370

4.3.3.5 LAB-5 (AM →OF): Message "New results" for the first 2 Work Orders

The Automation Manager sends the two final results for the 2 work orders, technically validated
by Suzy TECHNICIAN at 8h33:

```
MSH|^~\&|AM|Automation|OF|Chemistry|200309060833||OUL^R22^OUL_R22|msgAM1|T|2.5|123||||
2375    USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
SPM|1|123456781^gastric ||SER||||||||P||||||200309060735|200309060821|||||||||1
OBR||555_1^chemistry||GLUC^GLUCOSE^L||||||1234^BLEEDER
|S|||||222222^PHYSICIAN^^^^DR|821|||||200309060832|||F|||||||
2380    333333&TECHNICIAN&Suzy&&&&&&MEMPHIS HOSPITAL^200309060833
OBX|1|NM|14749-6^GLUCOSE^LN||4200|umol/l||N|||F|||200309060830
SPM|2|123456782^gastric||SER||||||||P||||||200309060755|200309060821|||||||||1
OBR||555_2^chemistry||GLUC^GLUCOSE^L||||||1234^BLEEDER
|S|||||222222^PHYSICIAN^^^^DR|821|||||200309060832|||F|||||||
2385    333333&TECHNICIAN&Suzy&&&&&&MEMPHIS HOSPITAL^200309060833
OBX|1|NM|14749-6^GLUCOSE^LN||6000|umol/l||N|||F|||200309060832
```

The related acknowledgement message isn't shown.

4.3.3.6 LAB-1 (OF → OP): Message "Status Changed"

Some results are available, not clinically validated (i.e., not verified)
2390
```
MSH|^~\&|OF|Chemistry|OP|Entero-gastric|200309060834||OML^O21^OML_O21|msgOF104|
T|2.5|123| |||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward||||||||||||||||12345
ORC|SC|12345678^gastric||666^gastric|A||||200309060834|222221^NURSE^NANCY|
2395    ||||||||||||Entero-gastric^^^^^^FI^^^EG02
TQ1||||||||||A
OBR||12345678^gastric|555^chemistry|82951^Glucose Tolerance
Test^C4|||||||1234^BLEEDER|P|||||222222^PHYSICIAN^^^^DR|821|||||||||R
SPM|1|123456781^gastric ||SER||||||||P||||||200309060735|200309060821||Y||||||1
2400    SPM|2|123456782^gastric ||SER||||||||P||||||200309060755|200309060821||Y||||||1
```

```
SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|200309060821||N|RB|||||1
```

The related acknowledgement message isn't shown.

4.3.3.7 LAB-3 (OF → ORT): Message "Status Changed"

2405 The two first results are sent, not clinically validated (i.e., not verified):
```
MSH|^~\&|OF|Chemistry|ORT||200309060825||ORU^R01^ORU_R01|msgOF105|T|2.5|123||||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
ORC|SC|12345678^gastric||666^gastric|A||||200309060834|222221^NURSE^NANCY|
```
2410
```
|||||||||||Entero-gastric^^^^^^FI^^^EG02
OBR||12345678^gastric|^chemistry|82951^Glucose Tolerance
Test^C4|||||||1234^BLEEDER|P|||||222222^PHYSICIAN^^^^DR|821||||||||R
TQ1|||||||||A
OBX|1|NM|GLUCOSE||75|g|||||F|||200309060735
```
2415
```
OBX|2|NM|14996-3^GLUCOSE PRE 75 G GLUCOSE PO^LN||4200|umol/l|4000-6100|N|||
R|||200309060755
OBX|3|NM|30263-8^GLUCOSE 20M POST DOSE GLUCOSE^LN||6000|umol/l|<7800|N|||
R|||200309060755
OBX|4|NM|30264-6^GLUCOSE 40M POST DOSE GLUCOSE^LN|| | ||||||X
```
2420
```
SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821||Y||||||1
SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|200309060821||Y||||||1
SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|200309060821||N|RB^Broken
container|||||1
```

The related acknowledgement message isn't shown.

2425

4.3.3.8 LAB-1(OP → OF): Message "Change Order/Service Request"

The last 2 specimens have been collected and are sent to the laboratory:
```
MSH|^~\&|OP|Entero-gastric|OF|Chemistry|200309060900||OML^O21^OML_O21|msgOP124|
T|2.5|123| |||USA||EN
```
2430
```
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
ORC|XO|12345678^gastric|| 666^gastric|||||200309060855|222221^NURSE^NANCY|
|||||||||||Entero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
```
2435
```
OBR||12345678^gastric||82951^Glucose Tolerance Test^C4|||||||1234^BLEEDER|S|||||
222222^PHYSICIAN^^^^DR|821
OBX|1|NM|GLUCOSE||75|g|||||F|||200309060735
SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|||||||||1
SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|||||||||1
```
2440
```
SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|||||||||1
SPM|4|123456784^gastric ||SER|||||||P||||||200309060835|||||||||1
SPM|5|123456785^gastric ||SER|||||||P||||||200309060855|||||||||1
```

The related acknowledgement message isn't shown.

4.3.3.9 LAB-4 (OF → AM): Message "New order" with the last 2 Specimens

Two new work orders sent to the Automation Manager:

```
MSH|^~\&|OF|Chemistry|AM|Automation|200309060905||OML^O21^OML_O21|msgOF106|T|2.5|123|
|||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
ORC|NW|||666^gastric|||||200309060904|222221^NURSE^NANCY||||||||||||
Entero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
OBR||555_4^chemistry ||GLUC^GLUCOSE^L||||||1234^BLEEDER|
S|||||222222^PHYSICIAN^^^^DR|821
SPM|1|123456784^gastric ||SER|||||||P||||||200309060835|200309060902||||||||1
ORC|NW|||666^gastric|||||200309060904|222221^NURSE^NANCY||||||||||||
Entero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
OBR||555_5^chemistry ||GLUC^GLUCOSE^L|||||||1234^BLEEDER|S|||||
222222^PHYSICIAN^^^^DR|821
SPM|1|123456785^gastric ||SER|||||||P||||||200309060855|200309060902||||||||1
```

The related acknowledgement message isn't shown.

4.3.3.10 LAB-1 (OF → OP): Message "Status changed" with all Specimens

All the specimens have been checked by the laboratory staff.

```
MSH|^~\&|OF|Chemistry|OP|Entero-gastric|200309060905||OML^O21^OML_O21|msgOF107|
T|2.5|123| |||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
ORC|SC|12345678^gastric| |666^gastric|A||||200309060904|222221^NURSE^NANCY|
|||||||||||Entero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
OBR||12345678^gastric|555^chemistry|82951^Glucose Tolerance test^C4|||||||
1234^BLEEDER|P|||||222222^PHYSICIAN^^^^DR|821||||||||R
SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821||Y||||||1
SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|200309060821||Y||||||1
SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|200309060821||N|RB|||||1
SPM|4|123456784^gastric ||SER|||||||P||||||200309060835|200309060902||Y||||||1
SPM|5|123456785^gastric ||SER|||||||P||||||200309060855|200309060902||Y||||||1
```

The related acknowledgement message isn't shown.

4.3.3.11 LAB-3 (OF → ORT): Message "Status Changed"

The last two specimens have been received. All the work is scheduled:

```
MSH|^~\&|OF|Chemistry|ORT||200309060905||ORU^R01^ORU_R01|msgOF108|T|2.5|123||||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
ORC|SC|12345678^gastric| |666^gastric|A||||200309060904|222221^NURSE^NANCY||||||||||||En
tero-gastric^^^^^^FI^^^EG02
OBR||12345678^gastric|555^chemistry|82951^Glucose Tolerance Test^C4|||||||
1234^BLEEDER|S|||||222222^PHYSICIAN^^^^DR|821||||||||R
TQ1|||||||||A
OBX|1|NM|GLUCOSE||75|g|||||F|||200309060735
```

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```
      OBX|2|NM|14996-3^GLUCOSE PRE 75 G GLUCOSE PO^LN||4200|umol/l|4000-6100|N|||
      R|||200309060735
2495  OBX|3|NM|30263-8^GLUCOSE 20M POST DOSE GLUCOSE^LN||6000|umol/l|<7800|N|||
      R|||200309060755
      OBX|4|NM|30264-6^GLUCOSE 40M POST DOSE GLUCOSE^LN|| | |||||X
      SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821||Y|||||||1
      SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|200309060821||Y|||||||1
2500  SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|200309060821||N|RB^Broken
      container|||||1
      SPM|4|123456784^gastric ||SER|||||||P||||||200309060835|200309060902||Y|||||||1
      SPM|5|123456785^gastric ||SER|||||||P||||||200309060855|200309060902||Y|||||||1
```

The related acknowledgement message isn't shown.

2505

4.3.3.12   LAB-5 (AM →OF): "New results" for the last 2 Work Orders

The Automation Manager sends the two final results for the 2 work orders, technically validated by Suzy TECHNICIAN at 9h12.

```
      MSH|^~\&|AM|Automation|OF|Chemistry |200309060912||OUL^R22^OUL_R22|msgAM2|
2510  T|2.5|123||||USA ||EN
      PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
      SPM|1|123456784^gastric ||SER|||||||P||||||200309060835|200309060902|||||||||1
      OBR||555_4^chemistry||30266-1^GLUCOSE 1.6H POST DOSE GLUCOSE^LN||||||1234^BLEEDER|
      S|||||222222^PHYSICIAN^^^^DR|821|||||200309060911|||F|||||||
2515  333333&TECHNICIAN&Suzy&&&&&MEMPHIS HOSPITAL^200309060912
      OBX|1|NM|14749-6^GLUCOSE^LN||7200|umol/l||N|||F|||200309060910
      SPM|2|123456785^gastric ||SER|||||||P||||||200309060855|200309060902|||||||||1
      OBR||555_5^chemistry ||GLUC^GLUCOSE^L|||||||1234^BLEEDER|S|||||
      222222^PHYSICIAN^^^^DR|821|||||200309060911|||F|||||||
2520  333333&TECHNICIAN&Suzy&&&&&MEMPHIS HOSPITAL^200309060912
      OBX|1|NM|14749-6^GLUCOSE^LN||7100|umol/l||N|||F||||200309060911
```

The related acknowledgement message isn't shown.

4.3.3.13   LAB-1 (OF → OP): Message "Status Changed"

2525 Jane CHEMISTRY-EXPERT has performed the clinical validation at 9h29. The order is completed.

```
      MSH|^~\&|OF|Chemistry|OP|Entero-gastric|200309060930||OML^O21^OML_O21|msgOF109|
      T|2.5|123||| |USA||EN
      PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
2530  PV1|1|O|Ward||||||||||||||||12345
      ORC|SC|12345678^gastric|| 666^gastric|CM||||200309060929|222221^NURSE^NANCY|||||||||||||E
      ntero-gastric^^^^^^FI^^^EG02
      TQ1|||||||||A
      OBR||12345678^gastric|555^chemistry|82951^Glucose Tolerance Test^C4|||||||
2535  1234^BLEEDER|S|||||222222^PHYSICIAN^^^^DR|821|||||200309060929|||F|||||||
      444444&CHEMISTRY-EXPERT&Jane&&&&&MEMPHIS HOSPITAL^200309060929
      SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821||Y|||||||1
      SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|200309060821||Y|||||||1
      SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|200309060821||N|RB|||||1
2540  SPM|4|123456784^gastric ||SER|||||||P||||||200309060835|200309060902||Y|||||||1
```

```
SPM|5|123456785^gastric ||SER|||||||P||||||200309060855|200309060902||Y||||||1
```

The related acknowledgement message isn't shown.

2545 **4.3.3.14   LAB-3 (OF → ORT): Message "Status Changed"**

Jane CHEMISTRY-EXPERT has performed the clinical validation at 9h29. The order is completed. The results are final.

```
MSH|^~\&|OF|Chemistry|ORT||200309060930||ORU^R01^ORU_R01|msgOF110|T|2.5|123||||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||12345
ORC|SC|12345678^gastric|||666^gastric|CM||||200309060929|222221^NURSE^NANCY||||||||||||E
ntero-gastric^^^^^^FI^^^EG02
OBR||12345678^gastric|555^chemistry|82951^Glucose Tolerance Test^C4||||||
1234^BLEEDER|S|||||222222^PHYSICIAN^^^^DR|821||||||200309060929|||F|||||||
444444&CHEMISTRY-EXPERT&Jane&&&&&MEMPHIS HOSPITAL^200309060929
TQ1|||||||||A
OBX|1|NM|GLUCOSE||75|g|||||F|||200309060735
OBX|2|NM|14996-3^GLUCOSE PRE 75 G GLUCOSE PO^LN||4200|umol/l|4000-6100|N|||
F|||200309060735
OBX|3|NM|30263-8^GLUCOSE 20M POST DOSE GLUCOSE^LN||6000|umol/l|<7800|N|||
F|||200309060755
OBX|4|NM|30264-6^GLUCOSE 40M POST DOSE GLUCOSE^LN|||||||X
OBX|5|NM|14756-1^GLUCOSE 1H POST DOSE GLUCOSE^LN||7200|umol/l|<7800|N|||
F|||200309060835
OBX|6|NM|30265-3^GLUCOSE 1.3H POST DOSE GLUCOSE^LN||7100|umol/l|<7800|N|||
F|||200309060855
SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821||Y||||||1
SPM|2|123456782^gastric ||SER|||||||P||||||200309060755|200309060821||Y||||||1
SPM|3|123456783^gastric ||SER|||||||P||||||200309060815|200309060821||N|RB^Broken
container|||||1
SPM|4|123456784^gastric ||SER|||||||P||||||200309060835|200309060902||Y||||||1
SPM|5|123456785^gastric ||SER|||||||P||||||200309060855|200309060902||Y||||||1
```

The related acknowledgement message isn't shown.

2575

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4.4 Battery with 2 Specimens: Creatinine clearance

4.4.1 Storyboard

This example corresponds to the use case described in Volume 1 as "Externally placed order
with specimens unidentified or to be collected by the laboratory". The specimens are not
identified by the ordering care unit.

Dr. Nephro orders one battery of one test: a creatinine clearance.

The battery consists of a procedure applied on two specimen type, serum and 24 hour urine. At
the end of the 24 hour urine collection process, the specimen collector measures the collected
urine volume, records the duration of collection, takes a urine sample from the 24 hours
collection and draws a serum sample from the patient.

The order is assumed to be part of a group of placer orders identified by the placer group number
'777'.

Human actors and organizations participating to the process:

Assigning authority: Abbeville Hospital

Placer: Nephrology department

Filler: Chemistry laboratory

Ordering facility: Nephrology

Patient: John Ill, Patient hospital identifier: 6543210, Patient visit number: 999888,
class = inpatient

Orderer: Dr. Nephro

Placer order enterer: Janet Nurse

Specimen collector: John Collect

Technician: Marc Techos

Clinical expert: Jane Chemistry

ID numbers used by the workflow:

ID number	Value	Assigned by
Patient hospital ID	6543210	Admission office (ADT)
Patient visit number	9998888	Admission office (ADT)
Care unit order group	777	Nephrology department (OP)
Care unit order	9876543	Nephrology department (OP)
Laboratory order (1st battery) idem for work order	654	Chemistry laboratory (OF)
Specimen Serum	654_1	Chemistry laboratory (OF)

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International.**

ID number	Value	Assigned by
Specimen Urine	654_2	Chemistry laboratory (OF)

LAB-1 interaction: The Care Unit processes the specimen collection related to an order for a creatinine clearance, and sends the notified or measured values and the specimens to the chemistry laboratory. The Order Placer sends a message "new order" (NW) accompanying the specimen, to let the laboratory start the testing.

LAB-4, LAB-1 and LAB-3 interactions: The laboratory checks the specimens and schedules the work. An identifier is assigned to the specimens by the Order Filler and the corresponding identification labels are printed out. The Order Filler sends a unique work order to the Automation Manager. The Order Filler notifies both Order Placer and Order Result Tracker of the scheduled work.

LAB-5, LAB-1 and LAB-3 interactions: After technical validation by a laboratory technician (Marc Techos), the Automation Manager sends back all the observations to the Order Filler.

LAB-1 and LAB-3 interactions: After clinical validation, the Order Filler notifies the results to the Order Result Tracker, and notifies the status change to the Order Placer. The last interaction in transaction LAB-3 shows a negative acknowledgement and a repetition of the message followed by the final positive acknowledgement.

4.4.2 Interaction Diagram
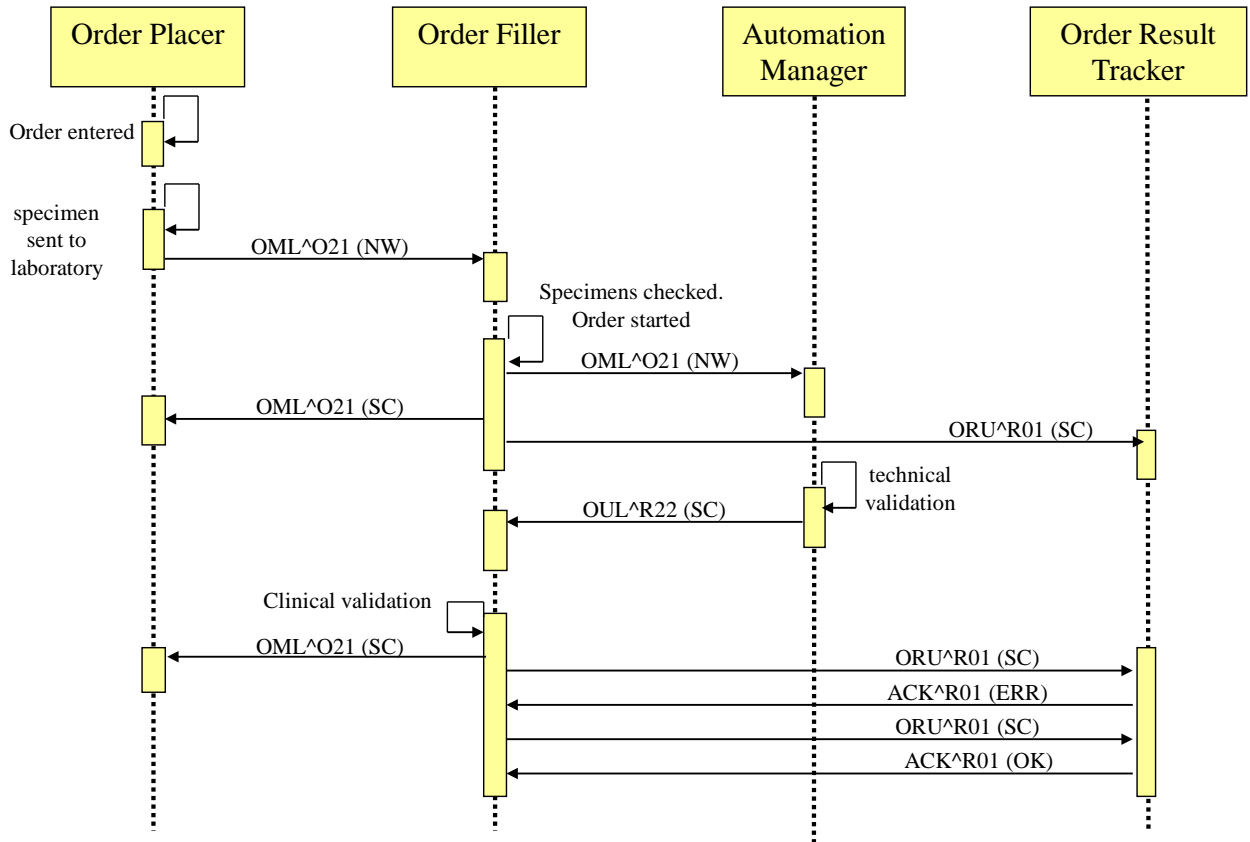
2620

4.4.3 Messages

4.4.3.1 LAB-1 (OP → OF): Message "New order" with one Specimen

A new placer order sent to the Order Filler:

```
MSH|^~\&|OP|Nephrology|OF|Chemistry|200310060820||OML^O21^OML_O21|001|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||9998888
ORC|NW|9876543^Nephro||777^Nephro|||||200310060710|^NURSE^JANET|||||||||||
Nephrology^^^^^^FI^^^NE03
TQ1|1||||||||R
OBR|1|9876543^Nephro||82575^Creatinine clearance^C4|||||||^COLLECT^JOHN|S|||||
^NEPHRO^^^^DR
OBX|1|NM|13362-9^URINE COLLECTION DURATION^LN||24|hr|||||F|||200309060735
OBX|2|NM|19153-6^URINE SPECIMEN VOLUME^LN||2500|ml|||||F|||200309060735
SPM|1|||SER|||||||P||||||200310060735|||||||||1
SPM|2|||UR|||||||P||||||200310060735|||||||||1
ORC|NW|||777^Nephro|||||200310060710|^NURSE^JANET||||||||||||| Nephrology^^^^^^FI^^^NE03
OBR|2|98765432^Nephro||11502-2^LABORATORY REPORT.TOTAL^LN|
```

The related acknowledgement message isn't shown.

4.4.3.2 LAB-4 (OF → AM): Message "New order"

A new work order is sent to the Automation Manager:

```
MSH|^~\&|OF|Chemistry|AM|Automation|200310060825||OML^O21^OML_O21|011|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||9998888
ORC|NW|||777^Nephro|||||200310060710|^NURSE^JANET|||||||||||
Nephrology^^^^^^FI^^^NE03
TQ1|1||||||||R
OBR|1|654^chemistry||82575^Creatinine clearance^C4|||||||^COLLECT^JOHN|S|||||
^NEPHRO^^^^DR
OBX|1|NM|13362-9^URINE COLLECTION DURATION^LN||24|hr|||||F|||200309060735
OBX|2|NM|19153-6^URINE SPECIMEN VOLUME^LN||2500|ml|||||F|||200309060735
SPM|1|654_1^chemistry||SER|||||||P||||||200310060735|200310060821|||||||||1
SPM|2|654_2^chemistry||UR|||||||P||||||200310060735|200310060821|||||||||1
```

The related acknowledgement message isn't shown.

4.4.3.3 LAB-1 (OF → OP): Message "Status Changed"

The placer order has been assigned a filler order number, the specimen is available and identified by the laboratory:

```
MSH|^~\&|OF|Chemistry|OP|Nephrology|200310060825||OML^O21^OML_O21|012|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||9998888
ORC|SC|9876543^Nephro||777^Nephro|IP||||200310060710|^NURSE^JANET|||||||||||
Nephrology^^^^^^FI^^^NE03
TQ1|1||||||||R
OBR|1|9876543^Nephro|654^chemistry|82575^Creatinine clearance^C4|
```

```
|||||^COLLECT^JOHN|P|||||^NEPHRO^^^^DR|||||||||I
SPM|1|654_1^chemistry||SER|||||||P||||||200310060735|200310060821||Y||||||1
SPM|2|654_2^chemistry||UR|||||||P||||||200310060735|200310060821||Y||||||1
```

2670   The related acknowledgement message isn't shown.

4.4.3.4 LAB-3 (OF->ORT): Message "Order Status Change"

The Order Result Tracker is informed that a new order is being processed:

```
MSH|^~\&|OF|Chemistry|ORT||200310060825||ORU^R01^ORU_R01|013|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
2675  PV1|1|I||||||||||||||||||9998888
ORC|SC|9876543^Nephro||777^Nephro|IP||||200310060710|^NURSE^JANET|||||||||||
Nephrology^^^^^^FI^^^NE03
OBR|1|9876543^Nephro|654^chemistry|82575^Creatinine clearance^C4|
|||||^COLLECT^JOHN|P|||||^NEPHRO^^^^DR|||||||||I
2680  TQ1|1||||||||R
SPM|1|654_1^chemistry||SER|||||||P|||||200310060735|200310060821||Y||||||1
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||2500|ml|||||F|||200309060735
```

2685   The related acknowledgement message isn't shown.

4.4.3.5 LAB-5 (AM->OF): Message "New Results"

The Automation Manager sends the final results for the work order:

```
MSH|^~\&|AM|Automation|OF|Nephrology|200310060900||OUL^R22^OUL_R22|3331|T|2.5|||||
USA||EN
2690  PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I||||||||||||||||||9998888
SPM|1|654_1^chemistry||SER|||||||P|||||200310060735|200310060821||Y||||||1
OBR|1|654^chemistry||82575^Creatinine clearance^C4|||||||^COLLECT^JOHN|
P|||||^NEPHRO^^^^DR||||||200310060832|||F|||||||&TECHOS&MARC^200310060833
2695  OBX|1|NM|15045-8^SERUM CREATININE^LN||93|umol/l|50-100|N|||F|||200310060830
SPM|2|654_2^chemistry||UR|||||||P|||||200310060735|200310060821||Y||||||1
OBR|1|654^chemistry||82575^Creatinine clearance^C4|||||||^COLLECT^JOHN|
P|||||^NEPHRO^^^^DR||||||200310060832|||F|||||||&TECHOS&MARC^200310060833
OBX|1|NM|14684-5^24H URINE CREATININE ^LN||7.06|mmol|8-16 (/24hr)|L|||F|||
2700  200310060830
OBX|2|NM|2164-2^CREATININE CLEARANCE^LN||52.7|ml/min|88-174|L||S|F|||200310060830
```

The related acknowledgement message isn't shown.

4.4.3.6 LAB-1 (OF->OP): Message "Status Changed"

The clinical expert has performed the clinical validation at 09h29. The order is completed:

```
2705  MSH|^~\&|OF|Nephrology|OP|Nephrology|200310060930||OML^O21^OML_O21|014|T|2.5|||||
USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I||||||||||||||||||9998888
ORC|SC|9876543^Nephro||777^Nephro|CM||||200310060710|^NURSE^JANET|||||||||||
2710  Nephrology^^^^^^FI^^^NE03
TQ1|1||||||||R
OBR|1|9876543^Nephro|654^chemistry|82575^Creatinine clearance^C4|
|||||^COLLECT^JOHN|P|||||^NEPHRO^^^^DR|||||||||F|||||||&CYTO&JANE^200310060929
SPM|1|654_1^chemistry||SER|||||||P|||||200310060735|200310060821||Y||||||1
2715  SPM|2|654_2^chemistry||UR|||||||P|||||200310060735|200310060821||Y||||||1
```

The related acknowledgement message isn't shown.

4.4.3.7 LAB-3 (OF->ORT): Message "Status Changed"

The clinical expert has performed the clinical validation at 09h29. The order is completed. The results are final:

```
2720   MSH|^~\&|OF|Chemistry|ORT||200310060931||ORU^R01^ORU_R01|015|T|2.5|||||USA||EN
       PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
       PV1|1|I|||||||||||||||||9998888
       ORC|SC|9876543^Nephro||777^Nephro|CM||||200310060710|^NURSE^JANET|||||||||||
       Nephrology^^^^^^FI^^^NE03
2725   OBR|1|9876543^Nephro|654^chemistry |82575^Creatinine clearance^C4|||||| ^COLLECT^JOHN
       |P|||||^NEPHRO^^^^DR|||||||200310060929|||F||||||| &CYTO&JANE^200310060929
       TQ1|1||||||||R
       OBX|1|NM|2164-2^CREATININE CLEARANCE^LN||52.7|ml/min|88-174|L||S|F|||200310060735
       OBX|2|NM|15045-8^SERUM CREATININE^LN||93|umol/l|50-100|N|||F|||200310060735
2730   OBX|3|NM|14684-5^24H URINE CREATININE^LN||7.06|mmol|8-16 (/24hr)|L|||F||| 200310060830
       SPM|1|654_1^chemistry||SER|||||||P||||||200310060735|200310060821||Y||||||1
       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||2400|ml|||||F|||200309060735
2735   ORC|SC|||777^Nephro|||||200805191100
       OBR|2|98765432^Nephro|6542^chemistry|11502-2^LABORATORY
       REPORT.TOTAL^LN|||||||||||||||||||||| ||F
       OBX|1|RP|11502-2^LABORATORY REPORT.TOTAL^LN||file://hserv/lr/lr12345678.pdf||||||F||P
```

Negative acknowledgement sent by the Order Results Tracker:

The ERR-4 = 'E' indicates that the message could not be integrated. The ERR-3 HL7 error code = 206 informs of the cause: a database locked. The MSA-1 = 'AR' says that the incoming message has been application-rejected. In this particular case, the rejection is not related to a value not acceptable in the MSH segment, therefore the sender should repeat its message later.

```
       MSH|^~\&|ORT||OF|Cytology|200310060932||ACK^R01^ACK|401|T|2.5|||||USA|EN
2745   MSA|AR|015
       ERR|||206^Application record locked|E
```

Repetition of the same result message by the Order Filler, one minute later

```
       MSH|^~\&|OF|Chemistry|ORT||200310060931||ORU^R01^ORU_R01|015|T|2.5|||||USA||EN
       PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
2750   PV1|1|I|||||||||||||||||9998888
       ORC|SC|9876543^Nephro||777^Nephro|CM||||200310060710|^NURSE^JANET|||||||||||
       Nephrology^^^^^^FI^^^NE03
       OBR|1|9876543^Nephro|654^chemistry |82575^Creatinine clearance^C4|||||| ^COLLECT^JOHN
       |P|||||^NEPHRO^^^^DR|||||||200310060929|||F||||||| &CYTO&JANE^200310060929
2755   TQ1|1||||||||R
       OBX|1|NM|2164-2^CREATININE CLEARANCE^LN||52.7|ml/min|88-174|L||S|F|||200310060735
       SPM|1|654_1^chemistry||SER|||||||P||||||200310060735|200310060821||Y||||||1
       OBX|1|NM|15045-8^SERUM CREATININE^LN||93|umol/l|50-100|N|||F|||200310060735
       SPM|2|654_2^chemistry||UR|||||||P||||||200310060735|200310060821||Y||||||1
2760   OBX|1|NM|13362-9^URINE COLLECTION DURATION^LN||24|hr|||||F|||200309060735
       OBX|2|NM|19153-6^URINE SPECIMEN VOLUME^LN||2400|ml|||||F|||200309060735
       OBX|3|NM|14684-5^24H URINE CREATININE^LN||7.06|mmol|8-16 (/24hr)|L|||F||| 200310060830
       ORC|SC|||777^Nephro|||||200805191100
       OBR|2|98765432^Nephro|6542^chemistry|11502-2^LABORATORY
2765   REPORT.TOTAL^LN|||||||||||||||||||||| ||F
       OBX|1|RP|11502-2^LABORATORY REPORT.TOTAL^LN||file://hserv/lr/lr12345678.pdf||||||F||P
```

Positive acknowledgement sent by the Order Results Tracker:

MSH|^~\&|ORT||OF|Cytology|200310060935||ACK^R01^ACK|401|T|2.5|||||USA|EN

MSA|AA|015

2770 4.5 Microbiology with Two Specimens and Three Germs Identified

4.5.1 Storyboard

This storyboard illustrates the use of transaction LAB-2 to notify generated batteries at the Order Filler level (i.e., antibiotic susceptibilities, within the same placer group number).

2775 Dr. Physician orders Microscopy and Culture for two different specimens collected from the same patient. The first specimen is Mid Stream Urine and the second one is Pus taken from a wound on patient's left toe. Since several batteries could be performed on each specimen (e.g., Microscopy and Culture, identification of organism, Antibiotic Susceptibility) the Order Placer transmits an OML^O33 message. Since both specimens are part of the same prescription, they are grouped via the Placer Group Number '777'.

2780 The patient is an Outpatient in Emergency ward.

We presume that all tests are performed manually and that results are directly entered by the laboratory technician in the Order Filler system, there is then neither LAB-4, nor LAB-5 transaction in this story board. We also presume that results for observations related to the urine specimen are transferred as soon they are available, whilst the Clinical Expert desires to review 2785 results related to other specimen types before they are released.

In this storyboard, a CIS application implements both Actors Order Placer and Order Result Tracker, which suppresses the need for OML messages "Status Change" from OF to OP.

Human actors and organizations participating to the process:

Assigning authority: Memphis Hosp 1

2790 Placer: Emergency Ward

Filler: Microbiology

Ordering facility: Emergency Ward

Patient: Adam Everyman Jr., account number: 12345 (check-digit 5 modulo 10),
class = outpatient

2795 Order placed by: Dr. PHYSICIAN, phone number 821, ID number in the hospital 222222.

Placer order enterer: Nancy NURSE, ID number 222221

Specimen collector: Nancy NURSE, ID number 222221

Technician: Terry BACK, ID number 333231

Clinical expert: Mike ROSCOP, ID number 444642

2800 ID numbers used by the workflow:

ID number	Value	Assigned by
Patient ID	12345	Admission office (ADT)

ID number	Value	Assigned by
Care unit order for Urine Spec.	12345679	Emergency Ward (OP)
Care unit order for Pus Spec.	12345670	Emergency Ward (OP)
Care unit order group	777	Emergency Ward (OP)
1st specimen	123456791	Emergency Ward (OP)
2nd specimen	123456701	Emergency Ward (OP)
Laboratory order for the Urine	MSU0309922	Microbiology laboratory (OF)
Laboratory order for the PUS	PUS0300666	Microbiology laboratory (OF)

Day 1 at 8:10 LAB-1 interaction: The two specimens are collected and transmitted to the Microbiology laboratory in Routine. The Order Placer sends a message "new order" (NW) to the order placer.

2805 **Day 1 at 8:20 LAB-3 interaction:** The laboratory checks the specimens and schedules the work. The Order Filler notifies Order Result Tracker of the scheduled work.

Day 1 at 14:46 LAB-3 interaction: After Microscopy for the Urine Specimen is achieved, the Order Filler notifies these partial results to the Order Result Tracker without waiting for the clinical validation.

2810 **Day 2 at 09:40 LAB-2 and LAB-3 interactions:** The following day, the Urine culture is positive, the laboratory adds Organism identification and Antibiotic Susceptibility test for this specimen. The Order Filler requires a Placer Order Number to the Order Placer for the added tests (Transaction LAB-2) and notifies this action to the Order Result Tracker via transaction LAB-3.

2815 **Day 2 at 09:45 LAB-2 and LAB-3 interactions:** The result of Microscopy and Culture is positive for the Pus specimen, the clinical expert has validated these preliminary results and the laboratory adds Organism identification and Antibiotic Susceptibility test for this specimen. The Order Filler requires a Placer Order Number to the Order Placer for the added tests (Transaction LAB-2) and it notifies this action to the Order Result Tracker via transaction LAB-3.
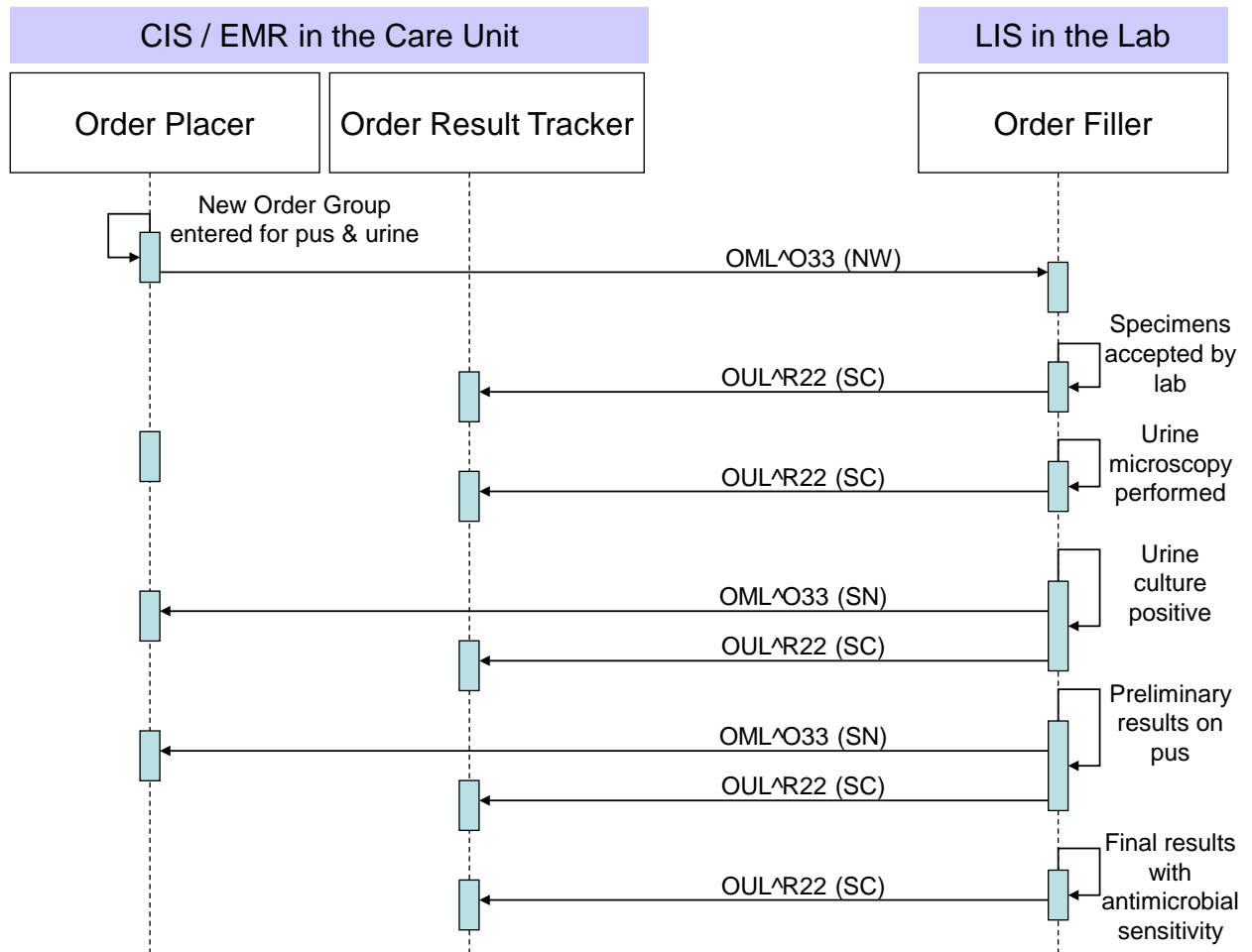
2820 **Day 3 at 11:32 LAB-3 interaction:** The next day, organism identification and Antibiotic Susceptibility tests are achieved; final results are transmitted to the Order Result Tracker after the clinical validation has been performed.

4.5.2 Interaction Diagram

2825

This example of microbiology workflow has selected the OUL^R22 message structure to convey the results back to the EMR system, because this specimen-centric message structure is
2830 particularly appropriate for microbiology results, which are usually specimen-centric, and for which the provision of specimen data is of key importance to the receiving system.

Nevertheless, ORU^R01 could also have been used instead, providing the same specimen data in a SPECIMEN segment group at the bottom of each ORDER_OBSERVATION segment group, as stated in Section 3.3.5.2 "ORU^R01 Static Definition". Alternative messages using ORU^R01
2835 are shown on the first and last LAB-3 interaction of this use case.

4.5.3 Messages

4.5.3.1 LAB-1 (OP → OF): Message "New order" with Two Specimens

Day 1 at 8:10 A new placer order sent to the Order Filler.

```
MSH|^~\&|OP|Emergency Ward|OF|Microbiology|200309060810||OML^O33^OML_O33|msgOP123|
T|2.5|123 ||||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward||||||||||||||12345
SPM|1|123456791^Emergency||MSU^Mid Stream Urine^L|||||||P|||||| 200309060800|||||||||1
ORC|NW|12345679^Emergency||777^Emergency|||||200309060800|222221^NURSE^NANCY|||||||||||
|Emergency Ward^^^^^^FI^^^EW00
TQ1|||||||||R
OBR|1|12345679^Emergency||87086^Urine Microscopy and Culture^C4|||||||S|||||
222222^PHYSICIAN^^^^DR|
SPM|2|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|||||||||1
ORC|NW|12345670^Emergency||777^Emergency|||||200309060800|222221^NURSE^NANCY|||||||||||
|Emergency Ward^^^^^^FI^^^EW00
TQ1|||||||||R
OBR|1|12345670^Emergency||87040^Microscopy and Culture^C4||||||222221^NURSE^NANCY
|S|||||222222^PHYSICIAN^^^^DR|
```

The related acknowledgement message isn't shown.

4.5.3.2 LAB-3 (OF → ORT): Message "Order Status Change"

Day 1 at 8:20 The Order Result Tracker is informed that the laboratory has accepted the specimens for a new microbiology order:

```
MSH|^~\&|OF|Microbiology|ORT||200309060820||OUL^R22^OUL_R22|msgOF12|T|2.5|123||||
USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward||||||||||||||12345
SPM|1|123456791^Emergency||MSU^Mid Stream
Urine^L|||||||P||||||200309060800|200309060818||Y|…
OBR|1|12345679^Emergency|MSU0309922^Micro|87086^Urine Microscopy and Culture^C4|||||||
|||||222222^PHYSICIAN^^^^DR||||||||||I
ORC|SC|12345679^Emergency||777^Emergency|IP||||200309060818|||||||||||||
Emergency Ward^^^^^^FI^^^EW00
SPM|2|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|200309060818||Y|…
OBR|1|12345670^Emergency|PUS0300666^Micro|87040^Microscopy and
Culture^C4||||||222221^NURSE^NANCY ||||||222222^PHYSICIAN^^^^DR|||||||||||I
ORC|SC|12345670^Emergency||777^Emergency|IP||||200309060818|||||||||||||
Emergency Ward^^^^^^FI^^^EW00
```

The related acknowledgement message isn't shown.

4.5.3.3 LAB-3 (OF → ORT): Message "Status Changed"

Day 1 at 14:46 Urine Microscopy results are sent, not clinically validated (i.e., not verified):

```
MSH|^~\&|OF|Microbiology|ORT||200309061446||OUL^R22^OUL_R22|msgOF14|T|2.5|123||||USA||
EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward||||||||||||||12345
```

```
      SPM|1|123456791^Emergency||MSU^Mid Stream
      Urine^L|||||||P||||||200309060800|200309060818||Y|…
      OBR|1|12345679^Emergency|MSU0309922^Micro|87086^Urine Microscopy and Culture^C4|||||||
2885  ||||||222222^PHYSICIAN^^^^DR||||||||MB|A
      ORC|SC|12345679^Emergency||777^Emergency|A||||200309060818|||||||||||||
      Emergency Ward^^^^^^FI^^^EW00
      TQ1|||||||||R
      OBX|1|CE|20453-7^Epithelial Cells^LN||value|||N|||R|||200309061445| |333231^BACK^TERRY
2890  OBX|2|NM|20455-2^Leukocytes^LN||value|/ml||N|||R|||200309061445| |333231^BACK^TERRY
      OBX|3|NM|32776-7^Erythrocytes^LN||value|/ml||N|||R|||200309061445| |333231^BACK^TERRY
      OBX|4|CE|24124-0^Casts^LN||value|||N|||R|||200309061445||333231^BACK^TERRY
      OBX|5|NM|699-9^Organism Count^LN||value|/ml||N|||R|||200309061445| |333231^BACK^TERRY
      OBX|6||20430-5^Culture^LN|||||N|||I|||200309070935||333231^BACK^TERRY
```

2895   The related acknowledgement message isn't shown.

The same content could also have been provided using this ORU^R01 message:

```
      MSH|^~\&|OF|Microbiology|ORT||200309060820||ORU^R01^ORU_R01|msgOF12|T|2.5|123||||
      USA||EN
2900  PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
      PV1|1|O|Ward|||||||||||||||12345
      ORC|SC|12345679^Emergency||777^Emergency|IP||||200309060818|||||||||||||
      Emergency Ward^^^^^^FI^^^EW00
      OBR|1|12345679^Emergency|MSU0309922^Micro|87086^Urine Microscopy and Culture^C4|||||||
2905  ||||||222222^PHYSICIAN^^^^DR||||||||||I
      SPM|1|123456791^Emergency||MSU^Mid Stream
      Urine^L|||||||P||||||200309060800|200309060818||Y|…
      ORC|SC|12345670^Emergency||777^Emergency|IP||||200309060818|||||||||||||
      Emergency Ward^^^^^^FI^^^EW00
2910  OBR|1|12345670^Emergency|PUS0300666^Micro|87040^Microscopy and
      Culture^C4||||||222221^NURSE^NANCY ||||||222222^PHYSICIAN^^^^DR||||||||||I
      SPM|1|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|200309060818||Y|…
```

4.5.3.4 LAB-2(OF → OP): Message "Send Order Number"

2915   Day 2 at 9:40 Urine Culture is positive with two microorganisms detected, not identified yet.,
Reflex tests Organism Identification and two Antimicrobial Susceptibility batteries are added.
For each, a placer order number is requested from the Order Placer, within Placer Group Number
777^Emergency.

```
2920  MSH|^~\&|OF|Microbiology|OP|Emergency Ward|200309070940||OML^O33^OML_O33|msgOF15|
      T|2.5|123 ||||USA||EN
      PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
      PV1|1|O|Ward|||||||||||||||12345
      SPM|1|123456791^Emergency||MSU^Mid Stream
2925  Urine^L|||||||P||||||200309060800|200309060818||Y|…
      ORC|SN|||777^Emergency|||||200309070938|333231^BACK^TERRY|||||||||||||
      Emergency Ward^^^^^^FI^^^EW00
      OBR|1||MSU03099221^Micro|87088^Organism Identification^C4|||||||
      G|||||222222^PHYSICIAN^^^^DR||||||||MB
```

```
2930    ORC|SN||||777^Emergency||||||200309070938|333231^BACK^TERRY|||||||||||||Emergency
        Ward^^^^^^FI^^^EW00
        OBR|2||MSU03099222^Micro|87186^Antibiotic Susceptibility^C4|||||||
        G|||||222222^PHYSICIAN^^^^DR|||||||||MB
        ORC|SN||||777^Emergency||||||200309070938|333231^BACK^TERRY|||||||||||||Emergency
2935    Ward^^^^^^FI^^^EW00
        OBR|3||MSU03099223^Micro|87186^Antibiotic Susceptibility^C4|||||||
        G|||||222222^PHYSICIAN^^^^DR|||||||||MB
```

Acknowledgement sent by the Order Placer:

```
        MSH|^~\&|OP|Emergency
2940    Ward|OF|Microbiology|200309070940||ORL^O34^ORL_O34|msgOP123|T|2.5|123 ||||USA||EN
        MSA|AA|msgOF15
        PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
        SPM|1|123456791^Emergency||MSU^Mid Stream
        Urine^L||||||||P||||||200309060800|200309060818||Y|…
2945    ORC|NA|12345681^Emergency||777^Emergency||||||200309070938|333231^BACK^TERRY|||||||||||||
        Emergency Ward^^^^^^FI^^^EW00
        OBR|1|12345681^Emergency|MSU03099221^Micro|87088^Organism Identification^C4|||||||
        G|||||222222^PHYSICIAN^^^^DR|||||||||MB
        ORC|NA|12345682^Emergency||777^Emergency||||||200309070938|333231^BACK^TERRY|||||||||||||
2950    Emergency Ward^^^^^^FI^^^EW00
        OBR|2|12345682^Emergency|MSU03099222^Micro|87186^Antibiotic Susceptibility^C4|||||||
        G|||||222222^PHYSICIAN^^^^DR|||||||||MB
        ORC|NA|12345683^Emergency||777^Emergency||||||200309070938|333231^BACK^TERRY|||||||||||||
        Emergency Ward^^^^^^FI^^^EW00
2955    OBR|3|12345683^Emergency|MSU03099223^Micro|87186^Antibiotic Susceptibility^C4|||||||
        G|||||222222^PHYSICIAN^^^^DR|||||||||MB
```

4.5.3.5 LAB-3 (OF → ORT): Message "Status Changed"

Day 2 at 09:42 Results for Urine Microscopy and Culture are released. Organism Identification and Antibiotic Susceptibility tests have been added

2960   Note: The Order Placer has acknowledged transaction LAB-2 and an Order Placer Number has been added to each test added by the laboratory

```
        MSH|^~\&|OF|Microbiology|ORT||200309070942||OUL^R22^OUL_R22|msgOF16|T|2.5|123||||USA||
        EN
        PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
2965    PV1|1|O|Ward|||||||||||||||||12345
        SPM|1|123456791^Emergency||MSU^Mid Stream Urine^L||||||||P||||||200309060800|
        200309060818||Y|…
        OBR|1|12345679^Emergency|MSU0309922^Micro|87086^Urine Microscopy and Culture^C4|||||||||
        |||||222222^PHYSICIAN^^^^DR|||||||||MB|R
2970    ORC|SC|12345679^Emergency||777^Emergency|A||||200309060818|||||||||||||
        Emergency Ward^^^^^^FI^^^EW00
        TQ1|||||||||R
        OBX|1|CE|20453-7^Epithelial Cells^LN||value|||N|||R|||200309061445| |333231^BACK^TERRY
        OBX|2|NM|20455-2^Leukocytes^LN||value|/ml||N|||R|||200309061445| |333231^BACK^TERRY
2975    OBX|3|NM|32776-7^Erythrocytes^LN||value|/ml||N|||R|||200309061445| |333231^BACK^TERRY
        OBX|4|CE|24124-0^Casts^LN||value|||N|||R|||200309061445||333231^BACK^TERRY
        OBX|5|NM|699-9^Organism Count^LN||value|/ml||N|||R|||200309061445| |333231^BACK^TERRY
        OBX|6|CE|20430-5^Culture^LN||2ORG^Two Organisms^L|||N|||R|||200309070935|
        |333231^BACK^TERRY
2980    OBR|2|12345681^Emergency|MSU03099221^Micro|87088^Organism Identification^C4|||||||
        G|||||222222^PHYSICIAN^^^^DR|||||||||MB|S
```

```
ORC|SC|12345681^Emergency||777^Emergency|IP||||200309070938|333231^BACK^TERRY|||||||||
||Emergency Ward^^^^^^FI^^^EW00
OBR|3|12345682^Emergency|MSU03099222^Micro|87186^Antibiotic Susceptibility^C4|||||||
G|||||222222^PHYSICIAN^^^^DR||||||||MB|S
ORC|SC|12345682^Emergency||777^Emergency|IP||||200309070938|333231^BACK^TERRY|||||||||
||Emergency Ward^^^^^^FI^^^EW00
OBR|4|12345683^Emergency|MSU03099223^Micro|87186^Antibiotic Susceptibility^C4|||||||
G|||||222222^PHYSICIAN^^^^DR||||||||MB|S
ORC|SC|12345683^Emergency||777^Emergency|IP||||200309070938|333231^BACK^TERRY|||||||||
||Emergency Ward^^^^^^FI^^^EW00
```

The related acknowledgement message isn't shown.

4.5.3.6 LAB-2(OF → OP): Message "Send Order Number"

Day 2 at 9:45 Culture for Pus specimen is positive, reflex tests Organism Identification and Antibiotic Susceptibility are added. For each, a placer order number is requested from the Order Placer, within Placer Group Number 777^Emergency.

```
MSH|^~\&|OF|Microbiology|OP|Emergency Ward|200309070945||OML^O33|msgOF18|T|2.5|123
|||||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
SPM|1|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|200309060818||Y|…
ORC|SN|||777^Emergency|||||200309070941|333231^BACK^TERRY|||||||||||
Emergency Ward^^^^^^FI^^^EW00
OBR|1||PUS03006661^Micro|87088^Organism Identification^C4|||||||
G|||||222222^PHYSICIAN^^^^DR||||||||MB
ORC|SN|||777^Emergency|||||200309070941|333231^BACK^TERRY|||||||||||
Emergency Ward^^^^^^FI^^^EW00
OBR|2||PUS03006662^Micro|87186^Antibiotic Susceptibility^C4|||||||
G|||||222222^PHYSICIAN^^^^DR||||||||MB
```

Acknowledgement sent by the Order Placer:

```
MSH|^~\&|OP|Emergency
Ward|OF|Microbiology|200309070945||ORL^O34^ORL_O34|msgOP124|T|2.5| 123||||USA||EN
MSA|AA|msgOF18
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
SPM|1|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|200309060818||Y|…
ORC|NA|12345685^Emergency||777^Emergency|||||200309070941|333231^BACK^TERRY||||||||||||
Emergency Ward^^^^^^FI^^^EW00
OBR|1|12345685^Emergency|PUS03006661^Micro|87088^Organism Identification^C4|||||||
G|||||222222^PHYSICIAN^^^^DR||||||||MB
ORC|NA|12345686^Emergency||777^Emergency|||||200309070941|333231^BACK^TERRY||||||||||||
Emergency Ward^^^^^^FI^^^EW00
OBR|2|12345686^Emergency|PUS03006662^Micro|87186^Antibiotic
Susceptibility^C4|||||||G|||||222222^PHYSICIAN^^^^DR||||||||MB
```

4.5.3.7 LAB-3 (OF → ORT): Message "Status Changed"

Day 2 at 09:45 The Clinical Expert has validated the preliminary results of Microscopy and culture for the Pus Specimen.

Note: Although the Culture is positive, the result status is not "Final" other Organisms may grow during the next 24 hours. Results of culture will be considered as final on Day 3 after 48 hours of incubation.

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```
3030    MSH|^~\&|OF|Microbiology|ORT||200309070945||OUL^R22^OUL_R22|msgOF19|T|2.5|123||||
        USA||EN
        PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
        PV1|1|O|Ward|||||||||||||12345
        SPM|1|123456701^Emergency ||PUS||||TOE|LEFT|P||||||200309060805|200309060818||Y|…
3035    OBR|1|12345670^Emergency|PUS0300666^Micro|87040^Microscopy and Culture^C4||||||222221^NURSE^NANCY
        ||||||222222^PHYSICIAN^^^^DR|||||||MB|P||||||444642&ROSCOP&Mike^200309070944
        ORC|SC|1234567O^Emergency||777^Emergency|A||||200309060818|||||||||||
        Emergency Ward^^^^^^FI^^^EW00
        OBX|1|NM|32761-9^Leukocytes^LN||value|||N|||F|||200309061125||333231^BACK^TERRY
3040    OBX|2|NM|32762-7^Epithelial Cells^LN||value|||N|||F|||200309061125| |333231^BACK^TERRY
        OBX|3|CE|20430-5^Culture^LN||POS^Positive^L|||N|||P|||200309070935| |333231^BACK^TERRY
        OBR|2|12345685^Emergency|PUS03006661^Micro|87088^Organism Identification^C4|||||| G||||  ||||||||MB|S
        ORC|SC|12345685^Emergency||777^Emergency|IP||||200309070941|333231^BACK^TERRY|||||||||||Emergency
        Ward^^^^^^FI^^^EW00
3045    OBR|3|12345686^Emergency|PUS03006662^Micro|87186^Antibiotic Susceptibility^C4|||||| G|||| ||||||||MB|S
        ORC|SC|12345686^Emergency||777^Emergency|IP||||200309070941|333231^BACK^TERRY|||||||||||Emergency
        Ward^^^^^^FI^^^EW00
```

The related acknowledgement message isn't shown.

4.5.3.8 LAB-3 (OF → ORT): Message "Status Changed"

3050   Day 3 at 11:32 Mike ROSCOP has performed the clinical validation at 11h30. Final results are transmitted.

> Note: This message is conforming to the requirements given in Section 3.11 "Microbiology Reporting Rules". In particular:
> Grouping of the results per microorganism using Observation Sub-ID (OBX-4), and association of antimicrobial
> sensitivity and microorganism identified, based on the parent/child mechanism: Parent Result (OBR-26) &
3055   Parent (OBR-29). Classification of the results (OBX) below an OBR per microorganism.

```
        MSH|^~\&|OF|Microbiology|ORT||200309081132||OUL^R22^OUL_R22|msgOF21|T|2.5|
        123||||USA||EN
3060    PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
        PV1|1|O|Ward|||||||||||||||12345
        SPM|1|123456791^Emergency||MSU^Mid Stream
        Urine^L|||||||P||||||200309060800|200309060818||Y|…
        OBR|1|12345679^Emergency|MSU0309922^Micro|87086^Urine Microscopy and Culture^C4|||||||
3065    |||||222222^PHYSICIAN^^^^DR||||||||MB|F|||||||444642&ROSCOP&Mike^200309081130
        ORC|SC|12345679^Emergency||777^Emergency|CM||||200309060818|||||||||||||Emergency
        Ward^^^^^^FI^^^EW00
        TQ1||||||||||R
        OBX|1|CE|20453-7^Epithelial Cells^LN||value|||N|||F||200309061445| |333231^BACK^TERRY
3070    OBX|2|NM|20455-2^Leukocytes^LN||value|/ml||N|||F|||200309061445|…
        OBX|3|NM|32776-7^Erythrocytes^LN||value|/ml||N|||F|||200309061445|…
        OBX|4|CE|24124-0^Casts^LN||value|||N|||F|||200309061445||333231^BACK^TERRY
        OBX|5|NM|699-9^Organism Count^LN||value|/ml||N|||F|||200309061445|…
        OBX|6|CE|20430-5^Culture^LN||2ORG^Two Organisms^L|||N|||F|||200309070935|…
3075    OBR|2|12345681^Emergency|MSU03099221^Micro|87088^Organism Identification^C4|||||||
        ||||| |||||||||MB|F|||||||444642&ROSCOP&Mike^200309081130
        ORC|SC|12345681^Emergency||777^Emergency|CM||||200309070938|333231^BACK^TERRY|||||||||
        ||Emergency Ward^^^^^^FI^^^EW00
        OBX|1|ST|11475-1^Micro organism identified^LN|1|E. Coli|||N|||F|||…
3080    OBX|2|ST|11475-1^Micro organism identified^LN|2|Strepto D|||N|||F|||…
```

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```
       OBR|3|12345682^Emergency|MSU03099222^Micro|87186^Antibiotic Susceptibility^C4
       |||||||||||||||||||||MB|F|11475-1&Micro organism identified&LN^1^E. Coli|||
       12345681&Emergency^MSU03099221&Micro|||444642&ROSCOP&Mike^200309081130
       ORC|SC|12345682^Emergency||777^Emergency|CM||||200309070938|333231^BACK^TERRY||||||||||
3085   ||Emergency Ward^^^^^^FI^^^EW00
       OBX|1|SN|18861-5^Amoxicillin^LN||1|>=^0.512|µg/ml||R|||F|||200309081107|…
       OBX|2|SN|18864-9^Ampicillin^LN||1|<^0.128|µg/ml||I|||F|||200309081107|…
       OBX|3|SN|18952-2^Nalidixate^LN||1|>=^2.0|µg/ml||R|||F|||200309081107|…
       OBX|4|SN|18956-3^Norfloxacin^LN||1|value|µg/ml||I|||F|||200309081107|…
3090   OBX|5|SN|18928-2^Gentamicin^LN||1|<^0.032|µg/ml||S|||F|||200309081107|…
       OBX|6|SN|25596-8^Fosfomycine^LN||1|<^0.1|µg/ml||S|||F|||200309081107|…
       OBX|7|SN|18955-5^Nitrofuranton^LN||1|<^0.25|µg/ml||S|||F|||200309081107|…
       OBR|4|12345683^Emergency|MSU03099223^Micro|87186^Antibiotic Susceptibility^C4
       ||||||||||||||||||||||MB|F|11475-1&Micro organism identified&LN^2^Strepto D|||
3095   12345681&Emergency^MSU03099221&Micro |||444642&ROSCOP&Mike^200309081130
       ORC|SC|12345683^Emergency||777^Emergency|CM||||200309070938|333231^BACK^TERRY||||||||||
       ||Emergency Ward^^^^^^FI^^^EW00
       OBX|8|SN|18965-4^Penicillin G^LN|2|<^0.5|µg/ml||S|||F|||200309081107|…
       OBX|9|SN|18861-5^Amoxicillin^LN|2|value|µg/ml||S|||F|||200309081107|…
3100   OBX|10|SN|18864-9^Ampicillin^LN|2|value|µg/ml||S|||F|||200309081107|…
       OBX|11|SN|18928-2^Gentamicin^LN|2|value|µg/ml||R|||F|||200309081107|…
       OBX|12|SN|18917-5^Doxycycline^LN|2|value|µg/ml||R|||F|||200309081107|…
       OBX|13|SN|18919-1^Erythromycin^LN|2|value|µg/ml||R|||F|||200309081107|…
       OBX|14|SN|18974-6^Rifampicin^LN|2|value|µg/ml||S|||F|||200309081107|…
3105   OBX|15|SN|18938-1^Lincomycin^LN|2|value|µg/ml||R|||F|||200309081107|…
       SPM|2|123456701^Emergency||PUS||||TOE|LEFT||P|||||200309060805|200309060818||Y|…
       OBR|1|12345670^Emergency|PUS0300666^Micro|87040^Microscopy and
       Culture^C4||||||222221^NURSE^NANCY
       ||||||222222^PHYSICIAN^^^^DR|||||||MB|F||||||444642&ROSCOP&Mike^200309081130
3110   ORC|SC|12345670^Emergency||777^Emergency|CM||||200309060818||||||||||||Emergency
       Ward^^^^^^FI^^^EW00
       OBX|1|CE|32761-9^Leukocytes^LN||value|||N|||F|||200309060830
       OBX|2|CE|32762-7^Epithelial Cells^LN||value|||N|||F|||200309060830| |333231^BACK^TERRY
       OBX|3|CE|20430-5^Culture^LN||POS^Positive^L|||N|||F|||200309070935|…
3115   |333231^BACK^TERRY
       OBR|2|12345685^Emergency|PUS03006661^Micro|87072^Organism
       Identification^C4|||||||||||| |||||||MB|F|||||||444642&ROSCOP&Mike^200309081130
       ORC|SC|12345685^Emergency||777^Emergency|CM||||200309070941|333231^BACK^TERRY||||||||||
       ||Emergency Ward^^^^^^FI^^^EW00
3120   OBX|1|ST|21020-3^Micro organism identified^LN|1|Staph Aureus|||N|||F| ||200309080830|…
       OBR|3|12345686^Emergency|PUS03006662^Micro|87186^Antibiotic
       Susceptibility^C4|||||||||||| |||||||MB|F|21020-3&Micro organism
       identified&LN^1^Staph Aureus|||
       12345685&Emergency^PUS03006661&Micro|||444642&ROSCOP&Mike^200309081130
3125   ORC|SC|12345686^Emergency||777^Emergency|CM||||200309070938|333231^BACK^TERRY||||||||||
       ||Emergency Ward^^^^^^FI^^^EW00
       OBX|1|SN|18928-2^Gentamicin^LN|1|value|µg/ml||S|||F|||200309080830|…
       OBX|2|SN|18996-9^Tobramycin^LN|1|value|µg/ml||R|||F|||200309080830|…
       OBX|3|SN|18954-8^Netilmicin^LN|1|value|µg/ml||S|||F|||200309080830|…
3130   OBX|4|SN|18959-7^Ofloxacin^LN|1|value|µg/ml||S|||F|||200309080830|…
       OBX|5|SN|18917-5^Doxycycline^LN|1|value|µg/ml||S|||F|||200309080830|…
       OBX|6|SN|19000-9^Vancomycin^LN|1|value|µg/ml||S|||F|||200309080830|…
       OBX|7|SN|18974-6^Rifampicin^LN|1|value|µg/ml||S|||F|||200309080830|…
       OBX|8|SN|25596-8^Fosfomycine^LN|1|value|µg/ml||S|||F|||200309080830|…
```

3135

The related acknowledgement message isn't shown.

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The same content could also have been provided using this ORU^R01 message:

```
3140   MSH|^~\&|OF|Microbiology|ORT||200309081132||ORU^R01^ORU_R01|msgOF21|T|2.5|
       123||||USA||EN
       PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
       PV1|1|O|Ward|||||||||||||||12345
       ORC|SC|12345679^Emergency||777^Emergency|CM||||200309060818||||||||||||Emergency
3145   Ward^^^^^^FI^^^EW00
       OBR|1|12345679^Emergency|MSU0309922^Micro|87086^Urine Microscopy and Culture^C4|||||||
       |||||222222^PHYSICIAN^^^^DR||||||||MB|F|||||||444642&ROSCOP&Mike^200309081130
       TQ1||||||||R
       OBX|1|CE|20453-7^Epithelial Cells^LN||value|||N|||F|||200309061445| |333231^BACK^TERRY
3150   OBX|2|NM|20455-2^Leukocytes^LN||value|/ml||N|||F|||200309061445|…
       OBX|3|NM|32776-7^Erythrocytes^LN||value|/ml||N|||F|||200309061445|…
       OBX|4|CE|24124-0^Casts^LN||value|||N|||F|||200309061445||333231^BACK^TERRY
       OBX|5|NM|699-9^Organism Count^LN||value|/ml||N|||F|||200309061445|…
       OBX|6|CE|20430-5^Culture^LN||2ORG^Two Organisms^L|||N|||F|||200309070935|…
3155   SPM|1|123456791^Emergency||MSU^Mid Stream
       Urine^L||||||||P||||||200309060800|200309060818||Y|…
       ORC|SC|12345681^Emergency||777^Emergency|CM||||200309070938|333231^BACK^TERRY|||||||||
       ||Emergency Ward^^^^^^FI^^^EW00
       OBR|2|12345681^Emergency|MSU03099221^Micro|87088^Organism Identification^C4|||||||
3160   ||||| ||||||||MB|F|||||||444642&ROSCOP&Mike^200309081130
       OBX|1|ST|11475-1^Micro organism identified^LN|1|E. Coli|||N|||F|||…
       OBX|2|ST|11475-1^Micro organism identified^LN|2|Strepto D|||N|||F|||…
       SPM|1|123456791^Emergency||MSU^Mid Stream
       Urine^L||||||||P||||||200309060800|200309060818||Y|…
3165   ORC|SC|12345682^Emergency||777^Emergency|CM||||200309070938|333231^BACK^TERRY|||||||||
       ||Emergency Ward^^^^^^FI^^^EW00
       OBR|3|12345682^Emergency|MSU03099222^Micro|87186^Antibiotic Susceptibility^C4
       |||||||||||||||||||||MB|F|11475-1&Micro organism identified&LN^1^E. Coli|||
       12345681&Emergency^MSU03099221&Micro|||444642&ROSCOP&Mike^200309081130
3170   OBX|1|SN|18861-5^Amoxicillin^LN|1|>=^0.512|µg/ml||R|||F|||200309081107|…
       OBX|2|SN|18864-9^Ampicillin^LN|1|<^0.128|µg/ml||I|||F|||200309081107|…
       OBX|3|SN|18952-2^Nalidixate^LN|1|>=^2.0|µg/ml||R|||F|||200309081107|…
       OBX|4|SN|18956-3^Norfloxacin^LN|1|value|µg/ml||I|||F|||200309081107|…
       OBX|5|SN|18928-2^Gentamicin^LN|1|<^0.032|µg/ml||S|||F|||200309081107|…
3175   OBX|6|SN|25596-8^Fosfomycine^LN|1|<^0.1|µg/ml||S|||F|||200309081107|…
       OBX|7|SN|18955-5^Nitrofuranton^LN|1|<^0.25|µg/ml||S|||F|||200309081107|…
       SPM|1|123456791^Emergency||MSU^Mid Stream
       Urine^L||||||||P||||||200309060800|200309060818||Y|…
       ORC|SC|12345683^Emergency||777^Emergency|CM||||200309070938|333231^BACK^TERRY|||||||||
3180   ||Emergency Ward^^^^^^FI^^^EW00
       OBR|4|12345683^Emergency|MSU03099223^Micro|87186^Antibiotic Susceptibility^C4
       |||||||||||||||||||||MB|F|11475-1&Micro organism identified&LN^2^Strepto D|||
       12345681&Emergency^MSU03099221&Micro |||444642&ROSCOP&Mike^200309081130
       OBX|8|SN|18965-4^Penicillin G^LN|2|<^0.5|µg/ml||S|||F|||200309081107|…
3185   OBX|9|SN|18861-5^Amoxicillin^LN|2|value|µg/ml||S|||F|||200309081107|…
       OBX|10|SN|18864-9^Ampicillin^LN|2|value|µg/ml||S|||F|||200309081107|…
       OBX|11|SN|18928-2^Gentamicin^LN|2|value|µg/ml||R|||F|||200309081107|…
       OBX|12|SN|18917-5^Doxycycline^LN|2|value|µg/ml||R|||F|||200309081107|…
       OBX|13|SN|18919-1^Erythromycin^LN|2|value|µg/ml||R|||F|||200309081107|…
3190   OBX|14|SN|18974-6^Rifampicin^LN|2|value|µg/ml||S|||F|||200309081107|…
       OBX|15|SN|18938-1^Lincomycin^LN|2|value|µg/ml||R|||F|||200309081107|…
       SPM|1|123456791^Emergency||MSU^Mid Stream
       Urine^L||||||||P||||||200309060800|200309060818||Y|…
```

```
     ORC|SC|12345670^Emergency||777^Emergency|CM||||200309060818|||||||||||||Emergency
3195 Ward^^^^^^FI^^^EW00
     OBR|1|12345670^Emergency|PUS0300666^Micro|87040^Microscopy and
     Culture^C4||||||222221^NURSE^NANCY
     ||||||222222^PHYSICIAN^^^^DR|||||||||MB|F||||||444642&ROSCOP&Mike^200309081130
     OBX|1|CE|32761-9^Leukocytes^LN||value|||N|||F|||200309060830
3200 OBX|2|CE|32762-7^Epithelial Cells^LN||value|||N|||F|||200309060830| |333231^BACK^TERRY
     OBX|3|CE|20430-5^Culture^LN||POS^Positive^L|||N|||F|||200309070935|…
     |333231^BACK^TERRY
     SPM|2|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|200309060818||Y|…
     ORC|SC|12345685^Emergency| |777^Emergency|CM||||200309070941|333231^BACK^TERRY|||||||||||
3205 ||Emergency Ward^^^^^^FI^^^EW00
     OBR|2|12345685^Emergency|PUS03006661^Micro|87072^Organism
     Identification^C4||||||||||||| |||||||||MB|F|||||||444642&ROSCOP&Mike^200309081130
     OBX|1|ST|21020-3^Micro organism identified^LN|1|Staph Aureus|||N|||F| ||200309080830|…
     SPM|2|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|200309060818||Y|…
3210 ORC|SC|12345686^Emergency| |777^Emergency|CM||||200309070938|333231^BACK^TERRY|||||||||||
     ||Emergency Ward^^^^^^FI^^^EW00
     OBR|3|12345686^Emergency|PUS03006662^Micro|87186^Antibiotic
     Susceptibility^C4||||||||||||| |||||||MB|F|21020-3&Micro organism
     identified&LN^1^Staph Aureus|||
3215 12345685&Emergency^PUS03006661&Micro|||444642&ROSCOP&Mike^200309081130
     OBX|1|SN|18928-2^Gentamicin^LN|1|value|µg/ml||S|||F|||200309080830|…
     OBX|2|SN|18996-9^Tobramycin^LN|1|value|µg/ml||R|||F|||200309080830|…
     OBX|3|SN|18954-8^Netilmicin^LN|1|value|µg/ml||S|||F|||200309080830|…
     OBX|4|SN|18959-7^Ofloxacin^LN|1|value|µg/ml||S|||F|||200309080830|…
3220 OBX|5|SN|18917-5^Doxycycline^LN|1|value|µg/ml||S|||F|||200309080830|…
     OBX|6|SN|19000-9^Vancomycin^LN|1|value|µg/ml||S|||F|||200309080830|…
     OBX|7|SN|18974-6^Rifampicin^LN|1|value|µg/ml||S|||F|||200309080830|…
     OBX|8|SN|25596-8^Fosfomycine^LN|1|value|µg/ml||S|||F|||200309080830|…
     SPM|2|123456701^Emergency||PUS||||TOE|LEFT||P||||||200309060805|200309060818||Y|…
```

4.6 Rejection of a Specimen

4.6.1 Storyboard

This example corresponds to the use case described in Volume 1 as "4.2.4 Order Filler rejects a specimen prior to result testing". The context for this use-case will be based on the simplification of having the actors OP and ORT grouped.

A physician in a ward requests a laboratory test "BG_CLAIR_CREAT_COCKROFT" for a patient "Marge Smith".

The Order Placer sends a LAB-1 "order create" message to the Order Filler, delivering the Order Group "2011122446_OPGN" with associated relevant information including a Specimen with bar coded id = "1200000808"

Upon reception, the Order Filler application accepts the content of the Order, and notifies a Filler Order Number in the acknowledgement message sent back to the Order Placer application.

Using the Order Filler application, the laboratory staff checks each Order with the corresponding specimens and detects a non-conformity for a particular specimen: "1200000808". The specimen will be cancelled in the Order Filler application. During the cancelation of the specimen, a reason will be asked to allow feedback towards a Nurse or the Physician.

This action will also lead to the cancelation of the related laboratory test.

The Order Filler informs the Order Placer / Order Result Tracker about the rejection executing the laboratory test

A nurse or the Physician detects this non-conformity and decides to take a new specimen sample from the patient to enable the laboratory fulfilling the laboratory test.

The Order Placer will inform the Order Filler about this new Specimen with new barcode id = "1200000809" and re-order the laboratory test within the already existing Order Group.
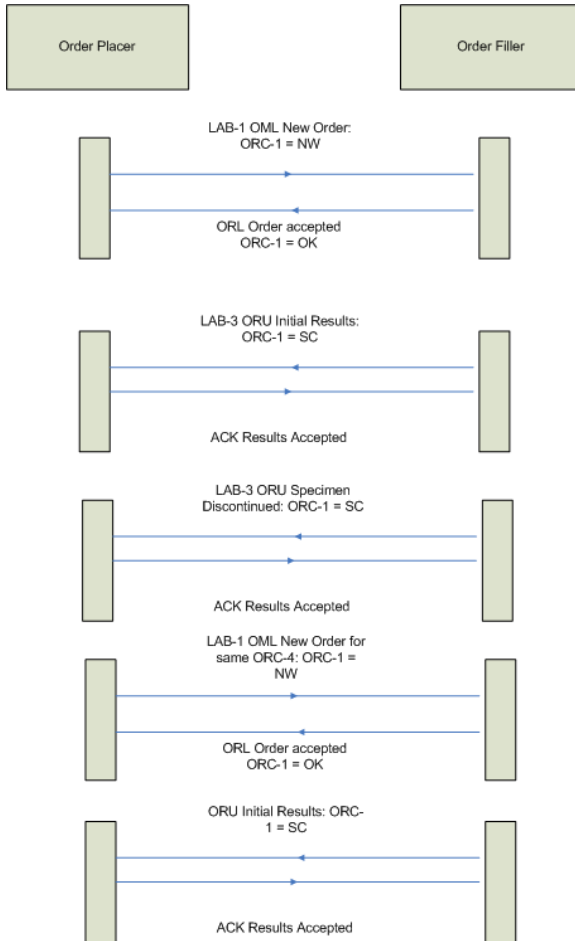
The Order Filler will update the Order Group and provide a status feedback to the Order Result Tracker informing about the new work for this new specimen.

3260 **4.6.2 Interaction Diagram**

4.6.3 Messages

4.6.3.1 LAB-1 (OP -> OF):Message "Create new order"

3265

```
MSH|^~\&||||APHP_CORDIER|20111213174100||OML^O21^OML_O21|391815247250212427|P|2.5|||||
||||
PID|1||7501052489^^^PSL||Smith^Marge^^^Mrs||19641120|F|||^^AMAREINS FRANCHELEINS
CESSEINS^^01090^100
PV1||I|||||||||||||||||JC0000407|||||||||||||||||||||||20120203101100|||||||V
ORC|NW|2011122446_OP1^APHP||2011122446_OPGN^APHP|SC||||20111213173234|||0607^Hart^Andr
e^^^^Dr^hcpr|0607_N^^^^^^^^^MIPSN||||S_CORDIER^BIOCH_HEMATO^L
```

3270

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```
      TQ1|||||||||R
      OBR|1|2011122446_OP1^APHP||APHP_CREA_COCKROFT^^APHP|||||||||||0607^Hart^Andre^^^^Dr^h
3275  cpr|||||||||S_CORDIER|S
      SPM|1|1200000808&PSL||MAT_HEPLIG_PLA^Plasma sur tube héparine lithium avec
      gel^L^APHP_HEPLIG_PLA^^APHP|||||||||0.0^ml&&L|||||20120210101100|||
```

```
      With:
3280   Order Group number (ORC) = 2011122446_OPGN
       Order Placer number (ORC) = 2011122446_OP1
       Order Placer assigned specimen number (SPM) = 1200000808
```

The related acknowledgement message isn't shown.

3285

4.6.3.2 LAB-3 (OF -> ORT/OP) : Acceptance of the order

```
      MSH|^~\&|PSL|E_BG_CORDIER|ORBIS|ResultImport|20120209112212||ORU^R01^ORU_R01|303900235
      622598969|P|2.5|||||BEL|8859/1|EN
      PID|1||7501052489^^^PSL||Smith^Marge||19641120|F
3290  PV1||I||||||||||||||||||JC0000407||||||||||||||||||||||||20120203101100|||||||V
      ORC|SC|2011122446_OP1^ORBIS|41498^PSL|2011122446_OPGN^ORBIS|SC||||20120209111827|||060
      7_N^BIOCHIMIE^^^^^^dept^MIPSN|0607|||||S_CORDIER^BIOCH_HEMATO^L
      OBR|1|2011122446_OP1^ORBIS|41498^PSL|BG_CLAIR_CREAT_COCKROFT^Clairance créat
      Cockroft^L^APHP_CREA_COCKROFT^^APHP|||20120210101100|||||||||0607_N^BIOCHIMIE^^^^^^dep
3295  t^MIPSN|||||||||S_CORDIER|S
      TQ1|||||||||R
      SPM|1|1200000808&ORBIS^1200000808&PSL||MAT_HEPLIG_PLA^Plasma sur tube héparine lithium
      avec gel^L^APHP_HEPLIG_PLA^^APHP|||||||||0.0^ml&&L||""|||20120210101100|||N
```

```
3300  With:
       Order Group number = 2011122446_OPGN
       Order Placer number = 2011122446_OP1
       Order Filler number = 41498
       Order Placer assigned specimen number = 1200000808
3305   Order Filler assigned specimen number = 1200000808
```

The related acknowledgement message isn't shown.

4.6.3.3 LAB-3 (OF -> ORT/OP) : Rejection of a specimen

```
      MSH|^~\&|PSL|E_BG_CORDIER|ORBIS|ResultImport|20120209122308||ORU^R01^ORU_R01|469731566
3310  7455003249|P|2.5|||||BEL|8859/1|EN
      PID|1||7501052489^^^PSL||Smith^Marge||19641120|F
      PV1||I||||||||||||||||||JC0000407||||||||||||||||||||||||20120203101100|||||||V
      ORC|SC|2011122446_OP1^ORBIS|41498^PSL|2011122446_OPGN^ORBIS|CA||||20120209111827|||060
      7_N^BIOCHIMIE^^^^^^dept^MIPSN|0607|||||S_CORDIER^BIOCH_HEMATO^L
3315  OBR|1|2011122446_OP1^ORBIS|41498^PSL|BG_CLAIR_CREAT_COCKROFT^Clairance créat
      Cockroft^L^APHP_CREA_COCKROFT^^APHP|||20120210101100|||||||||0607_N^BIOCHIMIE^^^^^^dep
      t^MIPSN|||||||||S_CORDIER|X
      TQ1|||||||||R
      SPM|1|1200000808&ORBIS^1200000808&PSL||MAT_HEPLIG_PLA^Plasma sur tube héparine lithium
3320  avec
```

```
gel^L^APHP_HEPLIG_PLA^^APHP||||||||0.0^ml&&L||""|||20120210101100|20120209113217||N|^N
on Conformite
OBX|1|ST|POIDS^Poids du patient^L^A1652^^APHP||Non
Conformite|kg^^L||N~N|||X|||20120210101100|E_BG_CORDIER^BIOCH_URG_CORDIER^L||^^L|INTEG
RA_01^L|20120209121943
OBX|2|ST|CREAT^Créatinine^L^A0094^^APHP||Non Conformite|µmol/l^^L|44-
80|N~N|||X|||20120210101100|E_BG_CORDIER^BIOCH_URG_CORDIER^L||^^L|INTEGRA_01^L|2012020
9121943
OBX|3|ST|CLCOCK^Clairance Créatinine Cockroft^L^A2154^^APHP||Non
Conformite|ml/min^^L||N~N|||X|||20120210101100|E_BG_CORDIER^BIOCH_URG_CORDIER^L||^^L|C
ALCUL_BG^L|20120209121942


With:
 Placer Group number = 2011122446_OPGN
 Order Placer number = 2011122446_OP1
 Order Placer assigned specimen number = 1200000808
 Specimen Availability (SPM-20) = N
 Specimen Reject Reason (SPM-21) = Non Conformite
```

The related acknowledgement message isn't shown.

4.6.3.4 LAB-1 (OP->OF): 'New Order' with new specimen for same order group

```
MSH|^~\&|PSL|E_BG_CORDIER|ORBIS|ResultImport|20120209140214||ORU^R01^ORU_R01|537296337
8993344693|P|2.5|||||BEL|8859/1|EN
PID|1||7501052489^^^PSL||Smith^Marge||19641120|F
PV1||I|||||||||||||||||JC0000407|||||||||||||||||||||||||20120203101100|||||||V
ORC|SC|2011122447_OP1^ORBIS|41499^PSL|2011122446_OPGN^ORBIS|SC||||20120209123701|||060
7_N^BIOCHIMIE^^^^^^dept^MIPSN|0607||||S_CORDIER^BIOCH_HEMATO^L
OBR|1|2011122447_OP1^ORBIS|41499^PSL|BG_CLAIR_CREAT_COCKROFT^Clairance créat
Cockroft^L^APHP_CREA_COCKROFT^^APHP|||20120210101100|||||||||0607_N^BIOCHIMIE^^^^^^dep
t^MIPSN|||||||||S_CORDIER|S
TQ1|||||||||R
SPM|1|1200000809&ORBIS^1200000809&PSL||MAT_HEPLIG_PLA^Plasma sur tube héparine lithium
avec gel^L^APHP_HEPLIG_PLA^^APHP||||||||0.0^ml&&L||""|||20120210101100|||N
```

```
With:
 Order group number = 2011122446_OPGN
 Order Placer number = 2011122447_OP1
 Order Placer assigned specimen number = 1200000809
```

The related acknowledgement message isn't shown.