

NPEx Messaging

Living Standard, 1 February 2021

Editor:

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Abstract

The National Pathology Exchange (*NPEx*) allows labs to exchange pathology [orders](#) and [results](#). This document can be read as a complete specification to implement functionality in a lab system to communicate with NPEx, or as a general introduction to NPEx messaging to assist in the creation of vendor-specific documentation.

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§ 1. Introduction

This specification is based on elements of the HL7 Version 2.3.1 [\[HL7\]](#) message format and the HL7 Minimal Lower Layer Protocol. Existing knowledge of these topics may be useful, but is not required. Readers familiar with HL7 may wish to read this introduction, then skip to [§ 3.2 Message structure](#).

For the purposes of this document:

- A **lab system** is anything that directly exchanges messages with NPEx, be it a LIMS, LIS, HISS, TIE, PIE, or any other acronym.
- An **order** consists of one patient, one specimen, and one or more requests.
- A **specimen** has a number that is unique within a lab system. Typically this is printed and attached to the physical specimen.
- A **request** produces one or more scalar **results**, which can be anything from a single number to a short story.
- References to message directions (i.e., **inbound** and **outbound**) are relative to NPEx.

This document **does not apply** to any deployment unless explicitly agreed with X-Lab. Behaviour defined here may change; undefined behaviour, even more so.

§ 1.1. Referring workflow

1. The referring lab system sends an order message to NPEx.
2. The specimen is packaged using the NPEx web application, and physically sent to the performing lab.
3. Optionally, when the specimen physically arrives at the performing lab, NPEx sends a confirmation message to the referring lab system.
4. Whenever results are available, NPEx sends a result message back to the referring lab system.

§ 1.2. Performing workflow (option 1)

1. When the specimen is packaged at the referring lab, NPEx sends an order message to the performing lab system.
2. When the specimen physically arrives at the performing lab, it is booked in using the performing lab system, which sends a confirmation message to NPEx.
3. Whenever results are available, the performing lab system sends a result message back to NPEx.

§ 1.3. Performing workflow (option 2)

1. When the specimen physically arrives at the performing lab, it is booked in using the NPEx web application, and NPEx sends an order message to the performing lab system.
2. Whenever results are available, the performing lab system sends a result message back to NPEx.

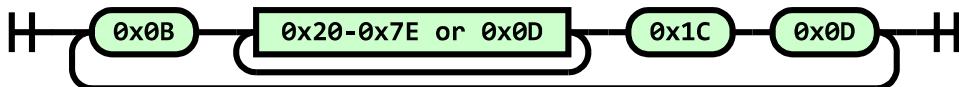
§ 2. Connections

NPEx establishes TCP connections to send messages to lab systems, and listens for connections to receive messages. Messages are framed using HL7 MLLP.

Outbound messages can be sent on a single connection, to different ports depending on message type, or even to different IP addresses as required. Connections are not persistent, and are only created when there are messages to send.

Inbound messages can be received on any agreed port. NPEx identifies the lab system based on the source IP address, and determines the message type based on its content.

§ 2.1. Framing



Message content consists of bytes in the range `0x20-0x7E`, plus `0x0D`. Each message is preceded by the byte `0x0B`, and followed by the bytes `0x1C 0x0D`.

In case of an error in framing, NPEx will close the connection.

Message content is encoded using 7-bit ASCII [[RFC20](#)].

§ 2.2. Acknowledgements

NPEx responds to inbound messages with an acknowledgement message on the same connection. An acceptance confirms the message has been queued for processing, and nothing else.

After sending an outbound message, NPEx will wait for the lab system to respond with an acceptance or rejection before sending the next message. Rejected messages will be logged internally. If the lab system sends any other response (e.g. an error), or no response is received within a short time, the message will remain queued and will be sent again.

§ 3. Messages

Note that:

- Where a maximum field length is specified, this limit refers to NPEx itself - other lab systems may have further restrictions.
- Unless otherwise stated, literal values are case-sensitive.
- The inclusion of a data item in this document does not necessarily mean that all systems connected to NPEx support it, particularly those that do not use HL7.

§ 3.1. Message syntax

Messages use several levels of delimiter:

- A message consists of segments terminated by CARRIAGE RETURN (CR).
- A **segment** consists of a three-character **segment type**, VERTICAL LINE (|), and one or more fields delimited by VERTICAL LINE (|).
- A **field** consists of values delimited by TILDE (~).
- A **field value** consists of components delimited by CIRCUMFLEX (^).
- A **component** consists of subcomponents delimited by AMPERSAND (&).
- A **subcomponent** can't be further divided, which is a relief.

Fields, components, and subcomponents are numbered starting at 1, except for **MSH** where the first field is defined to be a single VERTICAL LINE (|), and the actual fields are numbered starting at 2.

In this document, value locations are referenced as "<*segment type*>-<*field*>.<*component*>.<*subcomponent*>", with numbers omitted for convenience where a field consists of a single component or a component consists of a single subcomponent.

EXAMPLE 1

AAA|500|ABC^abcdef&xyz||qwertyuiop~asdfghjkl~zxcvbnm

AAA-1	500			
		AAA-2.1	ABC	
AAA-2			AAA-2.2.1	abcdef
		AAA-2.2	AAA-2.2.2	xyz
AAA-4	Three values: qwertyuiop, asdfghjkl, and zxcvbnm.			

Escape sequences consisting of capital letters surrounded by REVERSE SOLIDUS (\) are used when special characters occur in data, except in MSH-2. In inbound messages, escape sequences are matched left-to-right, and backslashes that don't match valid escape sequences are removed.

Character	Escape sequence
	\F\
~	\R\
\	\E\

Character	Escape sequence
&	\T\
^	\S\

EXAMPLE 2

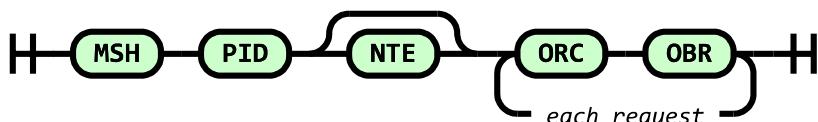
\R\\E\\S\\E\T\ represents the value ~\^E&

\F\R\\E\\S\\H\ represents the value |R\^H, but any system that sends such a value is going to have a bad time.

§ 3.2. Message structure

The segments produced/expected by NPEx in each message type are detailed below. NPEx ignores any additional segments in inbound messages.

§ 3.2.1. Order message



The order of requests is not meaningful, and may not be preserved. The NTE segment, if present, represents clinical details at the order level.

If NPEx receives a subsequent order message for the same specimen, the order is replaced, except:

- The specimen number and specimen type cannot be changed.
- Any requests already on the order are retained, even if they are not present in the new message.

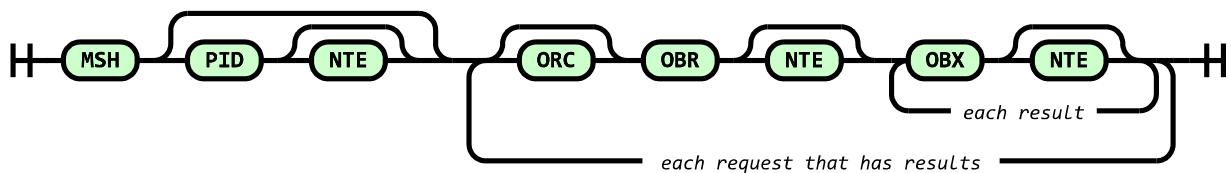
EXAMPLE 3

```

MSH|^~\&|PATHLAB|LLUH|NPEX|NPEX|20160229100136||ORM^001|42625|T|2.3.1|||AL|NE
PID|1||5991197253^^^NHS^NH~B129919^^^PAT^MR||Oldman^Anne^^^Miss||20120826|F|||
    |76 Andre House^Rundowne Estate^City of Town^Placefordshire^CT1
    2JC||01189998819|01818118181
NTE|1||Sample extracted from vending machine.
ORC|NW|N,17.0000111.H|||||^~~~~S||||DAKER|LOWLANDS
OBR|1|N,17.0000111.H||SC^Smartie
    Count|||20160229|||||NF||C&Chocolate|DAKER||||||CHO|||^~~~~S
ORC|NW|N,17.0000111.H|||||^~~~~R||||DAKER|LOWLANDS
OBR|2|N,17.0000111.H||CCH^Cochineal
    level|||20160229|||||NF||C&Chocolate|DAKER||||||CHO|||^~~~~R
ORC|NW|N,17.0000111.H|||||^~~~~R||||DAKER|LOWLANDS
OBR|3|N,17.0000111.H||SPS^Spirulina
    screening|||20160229|||||NF||C&Chocolate|DAKER||||||CHO|||^~~~~R

```

§ 3.2.2. Result message



When NPEx receives a result message, the performing and originating lab systems' specimen numbers are used to identify the order.

The order of requests and results is not meaningful, and may not be preserved. NTE segments immediately following a PID, OBR, or OBX segment represent order-, request-, or result-level comments respectively. Any unsolicited investigations appear in the same way as other requests and results.

ORC segments are always present in outbound messages, but are not used in inbound messages and so may be omitted. Similarly, the PID segment is always present outbound, but is only required inbound if an order-level comment is being sent. Patient data in inbound result messages is not used.

If NPEx receives more than one result message for the same specimen, all results are stored, though generally only current results are accessible. A result is ***current*** if it is the most recently received result on the order for a given result code, with the exception that "final" results are always treated as newer than interim results.

Depending on configuration, an outbound message may contain only the results from the associated inbound message, or all current results for the order.

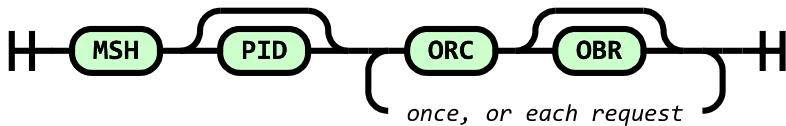
EXAMPLE 4

```

MSH|^~\&|NPEX|NPEX|LLUH|LLUH|20160301173502||ORU^R01|f2ea6ad9-89f7-4d3a-86d2-
c5f0177cf2e8|T|2.3.1|||AL|NE
PID|1||5991197253^^^NHS^NH~B129919^^^PAT^MR||Oldman^Anne^^^Miss||20120826|F||
|76 Andre House^Rundowne Estate^City of Town^Placefordshire^CT1
2JC||01189998819|01818118181
NTE|1||Sample melted slightly in transit.
ORC|RE|N,17.0000111.H|G170000062||||^^^^S||||DAKER|LOWLANDS
OBR|1|N,17.0000111.H|G170000062|SC^Smartie
Count|||20160229|||||NF||C&Chocolate|DAKER|||||20160301173455||CHO|F|||
^^^^^S
OBX|1|NM|TSC^Total count||42||46-50|L|||F
OBX|2|NM|PWT^Weight||38|g||||F
OBX|3|CE|BSCR^Brown screen||NEG|||||F
NTE|1||ABSOLUTELY NO BROWN ONES
ORC|RE|N,17.0000111.H|G170000062||||^^^^^R||||DAKER|LOWLANDS
OBR|2|N,17.0000111.H|G170000062|MN^Miscellaneous
nonsense|||20160229|||||NF||C&Chocolate|DAKER|||||20160301173455||CHO|
F|||^****R
NTE|1||This is a set comment nobody asked for.~It has a second line, which
you're reading now.
OBX|1|TX|MN||This~is~a~textual~result~with~one~word~per~line~for~some~reason.
||||||P

```

§ 3.2.3. Confirmation message



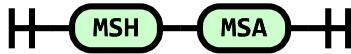
When NPEx receives a confirmation message, the originating lab system's specimen number is used to identify the order, and the performing lab system's specimen number is stored for future use.

Inbound messages need only contain one MSH and one ORC segment - anything else is ignored. Outbound messages will include patient data and requests.

EXAMPLE 5

```
MSH|^~\&|ChocolateLab|EHH|NPEX|NPEX|20160229170101||ORM^001|2017*46*821|T|2.3
    .1|||AL|NE
ORC|SC|N,17.000111.H|G170000062
```

§ 3.2.4. Acknowledgement message



EXAMPLE 6

```
MSH|^~\&|LLUH|LLUH|NPEX|NPEX|20170217095921.406+0000||ACK^R01|3758|T|2.3.1
MSA|AA|f2ea6ad9-89f7-4d3a-86d2-c5f0177cf2e8
```

§ 3.3. Common value types

datetime

An ISO 8601 value in one of the following formats. Note that the basic format is used, there is no time designator, and the decimal separator is FULL STOP (.). [\[ISO8601\]](#).

- YYYYMMDD
- YYYYMMDDhhmm
- YYYYMMDDhhmm±hhmm
- YYYYMMDDhhmmss
- YYYYMMDDhhmmss±hhmm
- YYYYMMDDhhmmss.ss
- YYYYMMDDhhmmss.ss±hhmm

If a time zone is not explicitly specified, the time is local to the United Kingdom.

date

A datetime in the first format above.

freetext

Any text. If applicable, multiple lines are expressed as multiple values, that is, delimited with TILDE (~). NPEx will remove trailing spaces from lines in inbound messages.

Whilst NPEx places no practical limits on freetext, some lab systems may have limits - both overall size and characters per line. Unless otherwise agreed, NPEx does not attempt to format text to meet the requirements of lab systems.

local code

Lab system-specific identifier for a type of specimen, request, or result. Up to 50 characters.

Multiple local codes may map to one "global" code; a full explanation of code mapping is out of scope for this document.

Before use, local codes are configured in the NPEx web application.

When receiving messages, NPEx maps the local codes to internal global codes. When sending messages, NPEx maps the internal global codes to local codes of the other lab system. If NPEx is unable to map a code, processing is stopped for the whole message.

local name

Lab system-specific name accompanying a local code. Up to 128 characters. Not used in inbound messages. In outbound messages, populated with the name configured in NPEx.

constant

A field that relates to the specimen/order as a whole. If the segment appears multiple times in a message, this field has the same value in each. In inbound messages, NPEx will use the first occurrence.

specimen number

An identifier for a specimen within a given [lab system](#). Up to 50 characters. Must not contain SPACE.

Depending on configuration, the originating lab system's specimen number may be formatted (for example, by the addition of a prefix) when it is sent to the performing lab system, and vice versa. Any added characters do not count towards the 50-character limit.

The performing lab system's specimen number is not present in outbound messages if it is not (yet) known to NPEx.

numeric

Normally, an integer or decimal number with FULL STOP (.) separator, but NPEx has no restrictions.

NPEx will normalise spacing in inbound numeric values: leading and trailing SPACE characters will be removed, and multiple consecutive SPACE characters will be replaced with one.

§ 3.4. Segment definitions

The fields produced/expected by NPEx in each segment are detailed below. Unspecified fields and extra values, components, and subcomponents are ignored in [inbound](#) messages, and never present

in outbound messages. Unless stated as **required**, specified fields are optional in inbound messages. Unless stated as **not present**, specified fields are always found in outbound messages.

§ 3.4.1. MSH

MSH-1 Field Separator	Always .						
MSH-2 Encoding Characters	<u>Required</u> . Always ^~\&.						
MSH-3 Sending Application	Not used in inbound messages.						
MSH-4 Sending Facility	In outbound acknowledgement messages, the sending and receiving fields are taken from the original message and swapped.						
MSH-5 Receiving Application	In other outbound messages, the sending fields are NPEx, and the receiving fields are an arbitrary identifier for the target <u>lab system</u> (usually made up of uppercase letters).						
MSH-6 Receiving Facility							
MSH-7 Date/Time of Message	<u>Datetime</u> . The current time, generated during message formatting.						
MSH-9 Message Type	<u>Required</u> . <table border="1" style="margin-left: 20px;"> <tr> <td>MSH-9.1 Message Type</td> <td>↪ In order and confirmation messages ORM^001</td> </tr> <tr> <td>MSH-9.2 Trigger Event</td> <td>↪ In result messages ORU^R01</td> </tr> <tr> <td></td> <td>↪ In acknowledgement messages MSH-9.1 is ACK, MSH-9.2 is taken from the original message.</td> </tr> </table>	MSH-9.1 Message Type	↪ In order and confirmation messages ORM^001	MSH-9.2 Trigger Event	↪ In result messages ORU^R01		↪ In acknowledgement messages MSH-9.1 is ACK, MSH-9.2 is taken from the original message.
MSH-9.1 Message Type	↪ In order and confirmation messages ORM^001						
MSH-9.2 Trigger Event	↪ In result messages ORU^R01						
	↪ In acknowledgement messages MSH-9.1 is ACK, MSH-9.2 is taken from the original message.						
MSH-10 Message Control ID	<u>Required</u> . A value of up to 100 characters that uniquely identifies the message within the sending system. In outbound messages, the value is globally unique.						
MSH-11 Processing ID	Not used in inbound messages. In outbound messages, P for the live NPEx system, T otherwise.						
MSH-12 Version ID	<u>Required</u> . Always 2.3.1.						

MSH-15 Accept Acknowledgment Type	Not used in inbound messages. Not present in outbound acknowledgement messages. AL in other outbound messages.
MSH-16 Application Acknowledgment Type	Not used in inbound messages. Not present in outbound acknowledgement messages. NE in other outbound messages.

§ 3.4.2. MSA

MSA-1 Acknowledgement Code	<u>Required.</u> <ul style="list-style-type: none"> ↪ In an acceptance AA or CA. ↪ In a rejection AR or CR. ↪ In an error AE or CE.
MSA-2 Message Control ID	<u>Required.</u> MSH-10 from the original message.

§ 3.4.3. PID

PID-1 Set ID	1	
PID-3 Patient Identifier List	PID-3.1 ID PID-3.4 Assigning Authority PID-3.5 Identifier Type Code	<p>Local or national patient numbers. May contain multiple values, that is, zero or more of the below delimited with TILDE (~).</p> <ul style="list-style-type: none"> ↪ NHS Number <i>nhs-number^^^NHS^NH</i> ↪ CHI Number <i>chi-number^^^CHI^NH</i> ↪ Originating lab system's patient number <i>patient-number^^^PAT^MR</i> <p>Depending on configuration, the number may be formatted / for</p>

number may be formatted (for example, by the addition of a prefix) in outbound order messages.

PID-5 Patient Name	PID-5.1 Family Name & Last Name Prefix	Family name
	PID-5.2 Given Name	Given name
	PID-5.3 Middle Initial or Name	Middle names
	PID-5.4 Suffix	Suffix
	PID-5.5 Prefix	Title
PID-7 Date/Time of Birth	<u>Date</u> representing the patient's date of birth.	
PID-8 Sex	F for a female patient, M for a male patient, or U for unknown (default if not specified).	
PID-11 Patient Address	PID-11.1 Street Address	Address line 1
	PID-11.2 Other Designation	Address line 2
	PID-11.3 City	Address line 3
	PID-11.4 State or Province	Address line 4
	PID-11.5 Zip or Postal Code	Postcode
	PID-11.6 Country	Country
PID-13 Phone Number - Home	Contact numbers. No format restrictions.	
PID-14 Phone Number - Business		

NPEx does not strictly require any patient data. However, certain items may be required by performing lab systems. It is common for given name, family name, date of birth, and at least one patient number to be required.

§ 3.4.4. ORC

ORC-1 |

Order Control ORC-2 Placer Order Number	<p>↪ In order messages <u>Required</u>. NW or X0; always NW in outbound messages.</p> <p>↪ In result messages Always RE. Not used in inbound messages.</p> <p>↪ In confirmation messages <u>Required</u>. Always SC.</p> <hr/> <p><u>Constant</u>. <u>Required</u> in inbound confirmation messages, otherwise not used (see OBR-2).</p> <p><u>Specimen number</u> for the originating lab.</p> <hr/> <p><u>Constant</u>. <u>Required</u> in inbound confirmation messages, otherwise not used (see OBR-3).</p> <p><u>Specimen number</u> for the performing lab.</p> <hr/> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">ORC-7 Quantity/Timing</td><td style="padding: 5px;">ORC-7.6 Priority</td><td style="padding: 5px;">Not used in inbound messages. In outbound messages, same as the following OBR-27.6.</td></tr> </table> <hr/> <p>ORC-12 Ordering Provider</p> <p>Clinician code.</p> <p>For outbound order messages, performing lab systems may choose fixed codes for each originating lab system in NPEx configuration. Otherwise, the clinician code from the inbound order message will be passed through, and the location code will be an NPEx identifier (see MSH-3/4/5/6).</p> <hr/> <p>ORC-13 Enterer's Location</p> <p>Location code.</p> <p>For outbound result and confirmation messages, the codes from the inbound order message will always be used.</p>	ORC-7 Quantity/Timing	ORC-7.6 Priority	Not used in inbound messages. In outbound messages, same as the following OBR-27.6.
ORC-7 Quantity/Timing	ORC-7.6 Priority	Not used in inbound messages. In outbound messages, same as the following OBR-27.6.		

§ 3.4.5. OBR

OBR-1 Set ID	Integer incremented for each OBR segment, starting at 1.
OBR-2 Placer Order Number	<u>Constant</u> . <u>Required</u> in inbound order messages.

		<u>Specimen number</u> for the originating lab.
OBR-3 Filler Order Number		<u>Constant. Required</u> in inbound result messages. Not used in inbound order messages.
OBR-4 Universal Service ID	OBR-4.1 Identifier	<u>Required. Local code</u> for the request type.
	OBR-4.2 Text	<u>Local name.</u>
OBR-7 Observation Date/Time		<u>Datetime</u> representing the specimen collection time, or the beginning of the specimen collection period, if known.
OBR-8 Observation End Date/Time		<u>Datetime</u> representing the end of the specimen collection period, if applicable.
OBR-9 Collection Volume	OBR-9.1 Quantity	Volume of the collected sample, if known.
	OBR-9.2 Units	Units of measure for OBR-9.1.
OBR-13 Relevant Clinical Info.		F if the patient was fasting, NF if the patient was not fasting, or not present if not known.
OBR-15 Specimen Source	OBR-15.1 Name or Code	OBR-15.1.1 Identifier <u>Required. Local code</u> for the specimen type.
		OBR-15.1.2 Text Not used in inbound messages. The global (NPEx) name for the specimen type.
OBR-16 Ordering Provider		Not used in inbound messages. In outbound messages, same as the previous ORC-12.
OBR-22 Results Rpt/Status Chng - Date/Time		<u>Constant. Required</u> in inbound result messages, not present in outbound order and confirmation messages. <u>Datetime</u> representing the time the result was generated.
OBR-24 Diagnostic Serv Sect ID		Discipline code. In outbound result and confirmation messages, the OBR-24 value from the inbound order message is passed back. Otherwise, not used.

OBR-25 Result Status	F in outbound result messages. Otherwise, not used. In the future , C may be used to indicate updated results.	
OBR-27 Quantity/Timing	OBR-27.6 Priority	R for routine (default if not specified), A for high, or S for critical priority. Not used in inbound result messages.

§ 3.4.6. OBX

OBX-1 Set ID	Integer incremented for each OBX segment, starting at 1 after each OBR segment.			
OBX-2 Value Type	<u>Required</u> . NM for a numeric result, TX for a text result, or CE for a coded result.			
OBX-3 Observation Identifier	OBX-3.1 Identifier	<u>Required</u> . Local code for the result type.		
	OBX-3.2 Text	<u>Local name</u> .		
OBX-4 Observation Sub-ID	Not used, but may be in the future . For forward compatibility, in inbound messages, either blank or equal to OBX-1.			
OBX-5 Observation Value	<u>Required</u> . <ul style="list-style-type: none"> ↪ For a numeric result <ul style="list-style-type: none"> ↪ If the result is below the measurable range LESS-THAN SIGN (<) followed by the numeric lower bound of the measurable range. ↪ If the result is above the measurable range GREATER-THAN SIGN (>) followed by the numeric upper bound of the measurable range. ↪ Otherwise Numeric value. ↪ For a text result Freetext. ↪ For a coded result <table border="1"> <tr> <td>OBX-5.1</td> <td>Local code for an interpretative result such</td> </tr> </table> 		OBX-5.1	Local code for an interpretative result such
OBX-5.1	Local code for an interpretative result such			

	Identifier	as "positive".
OBX-5.2 Text		Not used. In the future , the name of the result.
OBX-6 Units		Currently only used for numeric results, but this may change in the future . The units of measure for OBX-5 and OBX-7, if known.
OBX-7 References Range		Currently only used for numeric results, but this may change in the future . The normal range of the result, if known.
		↪ If the lower and upper bounds are known The numeric lower bound, followed by HYPHEN-MINUS (-), followed by the numeric upper bound.
		↪ If only the upper bound is known LESS-THAN SIGN (<) followed by the numeric upper bound.
		↪ If only the lower bound is known GREATER-THAN SIGN (>) followed by the numeric lower bound.
OBX-8 Abnormal Flags	H	A high result.
	HH	A very high result.
	L	A low result.
	LL	A very low result.
	A	An abnormal result. Either the performing lab is unable to say whether the result is high or low, or to do so would be meaningless.
		Not present if the result is normal, or the performing lab does not use abnormal flags.
OBX-11 Observation Result Status	F	A "final" result.
	I	An interim/provisional result.

C An updated result, that is, one that replaces a previously-sent "final" result.

In inbound messages, C or a missing value are treated the same as F.

§ 3.4.7. NTE

NTE-1 Set ID	1
NTE-3 Comment	<u>Freetext.</u>

§ Appendix A: Deviations from HL7

It may be possible to consume and produce messages as described in this specification using a generic HL7 2.3.1 messaging pipeline, but there are some areas in which there are potential problems.

This list is likely to be incomplete.

- MSA-1 begins with C for the "accept acknowledgement" described in HL7 which is most similar to the behaviour described here. Here, the MSA-1 values starting with A are also used, with no difference in behaviour.
- NTE segments following PID segments in ORM messages are "Notes and Comments (for Patient ID)" in HL7. Here, they represent clinical details in requests, and order-level comments in results.
- HL7 recommends, but does not require, the delimiters specified in this document.
- PID-3 (Patient Identifier List) and PID-5 (Patient Name) are required in HL7. They are optional here because they are not always provided by referring labs.
- ORC-2, ORC-3, OBR-2, and OBR-3 are unique order identifiers in HL7. Here, they are simply the specimen number, so are duplicated when there are multiple requests.
- OBR-7 (Observation Date/Time) is required in HL7. It is optional here because collection time is not always recorded by referring labs.
- OBR-9.2 and OBX-6 (Units) have a specific set of values in HL7. Here, there is no such restriction: the value is passed out as it is received.
- OBR-14 (Specimen Received Date/Time) is required in HL7. It is not used here.

- OBR-25 (Result Status) is always F, even if results are interim/provisional or have been updated. The status of individual results can be determined from OBX-11.

§ Appendix B: Changes to this document

This specification will change. Changes that affect compatibility with existing connections will be discussed with customers before implementation. Where this document refers to *the future*, this should be taken as notice that a change may happen at an indeterminate time, and lab systems should be prepared.

Recent notable changes to this document are listed below.

5 April 2017

- Clarify the definition of "all results" for outbound messages.
- Add updated result status to OBX-11.

3 May 2017

- Specify that most fields are updated when a subsequent order message is received.
- Add codes to OBX-8 for very high or low results.

5 July 2017

- Clarify that request/result order is undefined.
- Document stripping of trailing whitespace in freetext.
- Correct default for location code.

11 July 2017

- Add future note that OBX-6 and OBX-7 may be usable for non-numeric results.

3 August 2017

- Specify that rejected messages are no longer retried.
- Clarify that literals are case-sensitive.
- Add future note that OBX-5.2 may be used for coded results.

21 September 2017

- Add outbound confirmation messages.

25 July 2018

- Allow specimen collection time to be expressed as a period, in addition to a single point in time.

§ Index

§ Terms defined by this specification

<u>acceptance</u> , in §3.4.2	<u>NPEx</u> , in §Unnumbered section
<u>component</u> , in §3.1	<u>numeric</u> , in §3.3
<u>constant</u> , in §3.3	<u>order</u> , in §1
<u>current</u> , in §3.2.2	<u>outbound</u> , in §1
<u>date</u> , in §3.3	<u>rejection</u> , in §3.4.2
<u>datetime</u> , in §3.3	<u>request</u> , in §1
<u>error</u> , in §3.4.2	<u>required</u> , in §3.4
<u>field</u> , in §3.1	<u>results</u> , in §1
<u>field value</u> , in §3.1	<u>segment</u> , in §3.1
<u>freetext</u> , in §3.3	<u>segment type</u> , in §3.1
<u>inbound</u> , in §1	<u>specimen</u> , in §1
<u>lab system</u> , in §1	<u>specimen number</u> , in §3.3
<u>local code</u> , in §3.3	<u>subcomponent</u> , in §3.1
<u>local name</u> , in §3.3	<u>the future</u> , in §Unnumbered section
<u>not present</u> , in §3.4	

§ References

§ Normative References

[ISO8601]

Representation of dates and times. ISO 8601:2004., 2004. ISO 8601:2004. URL:
http://www.iso.org/iso/catalogue_detail?csnumber=40874

[RFC20]

V.G. Cerf. ASCII format for network interchange. October 1969. Internet Standard. URL:
<https://tools.ietf.org/html/rfc20>

§ Informative References

[HL7]

[HL7 Messaging Standard Version 2.3.1](#). URL:
http://www.hl7.org/implement/standards/product_brief.cfm?product_id=141