HISO 10008.1:2015

Pathology and Radiology Messaging Implementation Guide

To be used in conjunction with:

HISO Pathology and Radiology Messaging Standard

Document information

*HISO 10008 Pathology and Radiology Messaging Standard* is a standard approved for the New Zealand health and disability sector.

Published in February 2007, updated in September 2008 and October 2015 by the Ministry of Health.

This edition supersedes the first edition (HISO 10008 v1.1).

ISBN 978-0-947491-17-8 (online)

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This document can be found on our website.

<http://ithealthboard.health.nz/standards>

Contributors

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See the HISO website for information about our standards development processes.

New Zealand Legislation

The following Acts of Parliament and Regulations have specific relevance to this standard. Readers should be aware of the need to consider other Acts and Regulations as may be appropriate to their own implementation or use of this standard.

* Health Act 1956
* Health and Disability Commissioner (Code of Health and Disability Services Consumers’ Rights) Regulations 1996
* Health Information Privacy Code 1994
* Privacy Act 1993

Contents

1 Introduction 1

1.1 Purpose 1

1.2 Scope 1

1.3 HL7 2

1.4 Related Standards and Documents 3

2 Overview of HL7 Messaging 5

2.1 Transaction Flow 5

2.2 HL7 Message Structure 6

2.3 Message Composition 8

2.4 Message Definitions 9

2.5 Segment Definitions 9

2.6 Data Types 9

2.7 Tables 10

2.8 Supported Message Types 10

2.9 Responsibilities 10

3 New Zealand Specifics 11

3.1 Message Context and Content 11

3.2 User Interface 11

3.3 Creating a Message 11

3.4 Business Process 11

3.5 Terminologies / Identifiers 14

3.6 General Notes 18

Appendix A: Message Transaction Flows 20

Appendix B: Sample messages 26

Appendix C: Frequently Asked Questions 28

Appendix D: References: 29

Appendix E: Glossary: 30

# Introduction

This implementation guide is to be used for assistance when developing Pathology and Radiology applications compliant with the Pathology and Radiology Messaging Standard. It is intended to be read in conjunction with the Messaging Standard.

This second edition supersedes the first edition (HISO10008 v1.1) which has been technically and structurally revised.

Changes to this guide may be submitted to HISO for committee approval following Sector involvement.

## Purpose

The purpose of the documents within the Pathology and Radiology suite are:

|  |  |
| --- | --- |
| **Document** | **Purpose** |
| Messaging Implementation Guide | This guide. Designed to provide assistance when implementing systems which utilise the Standards contained in this suite |
| Messaging Standard | Describes the structure of the messages that are exchanges between sender and receiver over the course of a Pathology and Radiology interaction |

## Scope

This is a guide for those engaged in the implementation of electronic information exchange relating to pathology and radiology testing using the HISO 10008 Pathology and Radiology Messaging Standard. As such, it needs to be read in conjunction with that Standard. It seeks to provide information relating to the adaptation of the core HL7®[[1]](#footnote-1) version 2.4 to the New Zealand Health IT Sector with the overarching aim that the right information is provided at the right time to the right person in the right place.

The scope of the standard includes:

* Messages from an orderer of a test to the entity charged with performing the test (also termed a 'filler')
* Messages containing the results of the test
* Messaging within a facility (eg, an internal DHB system)
* Messages between facilities (eg, from a Community Lab to a GP system).

The scope of this document includes:

* Overview of HL7
* HL7 message structure used by messages
* Message utilisation for common use cases
* How segment fields are used within NZ
* Example messages
* Related standards and Terminologies

Excluded from scope are:

* Encryption and transformation mechanisms.  However it is assumed that the transport and processing of all of the messages described in the guide are using an infrastructure compliant with the Health Information Security Framework standard.
* Details of the specific business processes supported by the Standard. A description of this support can be found here:  <http://wiki.hl7.org/index.php?title=Laboratory_Order_Conceptual_Specification>
* Support of an intermediary broker in particular the QBP/RSP message pair.
* Requests for second opinions.

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| **!** *Although this Standard has a high degree of backwards compatibility with those based on early versions of the core HL7 (e.g. version 2.1), it should be noted that the practice of converting messages to a “flat file” format for consumption by primary care facilities is* ***not*** *supported in relation to HL7 version 2.4.* |

## HL7

### Background

HL7 version 2 is an international standard that is used globally and within New Zealand to manage the workflow and content involved with the exchange of clinical information about patients between providers.

This guide presents the adaptation of this standard to the New Zealand situation in the context of the transmission of pathology and radiology results.

Further information on the HL7 organization is available at <http://www.hl7.org/>, and about the Version 2 standards at <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=185> which are free to download.

### Why use HL7 version 2.4 and not HL7 version 2.1

To ensure a nationally consistent approach to messaging, the recommendation is to move away from the legacy standard and to use HL7 version 2.4. The reasons being:

* HL7 version 2.1 has been around the NZ sector for over 20 years and no longer sufficient to meet modern interoperability requirements in the way that HL7 version 2.4 does.
* Ability to include (send) attachments / multiple attachments with the HL7 message using the Encapsulated Data type. In particular some senders want to include PDF attachments; others have requested the ability to send multiple attachments. A full description of the Encapsulated Data Type is contained in section 5.1.6.9 of the Messaging Standard.
* Some ORU results are more descriptive and better suited being displayed with formatted text or as attached information. The sector expects a formatted presentation, which currently is not possible.
* Currently most vendors use the flat file mapping from version 2.1 which prevents the ability to utilise the NZPOCS and HPI coding systems.  It also does not support copying to multiple providers.
* Version 2.1 has no ability to use the RP Reference Pointer data type which is used to specify a URL.
* SAC (Specimen and Container Details) segment is not available in version 2.1.

### Use Cases

HL7 International provides a comprehensive Laboratory Order Conceptual Specification at <http://wiki.hl7.org/index.php?title=Laboratory_Order_Conceptual_Specification>.

This includes business model, information model and solution specification artefacts that support the following, broad, use cases:

Create Order – the full business process from order request to fulfilment (including results).

Change Order – variations when an order is modified.

Cancel Order – variations when an order is cancelled.

It is not believed that there are any significant variations to the business processes encapsulated in these use cases in New Zealand. Furthermore, aside from differing direct testing targets (specimen or patient), these use cases, and the related message types, do not differ when applied to radiology testing.

These use cases are expanded by the message transaction processing flow diagrams in Appendix A: Message Transaction Flows.

## Related Standards and Documents

### New Zealand Pathology Observation Code Set

A New Zealand Pathology Observation Code Set (NZPOCS) was developed to provide organisations with a New Zealand specific subset of Logical Observation Identifiers Names and Codes (LOINC) for use within the health and disability sector. Having standardised coding and consistent language available for use nationally supports the electronic messaging of laboratory orders and results. This set of codes reflects the Laboratory Test Schedule.

The New Zealand Pathology Observation Code Set Standard is to be used in conjunction with this standard when implementing laboratory electronic ordering and observation results. Refer to the following link for this Standard (<http://ithealthboard.health.nz/standards/approved-standards>).

### Health Information Security Framework

The Health Information Security Framework (HISF) is designed to support organisations and health providers holding personally identifiable health information to improve the security of that information. The Health Information Security Framework (HISF) is based on AS/NZS ISO/IEC 27001 Information Technology – Security techniques – Information security management systems requirements. A copy of this Standard is available here: <http://ithealthboard.health.nz/standards/approved-standards>.

### ***Health Provider Index***

The Health Practitioner Index (HPI) is a system which assigns a unique identifier (HPI Number) to individual health care providers, organisations and facilities within the health and disability sector. For further details on the Health Provider Index, please refer to the Ministry of Health website: <http://www.health.govt.nz/our-work/health-identity/health-practitioner-index>.

### National Health Index

The National Health Index (NHI) is a system which assigns a unique identifier (NHI Number) to every person who uses health and disability support services in New Zealand. The NHI Number along with that person’s demographic details is stored in the NHI. For further details on the National Health Index, please refer to the Ministry of Health website: <http://www.health.govt.nz/our-work/health-identity/national-health-index>.

### National Health IT Plan

The National Health IT Plan describes the priorities for the health and disability sector in order to achieve the Government’s eHealth vision of all New Zealanders having electronic access to their own core health information. It guides the sector in meeting challenges facing the health system and outlines how information solutions can enable improved care. The most recent copy of the National Health IT Plan can be found here: <http://ithealthboard.health.nz/national-health-it-plan>.

# Overview of HL7 Messaging

HL7 version 2 messaging with respect to this implementation guide is a structured methodology, whereby requests are made to pathology and/or radiology system for patient testing and results are returned electronically.

The elements are:

1. Transaction flow – ie, two-way transmission of messages. For example, a message is sent and a response or acknowledgement is received.
2. Structured messages containing clinical and administrative information.

Any data passed between the entities is contained in an HL7 message. The major parts of a message are referred to as message segments. The patient details, request details and result lines are sent as separate segments in the same message. Therefore, software systems must keep links between the patient, request and results and the different components of a result. As different requests give results that have differing numbers and types of component parts, it can require complex data connections.

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| **!** *NOTE: There is no inherent or implied formatting within the received atomic data. The practice management software is used to re-construct the results into an accurate and meaningful format for display/printing by the recipient.* |

The method of communicating between the entities is not part of this specification and users must design their systems to interface with different transmission methodologies, including those used by transport service providers.

## Transaction Flow

Messages are sent in response to 'real world' events and demands. HL7 version 2 has the concept of 'trigger' events, and the messages that are exchanged in response to those events.

The following example represents a common sequence of events in the pathology and/or radiology domain in which several messages are created and exchanged:

1. A request is made by a health provider for some service to be performed. This could be either a pathology or radiology test
2. If transmitted electronically, the requesting system sends an order (ORM^O01 or OML^O21) message as described in the messaging standard document to the laboratory or radiology information system
3. The recipient system acknowledges with an (ORR^O02 or ORL^O22) acknowledgement message
4. The patient presents at the laboratory or radiology clinic, where the required test is performed
5. The results are sent electronically back to the requester in an ORU^R01 message
6. The requesting system sends an ACK^R01 acknowledgement message

Variations to this cycle will occur. For example:

1. The orders are placed manually
2. Orders can be cancelled
3. Results can go to multiple recipients
4. Corrections can be made to previously sent orders or results

Monitoring is performed at both the requestor's site and the laboratory/radiology site to identify incomplete processing. It is the responsibility of the implementer to ensure that messages are acknowledged, and that correct processing occurs.

This process implies that a request has a distinct life cycle, as it is processed by the target. It starts out as an order request and ends when the order has been fulfilled or cancelled. This lifecycle can be represented by a state diagram, which describes the different states of an order/result message, the business processes that can cause a state to change, and what messages are generated as a result of the state change. This is often termed a 'Message Exchange Pattern'

Refer to the HL7 site (<http://wiki.hl7.org/index.php?title=Laboratory_Order_Conceptual_Specification>) for details of the supported patterns. Diagrams depicting the various states and message transactions flows are contained in Appendix A: Message Transaction Flows.

## HL7 Message Structure

An HL7 message consists of several segments used to carry information for a specific purpose, generally as part of a workflow associated with a specific trigger event. Each message has a name, which is a combination of the message type and the event trigger that led to its creation.  This is represented in the format {Message}^{Event} - eg ORU^R01 means an ORU message in response to an R01 event where the 'ORU' signifies 'Unsolicited Observation' (see chapter 7 of HL7) and R01 means "Unsolicited transmission of an observation message " (see chapter 2 of HL7).

Message types and events are described in the HL7 version 2 standard, which can be downloaded from <http://www.hl7.org/implement/standards/product_brief.cfm?product_id=142> (Note that this is the international standard, from which this one is derived. In the event of any discrepancies, this standard takes precedence).

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| **!** *HL7 describes a structure for the batching of messages, but this is not supported in New Zealand as it requires the rejecting of complete batches in the event of an error. However, in New Zealand a number of discrete messages may be concatenated together in a message queue or file.* |

### Message Types

The message type is defined in the MSH header by a three-character code. These are defined by the specification and cannot be altered. The ones that are used in this standard are:

Table : HL7 Message Types

|  |  |  |
| --- | --- | --- |
| **Type** | **Description** | **Purpose** |
| OML | Laboratory Order Message | Contains the information required for the electronic transmission of a Laboratory Order |
| ORL | Laboratory Order Response | The response message to the OML order message. This might be a simple acceptance of the order, through to a rejection (for example if the Laboratory cannot perform the requested order). |
| ORM | General Order Message | Contains the information required for the electronic transmission of general orders (other than Laboratory) |
| ORR | General Order Response | The ORM Response. Like the ORL it can indicate acceptance or refusal to perform the procedure associated with the order. |
| ORU | Unsolicited Observation Result | Contains the result of the investigation. 'Unsolicited' means that the result is sent as soon as it is available. |
| ACK | General Acknowledgment | An acknowledgement from the recipient to the sender that the message has been received. Note that this is an 'application level' acknowledgement and not simply a physical receipt. It acknowledges that the recipient application has processed the message. It will also contain any errors than may have occurred during processing. |

### Segments

Messages are constructed from a pre-defined order of segments. Each segment is identified in the HL7 specification by a unique three capital letter code, known as a segment ID, e.g. MSH (message header).   
Segments can be defined as required or optional and may be permitted to repeat. Optional segments do not need to be included in the message. Required segments must always be present.

|  |
| --- |
| **!** *HL7 permits the use of User Defined Segments – called ‘Z-segments’. These are* ***not*** *permitted in this Standard.* |

The following HL7 segments are used in this Standard:

Table : HL7 Segment Name

|  |  |
| --- | --- |
| **Segment Name** | **Description** |
| AL1 | Patient Allergy Information Segment |
| CT1 | Clinical Trial Identification Segment |
| DG1 | Diagnosis |
| ERR | Error Segment |
| In1 | Insurance Segment |
| MSA | Message Acknowledgement |
| MSH | Message Header |
| NTE | Notes and Comments |
| OBR | Observation Request |
| OBX | Observation Result |
| ORC | Order Control |
| PD1 | Patient Additional Demographics |
| PID | Patient ID |
| PV1 | Patient Visit |
| PV2 | Patient Visit – additional information |
| SAC | Specimen and Container Details |

Further details of these segments are available in the HL7 international specification.

## Message Composition

Messages are composed as follows:

* A message consists of multiple segments;
* Segments consist of multiple fields;
* Fields can be divided into components and sub components.

**!** *The HL7 specification allows the separator characters within a segment to be different to the standard. This is not supported in this specification. The segment terminator is a carriage return (ASCII Hex 0D 16). It is a common mistake for segments to be separated by both a carriage return character and a line feed (0A16) character. This is incorrect and should be avoided.*

HL7 practices 'trimming' of separators. That is, after the last field containing data in a segment, the carriage return character will occur to indicate the segment is complete. Thus the last character of a segment should never be a field separator.

**Example 1:** Correct usage of a hypothetical HL7 segment:

SEG|Field1|Field2|This is the last field<0D16>

**Example 2:** Incorrect usage of the same hypothetical HL7 segment:

SEG|Field1|Field2|This is the last field|<0D16>

Please take care to use only the carriage return character to separate segments. For further details concerning message construction and separator characters refer to HL7 version 2.4 chapters 2.10 (Message Construction Rules) and 2.7 (Message Delimiters).

### Delimiters

This implementation allows for the possibility of using message defined delimiters. However, it is recommended that HL7 characters are used for delimiting as some implementations may not support alternatives. The following table lists the delimiters:

Table : Delimiters

|  |  |  |  |
| --- | --- | --- | --- |
| **Delimiter** | **Name** | **ASCII** | **Hex** |
| Field separator | "Vertical bar" or "Pipe" | '|' | 7C16 |
| Component separator | "Hat" or "caret" | '^' | 5E16 |
| Sub-component separator | "Ampersand" | '&' | 2616 |
| Repetition separator | "Tilde" | '~' | 7E16 |
| Escape character | "Back-slash" | '\' | 5C16 |

These separators are used in example messages throughout this document.

## Message Definitions

For relevant message definitions, refer to Chapter 4 in the NZ Pathology and Radiology Messaging Standard.

## Segment Definitions

For relevant segment definitions, refer to Chapter 5 in the NZ Pathology and Radiology Messaging Standard.

## Data Types

For relevant data types, refer to Chapter 5.1.6 in the NZ Pathology and Radiology Messaging Standard.

## Tables

For relevant table information refer to the Appendix in the NZ Pathology and Radiology Messaging Standard.

## Supported Message Types

This table describes how the supported message types (described earlier) are used in this standard.

*Table 4: Business – Related Level Messages*

|  |  |  |
| --- | --- | --- |
| **Name** | **Used For** | **Message Code** |
| General Order Message | Radiology | ORM^O01 |
| General Order Response | Radiology | ORR^O02 |
| Laboratory Order Message | Laboratory | OML^O21 |
| Laboratory Order Response | Laboratory | ORL^O22 |
| Observation Message | Radiology and Laboratory | ORU^R01 |
| General Acknowledgement | Radiology and Laboratory | ACK^R01 |

## Responsibilities

Every business-related message that is sent will have an associated transport acknowledgement:

Table : Responsibilities

|  |  |
| --- | --- |
| **Sender Responsibility:** | It is the responsibility of the sender to ensure receipt of a transport acknowledgement message. If an acknowledgement is not received within a reasonable time frame, then the message should be resent.  If no acknowledgement is received after a number of re-tries, then an error should be raised to the person (or system) who created the message, to inform them that the message has not been successfully received by the recipient and that manual intervention is required to determine the cause of the error. This responsibility implies that the sending application needs to maintain a log of message events, including a copy of the original message. |
| **Recipient Responsibility:** | It is the responsibility of the receiving application to generate and return the acknowledgement message for any order or result message it receives.  This responsibility implies that the receiving application should also maintain a log of message events, including a copy of the original message, in the event that it needs to demonstrate correct operation in the event of an error. |

The structure of the transport messages are given in Chapter 4 of the Pathology and Radiology Messaging Standard.

# New Zealand Specifics

## Message Context and Content

This section contains important information regarding the content and context of the messages used for pathology and radiology messaging within the New Zealand environment. To maintain a consistent approach, fields, data and values are specified where possible.

For example:

1. Messages are received and sent from facilities (using the unique HPI code to identify the facility)
2. A facility has an address
3. People work in facilities
4. Organisations run facilities
5. Messages should be delivered to facilities and addressed to people.

## ****User Interface****

This Standard does not cover the user interface, as this is the responsibility of the individual implementation. It is the responsibility of the renderer that all data in the message required for correct interpretation of the message is displayed to the user and made available to their application.

## Creating a Message

A primary purpose of this Standard is to specify the structure of messages so that the receiving systems are able to incorporate the data into their own systems.

## Business Process

This section describes how specific business processes are supported by this standard.

### Deleted Results

When deleting a test result, the OBX observation result status (OBX-11) **must** be defined as "D" and the observation value (OBX-5) defined as "". The observation identifier (OBX-3), together with observation sub-ID (OBX-4) if present, is used to identify the original result to be deleted.

In other words a value of "" in an OBX explicitly means null value and the receiving application must remove any previous values for that field.

**For example:**

OBX|1|ST|1001^ANA||**""**||||||D

OBR-25, result status, can be used to cancel a complete set of observations by setting its value to "X". This is analogous to deletion. Child observations in related OBX segments should follow the instructions in the paragraph above which describes the procedure for individual observation deletion by setting observation result status (OBX-11) to “D”.

This implementation guide does not address un-deletion of observation results but suggests that an OBR segment containing a *completely new unique* Filler order number (OBR-3) be sent together with the child observation results that are now being un-deleted.

### Corrected results

Occasionally radiology and laboratory systems will amend an earlier result that was transmitted with observation result status (OBX-11) set to “F” (Final). When this happens, observation result status (OBX-11) **must** be set to "C".

In the event that a complete set of observations is to be corrected, OBR-25, result status, should be set to “C”. Amending child observation results is as described in the previous paragraph by setting observation result status (OBX-11) to “C”.

**!** *Recipient systems should not permanently delete or replace previous results, as clinical decisions may have been made on them, and may need to be available for medico-legal review. All results should be archived.*

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| ***NOTE:*** *With respect to both deletion and correction of results which have previously been transmitted, it is important that the sender does not inadvertently alter the meaning of a set of results when interpreted as a whole. This is particularly important with microbiology results, where individual observation results – for example anti-microbial sensitivity – may bear a relationship to one or more other observations within the same set of results.* |

### Receiving a Message

The message is first examined to see if it is a valid HL7 message.  If it is not, then it must be rejected outright with no acknowledgement sent (as generating an acknowledgement requires parsing of the message).

The message is then further examined to ensure that it is semantically correct, e.g. data types are correct and appropriate code tables are used. A semantic error will result in an error acknowledgement message being returned (eg, ACK, ORL).  The status of the message is not a correction as the message was never processed.

If a message contains multiple results, e.g. two results (OBR) and one is invalid, then the whole message is rejected and the ERR segment will indicate which segment(s) and location(s) within the message are in error.  All results in the rejected message will have to be re-sent by the sender, maybe with other results, or separately.

As some organisations may incorrectly re-send a result as a change, the receiving system should accept a change, even if a final result has not been processed.

### Sending Copies of a Message

If a copy of a message is sent to other recipients, then it is essential that OBR-46 (placer supplemental service information) and OBR-47 (filler supplemental service information) fields are completed with HPI facility codes as the original placer and filler identifiers will be lost from the message header (MSH).

### Logging

In order to meet the business requirements of reliable messaging and to support an audit trail, it is important that systems that send and receive messages should implement a messaging log.   
The message log should contain the:

* Message ID;
* Copy of the message;
* Date/Time sent;
* Address sent to;
* Date/time of receipt acknowledgement.

The system should also implement the ability to re-send a message.

### Batching

The batching of messages, as described in HL7 Chapter 2, is not supported in New Zealand.

### Order and Result Matching

A single order message may result in multiple result messages.

### Completeness of the order

Occasionally the laboratory/ department is unable to perform the requested tests,  eg inappropriate order, unacceptable or missing specimens, duplicate ordering,  and the order may be modified or deleted.

Results may be returned with tests other than those ordered.

If a test is not performed the response message (eg, ORU) should contain a segment which deletes the tests as described above. In some cases it may be appropriate to provide an explanation in an NTE segment or another OBX segment within the same OBR.

### Sendaways

When a test is carried out by a laboratory other than the laboratory reporting the results, the facility number (HPI) of the laboratory doing the test must be recorded in OBX-15. If this field is null the receiving system assumes that the observations were produced by the sending or reporting organisation.

### Repeating Orders

When a diagnostic procedure is to be repeated, then the timing information is described in field 7 of the ORC segment. This structure covers situations such as "carry out the observation every week from [a start date] to [finish date]".

The more complex situations, for example the following, are not covered and would require multiple orders to be placed:

1. "Cardiac enzymes STAT and then q 4 hours";
2. "Streptokinase studies, draw 1st Stat and run Stat, then draw q 4 hours and run Stat".

### Results Copies To

All ‘copy to’ information should be output in OBR-28.

The first health provider in the 'copy to' field is the recipient of the report.

## Terminologies / Identifiers

### Coded data elements

The following table describes which fields should carry codes from well-defined terminologies or 'code-sets'. Each row contains the HL7 version 2.4 segment.field couplet, the field description (from the HL7 specification), the data type (from the HL7 specification), the terminology source and comments.

 Table : Coded Data Elements

| **Segment.field** | **Description** | **HL7 v2.x Data Type** | **Terminology** | **Comments** |
| --- | --- | --- | --- | --- |
| MSH-3 | Sending Application | HD |  | Unspecified. |
| MSH-4 | Sending Facility | HD | Component 1 (IS) ‘NZLMOH’  Component 2 (ST) ‘F2B321-B’  Component 3 (ID) 'HF'  Or…  Component 1 (IS) EDI Account Number | The actual HPI [identification](#Updateto10008PathologyandRadiologyImple) number for the **facility**, or EDI account number.  Refer to note at end of table on the use of HD. |
| MSH-5 | Receiving Application | HD |  | Unspecified. |
| MSH-6 | Receiving Facility | HD | Component 1 (IS) ‘NZLMOH’  Component 2 (ST) ‘F2B321-B’  Component 3 (ID) 'HF'  Or…  Component 1 (IS) EDI Account Number | The actual HPI [identification](#Updateto10008PathologyandRadiologyImple) number for the **facility**, or EDI account number.  Refer to note at end of table on the use of HD. |
| PID-3 | Patient Identifier | CX | Component 1 (ST) NHI  Component 4 (HD) 'NZLMOH' | 'L' | The actual NHI [number](#Updateto10008PathologyandRadiologyImple) for the patient.  If component 1 is NHI, refer to Table 43 in the Messaging Standard for values for component 4.  *NOTE:* S*ome legacy systems use NHI in component 4- this standard recommends the use of NZLMOH.* |
| PID-11 | Patient Address | XAD |  | Unspecified. |
| PV1-3 | Patient Location | PL | Component 4 (HD), sub-component 1 (IS) ‘NZLMOH’  Component 4 (HD), sub-component 2 (ST) ‘F2B321-B’  Component 4 (HD), sub-component 3 (ID) 'HF' | Unspecified.  Refer to note at end of table on the use of HD. |
| PV1-7 | Attending health provider | XCN | Component 1 (ST) HPI - CPN  Component 9 (HD), Assigning Authority  Component 13 (IS), Identifier Type Code | The actual HPI-CPN [number](#Updateto10008PathologyandRadiologyImple) for the practitioner as identified by the HPI system. Exceptions may occur when the enterer has no HPI-CPN.  For component 9, refer to Table 43 in the Messaging Standard for values. The assigning authority is the system, application or body that actually generates the ID number. If this field is blank then the value in the first component is assumed to be the Health Practitioner Index (HPI) number. In this case the assigning authority is the Ministry of Health (NZLMOH). If another identifier is being messaged then this field must be filled in.  For component 13, refer to the Identifier Type table in the Messaging Standard (Table 154). |
| PV1-8 | Referring health provider | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| PV1-9 | Consulting health provider | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| PV1-17 | Admitting health provider | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| ORC-10 | Entered by | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| ORC-11 | Verified by | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| ORC-12 | Ordering Provider | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| ORC-13 | Enterers Location | PL |  | Unspecified. |
| OBR-4 | Universal Service ID | CE | Component 1 (ST) NZPOCS (LOINC or Local)  Component 3 (IS) 'LN' |'NZ' | 'L' | Preference given to codes identified in NZPOCS, being either LOINC codes (source type ‘LN’) or temporary NZPOCS codes (source type ‘NZ’), or if neither is available a ‘local’ code. |
| OBR-10 | Collector Identifier | XCN |  | (see PV1.7 though exceptions may occur when the collector has no HPI - CPN) |
| OBR-16 | Ordering Provider | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| OBR-28 | Report copies to | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| OBR-32 | Principal Result Interpreter | CM |  | NOTE: inconsistent data type.  Refer to messaging standard for more information. |
| OBR-33 | Assistant Result Interpreter | CM |  | NOTE: inconsistent data type.  Refer to messaging standard for more information. |
| OBR-34 | Technician | CM |  | NOTE: inconsistent data type.  Refer to messaging standard for more information. |
| OBX-3 | Observation Identifier | CE | Component 1 (ST) NZPOCS (LOINC or local)  Component 3 (IS) 'LN' |'NZ' | 'L' | Preference given to codes identified in NZPOCS, being either LOINC codes (source type ‘LN’) or temporary NZPOCS codes (source type ‘NZ’), or if neither is available a ‘local’ code. |
| OBX-15 | Producers Identifier | CE |  | Unspecified. |
| OBX-16 | Responsible Observer | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| DG1-3 | Diagnosis Code | CE |  | SNOMED CT, Read, ICD10 |
| DG1-6 | Diagnosis Type | IS |  | Unspecified |
| DG1-16 | Diagnosing Clinician | XCN |  | (see PV1.7 though exceptions may occur when the enterer has no HPI-CPN) |
| AL1-2 | Allergen Type Code | CE |  | Refer to table 51 in Messaging Standard |
| AL1-3 | Allergen Code/mnemonic/description | CE |  | Unspecified. |

|  |
| --- |
| ***Variance to HL7:***This implementation:   * permits a non-standard variation on the use of the HD data-type in MSH-4 and MSH-6, by allowing a single EDI Account number to be placed in these fields. * extends the code values allowed for the HD data-type in the HL7 Standard to include New Zealand-only values. These values are for use in fields MSH-4, MSH-6 and PV1-3. |

**Examples of data type content:**

CE -  1013^White Cell Count^L^6690-2^^LN

CX -  11112222^^L~NH1111^^^NHI

CM -  No new CMs are allowed after HL7 v2.2

HD -  NZLMOH^F2B321-B^HF

PL -  5^12^4^NZLMOH&F2B321-B&HF

XAD -  1 Anonymous St^Home Town^AKL 5467

XCN - 55REXH^Kildare^John^M^JP^Dr^MD^^NZLMOH&55REXH&HI^^^^HI

### Patient Identifiers

Where possible, the NHI number should be used in PID-3. If unavailable, a local patient identifier may be used.

**!** *PID-2 is no longer supported.*

### Practitioner Identifier

Where possible, the HPI number should be output in all practitioner fields. If this information is not available, a registration authority code or a local code is to be provided.

### Placer Group Number

A placer group is a series of observations that result from a consultation. It is synonymous with the manual pad used to order tests. This number is unique to the facility and has no relevance to the filler.

### Placer Order Number

The placer order number consists of a unique number within the ordering facility. This number combined with the facility code for the placer establishes a unique identifier for the order. If there is no number, due to a manual order, then the fillers order number is used as the unique sequence number. In this case the fact that the number was allocated by the filler can be highlighted by the use of the last three components of this field.

If observations are added to an order by the filler, then the placer order number of the observation that gave rise to the further test will be used for subsequent observations.

The filler must retain this number and return it on all observation results.

### Filler Order Number

The filler order number consists of a unique number for that facility.  It is determined by the filling facility to acknowledge that an order has been registered (be it a manually registered or electronically requested order).

In most situations, it is the request number assigned to the specimen when they are collected.   
This number combined with the facility code for the filler establishes a unique identifier for the order.   
The field may be populated during an order response message. It must be populated when creating observation results messages.

### Universal service ID/Observation identifier

This field is used to describe requested radiology and laboratory test codes.

The universal service ID is OBR-4 and the observation identifier is OBX-3. New Zealand has adopted a subset of the coding standard 'LOINC' known as the New Zealand Pathology Observation Code Sets (NZPOCS). Refer to the link for further NZPOCS details: <http://ithealthboard.health.nz/hiso-10004-new-zealand-pathology-observation-code-sets>.

If the LOINC or NZPOC is not available, a local identifier code can be used.

**For example:**

OBX|0001||1020^ Creatine Phosphokinase^L||""|U/L|30-180||||I

### Sending Facility

This field identifiers the facility that sent/produces the message. (Refer Terminology table/document for examples).

Where possible, the HPI code or EDI account number should be used.

## General Notes

### Units of Measure

New Zealand uses SI units. Refer to Table 155 Common ISO derived units and ISO+ extensions in Pathology and Radiology Messaging Standard.

### Message Control ID

In order for messages to be linked together, there needs to be a common identifier. Message Control ID’s will be unique to messages that come from a particular site.

### Scheduled Date/Time

For radiology orders, this field will contain the booking date/time.

### Date and Time Fields

The following date/time fields can be used in order and/or result messages:

Table : Date and Time Fields

|  |  |
| --- | --- |
| **Segment** | **Description** |
| PID-7 | Date of birth |
| ORC-9 | Date/time the order was created |
| ORC-15 | Date/time that the changes to the order took effect |
| OBR-7 | Specimen collection date/time |
| OBR-14 | Specimen received date/time |
| OBR-36 | Scheduled date/time |

**!** *OBR-7 will only be sent with an order if the party responsible for placing the order has collected the sample, otherwise this field can be empty.*

### Special field items

Field 20 of the OBR segment is available for user defined information, e.g. free text information.

**!** *Fields 19 and 21 of the OBR segments are* ***not*** *supported.*

### NTE comments

Comments can be output in NTE segments after the PID, OBR or OBX segment. A comment can provide additional information regarding the patient, report or test result.

NTE comment(s) will be appended to any preceding OBX result.

# Appendix A: Message Transaction Flows

The following diagrams illustrate these states and the message flows between placer and filler in laboratory and radiology order processing.

*Laboratory message types and status (not including change or cancel requests from the placer)*

Lab-order-activity

Figure : Laboratory Message Type and Status

Figure : Laboratory Message Type and Status

Laboratory Order Change

Lab Order Change

Figure : Laboratory Order Change

Lab Order CancelLaboratory Order Cancel

Figure : Laboratory Order Cancellation

Radiology message types and status (not including change or cancel requests from placer)

Rad-order-activity

Figure : Radiology Message Types and Status

Radiology Order Change

Rad Order Change

Figure : Radiology Order Change

Radiology Order Cancel

Rad Order Cancel

Figure : Radiology Order Cancel

# Appendix B: Sample messages

**Laboratory Order: OML^O21**

MSH|^~\&|WAM-3|testedi1|DataManager-1|testedi2|20141102104157||**OML^O21**^OML\_O21|43|D|2.4^NZL|||AL|NE

PID|||EVG1234||Evatt^Gabrielle||19710725|F|||208 Dunedin-Waitati Road^Upper Junction^Dunedin^^9010

PV1||I||||||THTH^Thorby^Thalia

ORC|NW|14/S00124.1^L||14/S00124^L

OBR|1|NW|14/S00124.1^L||CASSETTE^^L

SAC||14/S00124^L|14/S00124.1^L|||COL^^COLON

OBX|1|ST|Case^CaseType^L||SU||||||F

ORC|NW||14/S00124.2^L||14/S00124^L

OBR|1|14/S00124.2^L||CASSETTE^^L

SAC||14/S00124^L|14/S00124.2^L|||SKN^^SKIN

OBX|1|ST|Case^CaseType^L||SU||||||F

**Laboratory Order Response: ORL^O22**

MSH|^~\&|DataManager-1|testedi2|WAM-3|testedi1|20141102104159||**ORL^O22**^ORL\_O22|581018DA-315D-4F96-893A-9C7E46B0F6D0|P|2.4^NZL

MSA|AA|43

**General Order Message (Radiology): ORM^O01**

MSH|^~\&|LIS-1|testedi3|WAM-1|testedi4|201405071412||**ORM^O01**^ORM\_O01|10871452|P|2.4^NZL

PID|||EVG1234||Evatt^Gabrielle||19710725|F|||208 Dunedin-Waitati Road^Upper Junction^Dunedin^^9010

PV1||I||||||THTH^Thorby^Thalia

ORC|NW|14-2964309-RET

OBR|1|14-2964309-RET-0||RET^^L|R|201405071411|201405071300|||||||||THTH^Thorby^Thalia||2964309

**General Order Response (Radiology): ORR^O02**

MSH|^~\&|WAM-1|testedi4|LIS-1|testedi3|201405071413||**ORR^O02**^ORR\_O02|44|P|2.4^NZL

MSA|AA|10871452

**Unsolicited Observation Result: ORU^R01**

MSH|^~\&|WAM-1|testedi4|LIS-1|testedi3|201408092056||**ORU^R01**^ORU\_R01|20140809205639267|P|2.4^NZL

PID||ZZZ7070^^NHI|ZZZ7070||Testing^Patient^||19611121|F|||2 Nowhere St^Marsden Heights^CHCH^^8001^^

PV1||O|CNY^^^CH^^^^^Nephrology Outpatients

ORC|OK||DELPHIC|15XX0000H

OBR|0001||15XX0000H999999^ECLAIR|3011^Routine Biochemistry^L|R||201505040800|||||||201505040934|DIAF|98765^Dialysis Team||||||201505041148||CH|I|||12345^Dr House~07363^Patients Copy~08747^Nephrology Computer

OBX|0001|ST|^^^2951-2^Sodium^LN||134|mmol/L|135-145|L|||F

OBX|0002|ST|^^^2823-3^Potassium^LN||5.0|mmol/L|3.5-5.2||||F

OBX|0003|ST|^^^2075-0^Chloride^LN||98|mmol/L|95-110||||F

OBX|0004|ST|4523^Bicarbonate^L||22|mmol/L|22-28||||F

OBX|0005|ST|7502^Anion Gap^L||19|mmol/L|10-20||||R

OBX|0006|ST|3517^Urea^L^22664-7^Urea^LN||22.4|mmol/L|3.2-7.7|H|||F

OBX|0007||^ ^^14682-9^Creatinine^LN||””|umol/L|45-90||||I

OBX|0008||7483^Est GFR^L||””|mL/min/1.73m2|||||I

OBX|0009|ST|^^^14933-6^Urate^LN||0.30|mmol/L|0.15-0.36||||F

OBX|0010|ST|0225^Glucose^L^14749-6^ Glucose ^LN||4.5|mmol/L|3.5-7.7||||F

OBX|0011|ST|^ ^^2000-8^Calcium^LN||2.2|mmol/L|2.2-2.6||||F

OBX|0012|ST|3138^Calcium (corr)^L||2.3|mmol/L|2.2-2.6||||R

OBX|0013|ST|^^^14879-1^Phosphate^LN||1.1|mmol/L|0.8-1.5||||F

OBX|0014|ST|^^^2601-3^Magnesium^LN||0.6|mmol/L|0.6-1.2||||F

OBX|0015|ST|^ ^^1751-7^Albumin^LN||39|g/L|35-50||||F

OBX|0016|ST|^^^6768-6^Alkaline phosphatase^LN||324|U/L|30-150|H|||F

OBX|0017|ST|^^^2324-2^GGT^LN||13|U/L|10-35||||F

OBX|0018|ST|^^^1742-6^ALT^LN||12|U/L|0-30||||F

OBX|0019|ST|3206^CRP^L^1988-5^CRP^LN||<3|mg/L| <5||||F

OBX|0020||7516^Comment:^L||””||||||D

OBX|0021||3549^Serum indices:^L||””||||||D

**General Acknowledgement: ACK^R01**

MSH|^~\&|LIS-1|testedi3|WAM-1|testedi4|201408092057||**ACK^R01**|D2FFD5E2-1C90-493B-8BBD-033D3B46E74F|P|2.4^NZL

MSA|AA|20140809205639268

# Appendix C: Frequently **Asked Questions**

**Q. Does a message require an ORC and OBR?**

A. An order message requires an ORC/OBR pair. A result message does not require ORC but does require an OBR segment.

**Q. How many results can be in an OBX segment?**

A. Each OBX segment relates to an individual result

**Q. How many OBX segments can be in a result message?**

*A. There is no limit to the number of OBXs that can be used to report a result.*

**Q. Can a single ORU^R01 or OML^022 message contain ‘non-unique OBR segments – ie multiple OBR segments that contain the same unique identification fields (OBR-2 and OBR-4)?**

*A. No, as this would add unnecessary complexity and possible confusion to receiving systems. One situation where this might possibly be suggested is when a set of OBX results are being amended and it is proposed to delete a prior set of OBX results, then in the same message, re-add and re-result those same OBX results. There is already a robust strategy for amending results using OBX-11 which must be adhered to.*

# Appendix D: References:

**Addressing and Geocoding**

<http://www.health.govt.nz/our-work/health-identity/addressing-and-geocoding>

**HL7 NZ OID Registry**

<http://www.hl7.org.nz/new-zealand-oid-registry>

**Health Practitioner Index (HPI)**

<http://www.health.govt.nz/our-work/health-identity/health-practitioner-index>

**National Health Index (NHI)**

<http://www.health.govt.nz/our-work/health-identity/national-health-index>

**New Zealand Pathology Observation Code Sets (NZPOCS)**

<http://ithealthboard.health.nz/system/files/documents/publications/10004-nzpocs-information-business-process-v4.pdf>

# Appendix E: Glossary:

The following definitions are integral to the understanding of this document.

|  |  |
| --- | --- |
| **Value** | **Description** |
| Conformance Statement | A declaration which sets forth the name of the query supported by the Server, the logical structures of the information that can be queried, and the logical structure of what can be returned. |
| Data Elements | An atomic piece of data e.g. first name, last name etc. |
| Data Set | Collection of data groups, used for specific purposes e.g. Referral data set, Discharge data set. |
| Facility | A single physical location from which health goods and/or services are provided Extracted from the HPI Data Set. A health care provider organisation may consist of multiple facilities. |
| Filler | The Filler is the system that is responsible for filling the order. In the example above, the Laboratory Computer system is the Filler system. |
| Filler Order Number | An acceptance or receipt number from the lab to acknowledge that an order has been received and accepted |
| Health Care Provider | A person or organisation that provides Patient health care services. |
| HL7 | Health Level Seven – a common standard used in health care. |
| HPI | Health Practitioner Index |
| HPI-CPN | The common person number issued from the Health Practitioner Index. |
| HPI-FAC | The facility number issued from the Health Practitioner Index to identify a single physical location from which health goods and/or services are provided. |
| LOINC | Logical Observation Identifiers Names and Codes |
| NCCLS AUTO4 | National Committee for Clinical Laboratory Standards; the Subcommittee on System Status (AUTO4) |
| NZMC | The New Zealand Medical Council |
| NZNC | The New Zealand Nursing Council |
| Order | The request for service from which the messages are derived independent of transport mechanism. |
| Order Number | This uniquely identifies the order. |
| Placer | The Placer is the system that has placed the order. In the example event sequence above, the Practice Management of the system is the placer. |
| Placer Group Number | Used to identify a particular pathology episode and to link all tests that comprise that episode. All tests from a particular episode should have the same Placer Group Number |
| Placer Order Number | Order reference number generated by placer when ordering pathology testing |
| PMS | Practice Management System |
| Public Funded | Funding derived from local or central government |
| Report | A report is a set of one or more results and any associated interpretation usually generated in response to a request for a laboratory test or radiology examination. A report may include results previously reported and in some instances results from another request. |

1. HL7® is the trademark of Health Level Seven and is referred to as HL7 within this document. [↑](#footnote-ref-1)