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# Implementation of Health Level Seven (HL7) Version 2.3.1

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## PREFACE

This document was prepared for discussion purposes as a working document, with the intention of eventual submission to the IT-14-06-05 Standards Australia sub-committee as a proposed Australian Standard.

It covers implementation of the Health Level Seven (HL7) Version 2.3.1 protocol, for communication between health service providers and radiology providers within and between Australian healthcare settings. It also covers referrals between radiology providers and communication between radiology providers and knowledge bases.

HL7 is a healthcare application protocol accredited as a Standard by the American National Standards Institute (ANSI). 'Level Seven' refers to the highest level of the International Organization for Standardization (ISO) communications model for Open Systems Interconnection (OSI)—the application level. Issues within the application level include definition of the data to be exchanged, the timing of the exchange and communication of certain errors to the application. This level supports such functions as security checks, identification of the participants, availability checks, negotiating exchange mechanisms and, importantly, structuring the data exchanges themselves.

Australia and New Zealand already have an existing base of healthcare institutions that use the HL7 protocol to exchange key sets of data between different computer application systems. While HL7 is concerned with addressing immediate needs, there is a very strong focus on convergence with other Standards development activities in the United States of America and international HL7 initiatives in countries including Canada, Finland, Germany, India, Japan, the Netherlands, South Africa and the United Kingdom.

The HL7 family of standards is a collection of standards that specify the implementation of interfaces between computer applications. It is not rigid. Flexibility is built into the protocol to allow compatibility for specialized data sets that have facility-specific needs. One of HL7's strengths is its inbuilt flexibility. However, it is also one of its weaknesses. It is open to differences in interpretation in its structure and format. Implementation of the HL7 Version 2.3.1 Standard in the Australian health environment requires a common and consistent approach.

The initiative known as Integrating the Healthcare Enterprise (IHE) is designed to promote the integration of healthcare information systems in modern institutions. The IHE approach is not to define new integration standards, but to employ existing standards in an integrated manner. IHE maintains active links with the HL7 and DICOM groups.

This document utilises the IHE approach where appropriate.

The intended audience for this document includes health authorities, health service providers, radiology providers, health institutions, health information technology vendors, health information technology consultants and the health informatics community.

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## FOREWORD

This document was prepared by the Collaborative Centre for eHealth, University of Ballarat, in co-operation with members of the health informatics and radiology messaging community in Australia.

The aim of the document is to advise on the methods for implementation of report messages and order entry messages, utilising appropriate international and national Standards.

The HL7 Version 2.3.1 protocol covers a wide range of data interchange functions. However, this document focuses on the radiology orders and results for HL7 messages. An order entry message is analogous to a radiology request. An observational report message is analogous to the printed radiology report.

All efforts have been made to minimize divergence from the HL7 protocol to ensure maximum compatibility with future versions.

## **Implementation of Health Level Seven (HL7) Version 2.3.1**

### **Part : Radiology orders and results**

#### **I. SCOPE**

HL7 is a healthcare application protocol accredited as a Standard by the American National Standards Institute (ANSI). This document covers implementation of radiology orders and results using HL7 Version 2.3.1 protocol, for communication between health service providers and Radiology providers, within and between Australian healthcare settings. The document includes the data segments and data elements that are mandatory (required), optional or conditional (required, based on a condition), and relevant usage notes in the Australian health environment. The document provides consistent use of data definitions as well as commentary and references to the International Organization for Standardization (ISO), the National Health Data Dictionary (NHDD), the National Association of Testing Authorities Australia (NATA), The Royal Australian and New Zealand College of Radiologists (RANZCR) and the Integrating the Healthcare Enterprise (IHE) initiative.

#### **II. APPLICATION**

Australia already has an existing base of healthcare institutions that use the HL7 protocol to exchange key sets of data between different computer application systems. However, because of HL7's inbuilt flexibility, it is open to differences in interpretation in structure and format. Implementation of the HL7 Standard in the Australian health environment requires a common and consistent approach.

This document is for use by Australian health authorities, health service providers, Radiology providers, health institutions, health information technology vendors, health information technology consultants and the health informatics community.

For the purposes of this Standard, only human patients are considered.

#### **III. REFERENCED AND RELATED DOCUMENTS**

##### **Referenced documents**

The following documents are referred to in this Standard:

##### AS

4700 Implementation of Health Level Seven (HL7) Version 2.3.1  
4700.1 Part 1: Patient administration

5017 Health Care Health Care Client Identification

##### ISO

2955 Information processing — Representation of SI and other units in systems with limited character sets

HL7 V2.3.1 Health Level Seven Standard Version 2.3.1: Health Level Seven Inc., Ann Arbor 2002

LOINC Logical Observation Identifier Names and Codes, Users Guide: Regenstrief Institute, Indianapolis, 2003.

NHDD National Health Data Dictionary Version 11.0. National Health Data Committee, Canberra: Australian Institute of Health and Welfare, 2002

IHE RTF Integrating the Healthcare Enterprise, Radiology Technical Framework, Revision 5.5, 7 April 2003

##### **Related documents**

Attention is drawn to the following related documents:

|        |   |
|--------|---|
| HB 262 | Pathology electronic messaging – Guidelines for Pathology messaging between Pathology providers and health service providers – Implementation Guide |
| AS     |   |
| 4390   | Records management  |
| 4400   | Personal privacy protection in healthcare information systems   |
| 4590   | Interchange of client information   |
| 4700.4 | Part 4: Pathology results for notification and registries   |
| ASNZS  |   |
| 4360   | Risk management   |
| 4700.3 | Part 3: Electronic messages for exchange of information on drug prescription  |
| ASTM   |   |
| E 1238 | Specification for transferring clinical observations between independent computer systems   |

#### IV. DEFINITIONS

For the purpose of the Standard, the definitions below apply.

##### **Add-on test**

A test requested by the requestor in addition to the original set of tests requested as part of an episode. See also Reflex Test.

##### **Atomic result**

The finest level of granularity of a test result, as opposed to a full text result.

##### **Filler**

The application responding to, i.e. performing, a request for services (orders) or producing an observation. The filler can also originate requests for services (new orders), add additional services to existing orders, replace existing orders, put an order on hold, discontinue an order, release a held order, or cancel existing orders.

##### **Full text result**

An electronic representation of a radiology report, or part thereof, as if it were typed on paper.

##### **Observation report**

An electronic representation of observations and results of diagnostic studies.

##### **Order**

A request for radiology and diagnostic services for a specified patient.

##### **Placer**

The application or individual originating a request for services (order).

##### **Placer order group**

A list of associated orders coming from a single location regarding a single radiology episode.

##### **Reflex test**

A test automatically performed by the filler without it being specifically requested.

## Report

A report is a set of one or more results and any associated interpretation usually generated in response to a request for radiology. A report may include results previously reported and in some instances results from another request.

### Trigger event

Action that takes place in an application, based on some predefined condition such as an admission, ward transfer, or placement of an order and the like. The action usually results in the compilation and transmission of a data message.

## V. OVERVIEW

### General

Within Australian radiology messaging there are several issues which must be managed to provide for regulatory and operational differences. They do not form part of the HL7 standard but are included to provide information about situations, which must be managed so that a degree of commonality may be achieved across systems.

### Patient identification

The HL7 PID segment permits transmission of all known patient identifiers. The transmission and use of identifiers should take into account the requirements of the privacy regulation.

For further information of patient identification and business processes, see *AS5017 Health Care Client Identification* (particular reference is made to Section 5 *Data Matching*) and see *AS4700.1 Implementation of Health Level Seven (HL7) Version 2.3.1 Part 1: Patient administration*.

NOTES: Patient identifiers may not necessarily be unique.

### Site identification

Placer and filler site are specified uniquely by a code contained in the last three components of *ORC-2-Placer order number* and *ORC-3-Filler order number*. (These components of the EI data type are the equivalent of the 3 components of the HD data type.) Since there is no officially recognised way of uniquely identifying sites in Australia, the following guidance is provided as an interim solution. The second component of the EI data type (first component of the HD data type) can be populated with a composite identifier. Generally, unique identifiers should be chosen from a controlled namespace. The namespace IDs are listed in *User-defined table 0300 – Namespace ID*, see usage notes against *ORC-2-Placer order number* in Table 7. It is suggested that for local use, a composite identifier comprise sub-components separated by dots.

The first sub-component should indicate the identifier. The second sub-component indicates controlled namespace.

Recognised national namespaces should be identified by a code starting with “AUS” (e.g. AUSNATA), preceded by the identifier.

Example: “1234567.AUSNATA”

Local namespace should be identified by a code starting with “LOC”, preceded by the identifier.

Example: “QML.LOCRAD”, “RPA.LOCHOSP”, “37284.LOCMDW”

Further specification of the local site code can be performed using the dot notation.

Example: “EMERG.RPA.LOCHOSP”

Internet domain names are a suitable controlled namespace identifier where available. Their usage is defined in HL7 2.3.1 Clause 2.8.20.3.

Example: “auslab.com.au”

NOTES: All Australian namespaces will be coded as 'local' in HL7 terms, unless they are part of an internationally recognised namespace.

### **Lower Layer Protocols**

Essentially, this provides a protocol to manage end to end processing of a complete HL7 message transmission. It may occur that the transmitting layer breaks a message or the messages relating to a single process into several blocks.

Therefore a mechanism is required to define the start of message and end of message. In its simplest form it is no more than a <SB> character at the start of the message and an <EB><CR> at the end of the complete message.

Users must consider their underlying transport processes to determine if it is required at all, or if a more complex mechanism is required.

If used, it should remain transparent to sending and receiving systems i.e. systems should dynamically insert it in messages and correspondingly detect and remove it from received messages.

There is some reference in Appendix C of the HL7 manual v2.3.

### **Batch Protocol**

Under some circumstances it may be more viable to send messages batched into a file. It is probable that the transmission mechanism being used may lend itself to batched files rather than single messages.

In this case a file naming convention should be adopted to ensure that messages from different sources do not overwrite each other at the receiving site. Further advice is provided in the HB 262 Handbook relating to the methodology, processes, reasons, traps and potential problems.

Regardless of the file naming convention that is adopted it is only a high level methodology. The receiving system should use the data values within the message to direct processing of the message.

### **HL7 encoding of radiology orders and reports**

Each requested test shall be ordered using a single (ORC,OBR) segment pair. Orders required for a single episode should be sent within one message i.e. under a single MSH segment.

Each ordered test shall be identified by a unique Placer order number – contained in both the ORC and OBR segments.

The episode should be identified by a Placer group number – contained in the ORC segment only.

#### *1. Use of order numbers and group numbers*

Placer order number, Placer group number and Filler order number should be used in a clearly defined way. To minimise the amount of site-specific negotiation, the recommended methodology is described below. This methodology provides a consistent mechanism to match results to orders where a one-for-one relationship between requested tests and test results is not possible. There are numerous circumstances where this occurs. The method remains consistent when one-to-one relationships do exist.

#### *2. Placer Group Number*

*ORC-4-Placer group number* is used to identify a particular radiology episode and to link all tests that comprise that episode (this is equivalent to a Radiology request identifier). All tests from a particular episode should have the same Placer group number, including add-on tests and department-generated investigation requests.

#### *3. Placer order number*

The Placer order number is the order reference number generated by the placer site (surgery, hospital, etc.) when ordering radiology testing. It is a multi-component field comprising a number and the

Placer site to ensure that the order does not duplicate an order from another site. A separate Placer order number should be used for each test in the request. This allows each item in the order to be individually referenced especially in situations where part of the order is to be cancelled.

The suggested method for generating a Placer order number is to concatenate the Placer Group Number with a 'counter' for each test in the request.

#### 4. *Filler order number*

The Filler order number is essentially an 'acceptance or receipt number' from the radiology department to acknowledge that an order has been received and accepted. It may be sent when returning results to the placer. It should not be used to link results to orders, as there are instances where more than one filler order number could be generated in response to a single request. Filler order number may equate to the radiology department number assigned to the episode when it is collected.

#### 5. *Episode and result identifiers*

Historically, results have been identified by the ubiquitous number. However, in HL7 (Order Entry)/(Results Reporting) the radiology department number is not available until the patient presents for examination which will generally be some time after the order has been submitted. The Order and the Collection are usually two disparate events separated by time and distance.

When the department receives an electronic order it must respond with a Filler order number. If several orders are received on the same request (same Placer group number) then an equivalent number of order responses will be sent.

The department can adopt one of two positions:

It can respond immediately to the order with a 'receipt reference' as the Filler Order Number.

When the patient eventually presents for examination they are allocated a number by the department. On reaching the department the patient and the paperwork are linked to the original order and the department number is entered against the order and the order is activated.

It can hold the order and not respond until the patient presents and a department number is assigned to the request and use this as the Filler order number.

The order is activated when the department number is entered and an order response can then be sent to the placer using the department number as the Filler order number.

In an electronic environment, the department number is not required by the requestor to link results to an order - the Placer order number/Placer group number/Filler order number should be used for this purpose.

#### 6. *Add-on tests*

Add-on tests maintain the same placer group number as the original episode, with a new placer order number. Results are correlated to placer order number.

#### 7. *Reflex Tests*

Reflex tests are generally not ordered by the placer. They will be associated with the original order by placer group number but may not have a placer order number. Placer applications shall be able to receive reports for which there is no placer order number.

**Billing information**8. *Funding source*

NHDD 000632 'Funding source for hospital patient' lists the following codes.

01 Australian Health Care Agreements (in the community setting, this can be used to indicate Medicare funding)

**ALERT: Variance to NHDD version 10.**

02 Private health insurance

03 Self-funded

04 Worker's compensation

05 Motor vehicle third party personal claim

06 Other compensation (eg. public liability, common law, medical negligence)

07 Department of Veterans' Affairs

08 Department of Defence

09 Correctional facility

10 Other hospital or public authority (contracted care)

11 Reciprocal health care agreements (with other countries)

12 Other

99 Not known

Funding source is specified in *PVI-20 - Financial Class*.

Further information on the billable party can be sent in various segments, depending on funding source.

**Code Funding Source Details**

- 01 Medicare number is sent in *PID-3 - Patient Identifier List*
- 02 Private fund details sent in IN1 segment
- 03 Patient or guarantor details in GT1 segment. If the patient is the payer, their details are included in the GT1 segment
- 04 Organisational guarantor details are sent in the GT1 segment
- 05 Third party claims are usually billed to another party in the first instance. If a known guarantor is identified, their details can be sent in GT1 segment.
- 06 Other compensation claims are usually billed to another party in the first instance. If a known guarantor is identified, their details can be sent in GT1 segment.
- 07 DVA File number is sent in *PID-3 - Patient Identifier List*
- 08 Dept of Defence file number is sent in *PID-3 - Patient Identifier List*
- 09 Occupants of a correctional facility will usually be covered by Medicare. Medicare number is sent in *PID-3 - Patient Identifier List*
- 10 Contract details are sent in *PVI-24 - Contract Code*. Organisational guarantor details are sent in the GT1 segment
- 11 Organisational guarantor details are sent in the GT1 segment
- 12 Guarantor details are sent in the GT1 segment

99 Undefined or not known

9. *Billing category*

Currently, there is no agreed controlled vocabulary for billing category. As an interim solution, it is recommended that the following method be used:

Agreed Australian billing category codes:

|         |  |
|---------|--|
| AUSM85  | 85% of Medicare schedule fee                         |
| AUSM75  | 75% of Medicare schedule fee                         |
| AUSM100 | Medicare scheduled fee                               |
| AUSAMA  | Australian Medical Association (AMA) recommended fee |

Local codes

The BLG segment is used to provide billing information on the ordered service, to the filling application. By site-specific agreement, local billing codes may be used. It is recommended that these be prefixed with 'LB\_' (as per HL7 V2.3.1 table 0396 'Coding System') to indicate the local domain of the code list. The next 3 characters identify the originator of the code. For example: LB\_QMLxxxx.

Billing category is sent in PV1-21-Charge price indicator.

10. *Display format for results*

HL7 messages provide results data in an atomic format - that is, there is no inherent formatting or any dependency between the data in the OBX segments of a results message except in the sequence of the OBX segments - and that is accidental and should not be relied upon to provide any relationship whatsoever.

Therefore, in order to ensure the display integrity of results transmitted using the HL7 protocol, filler systems shall do either or preferably both of:

The filler system sends atomic results and the receiving system is capable of rendering the message in the manner expected by the filler. This will include attention to the format of:

Single reports

Cumulative reports

Cumulative reports from multiple fillers

Graphs

Graphs from multiple fillers

Patient demographics

Results

Abnormal flags

Reference ranges

Comments

This is an important area for the maintenance of the integrity of the transfer of the information and may have medico-legal implications.

## AND / OR

The filler system sends a display form of the report. Where a result is sent to be displayed which is in addition to atomic results it should be indicated using the following convention:

OBX||FT|HTML^Display format in HTML^AUSPDI||...

OBX||FT|XML^Display format in XML^AUSPDI||...

OBX||FT|PIT^Display format in PIT^AUSPDI||...

OBX||FT|TXT^Display format in text^AUSPDI||...

OBX||ED|RTF^Display format in RTF^AUSPDI||...

OBX||ED|PDF^Display format in PDF^AUSPDI||...\*

OBX||ED|JPG^Display format in JPG^AUSPDI||...\*

**\*Note special format required for OBX-5 when using ED data type**

For Example this could be using PIT format, pdf, or other suitable format.

PIT lines 100-399 can be incorporated as the final OBX segment of an {ORC-OBR} pair with an OBX-3 (observation identifier) value of OBX||FT|PIT^Display format in PIT^AUSPDI||..." The included FT data type formatting strings provide the necessary formatting for a correct display in a report format.

If the receiving software chooses not to show the display format sent by the filler then it is the receiving system's responsibility to render the results accurately. This could only be done with site negotiation and conformance testing.

Note that the above reports, although able to include images, are not intended to fulfill the requirement for transmitting detailed diagnostic images. Such images and transactions are recommended by IHE to be performed using the DICOM Query/Retrieve SOP Classes and the DICOM Image Storage Classes. Refer to IHE Technical Framework, vol II, section 4.16.

### 11. Correlation of order and result messages

Practical implementation of Radiology information systems demonstrates that direct one-to-one alignment of orders and results will not always occur. The use of a one-to-one relationship between placer order numbers and requested tests provides a robust mechanism for determining whether a particular order has been filled. This does not depend on any correlation between ordering test codes and result codes. The following scenarios shall be accommodated by both placers and fillers:

Direct one-to-one correlation between orders and reports.

Each placer order number is returned with a report, thus completing the request-test-report cycle. Results shall be sent with *ORC-2-Order Control Code* of 'RE'.

- 1. ALERT: Variance to HL7. HL7 2.3.1 clause 4.3.1.1(j) says this code is not necessary in an ORU message but provides no alternative to filling this mandatory field.**

More than one ordered test is reported as a single report.

Results for tests with no direct report shall be sent with *ORC-2-Order Control Code* of 'CN'. The final test shall be sent with the report for all, using *ORC-2-Order Control Code* of 'RE'. See HL7 2.3.1 clause 4.3.1.1(m).

A single ordered test spawns more than one report

The result for the original order shall be sent with *ORC-2-Order Control Code* of 'PA'. Child orders shall be sent with *ORC-2-Order Control Code* of 'PA'. Only the final child order shall be sent with *ORC-5-Order Status* of 'CM'. This indicates that the entire order has been completed.

Copies of results are sent to parties other than the original requestor.

Results shall be sent with *ORC-2-Order Control Code* of 'RE'. Placer group number and placer order number shall be <null>.

- 2. ALERT: Variance to HL7 2.3.1. *ORC-2-Placer order number* is described as a conditional field. No conditions are specified. The use of a <null> value to transmit copy reports is unclear. This may cause problems for some systems.**

Add-on tests are ordered by a provider other than the original requestor.

Results shall be sent with *ORC-2-Order Control Code* of 'RE'. Placer group number should be sent as for the original episode.

For the ordering provider, placer order number will be returned.

For the original requestor, placer order number shall be <null>. (They did not order this test, but would normally be included in the "copy to" doctors.)

Corrections to reports.

The HL7 standard permits flagging of result status at both individual observation-level and report level. In practice, a comment usually applies to a "report" (See clause 0) and a placer acts on the basis of a "report".

Corrected reports shall be sent as a complete "report", with *OBR-25-Result status* value of "C".

- 3. ALERT: Variance to HL7. HL7 2.3.1 states this field is known only to the filler and not the placer. Placers must be able to interpret this field to replace a final report with a corrected report.**

Individual observations which have been corrected shall be flagged individually with *OBX-11-Observation result status* value of "C". Observations which have not changed shall be flagged individually with *OBX-11-Observation result status* value of "F".

- 4. ALERT: HL7 2.3.1 states that results flagged 'F' can only be changed with a corrected result. In practice one would replace a final result with an identical final result retransmitted as part of the corrected report. Individual observation flagging permits placer systems to highlight changes, which must be brought to clinical attention.**

Placer systems shall retain (and not discard) records pertaining to action based on final reports, which have subsequently been corrected. Preferably, previously documented action should be permitted to be updated based on a view of a report, which highlights the changed items.

## Reporting

### 12. Report integrity

In atomic HL7 format there is no clear mechanism to associate with results in the overall context of the report because they are received as separate OBX segments. The following is a mechanism to align comments with a specific result line or to indicate that it is a report-wide comment.

Result comments apply to individual observations

Use LOINC codes 15412-0 to 15431-0 to indicate result comments.

Result comments shall immediately follow the result to which they refer.

Report comments apply to entire reports of observations

Use LOINC codes 8251-1 to 8270-1.

Report comments will generally be placed in the final OBX segment.

### 13. *Processing OBX-FT value type*

When an OBX segment is generated with a value type FT care needs to be taken in how the line is handled at both the sending and receiving sites.

Departments should be aware that if they require the Observation Identifier to be displayed then the value type should be ST - not FT. In this case any embedded formatting in the Observation Value will not be applied and will display incorrectly. This will require departments to ensure that any short result lines (say less than 50 bytes) should not contain embedded formatting controls. However, where formatting is required to be maintained then:

The Observation Id can be part of the Observation Value (OBX-5) – preferred.

The Observation Id can be a separate OBX line of value type ST with a blank Observation Value OBX-5

The result is broken down into separate OBX segments not requiring embedded formatting

Special arrangement can be negotiated

Some combination of the above.

### 5. **ALERT: The use of value type TX is not recommended.**

### 14. *Radiology*

The body of the report should be encoded in an OBX segment with value type FT.

Any conclusion should be coded using the CE data type. If a suitable code is not available, it is acceptable to send free text in the second component of the CE data type.

### 15. *Special field items*

Some established methods of data transmission between external agencies in Australia require features that are not inherent in the HL7 Standard model. The HL7 protocol has provided the OBR segment fields 18 and 19 for 'free' use by the placer and fields 20 and 21 for 'free' use by the filler. These fields are defined in the HL7 protocol as value type ST with non-repeating attribute.

These fields provide the ability to incorporate customised processing by using them to set flagging values and/or store information, which can be utilised by the sending and receiving processes.

The OBR-20/21 Filler fields are thus defined as repeating two component items – 'code=value'.

the first is a code which defines the element

the second is the relevant value of that element

Repeating sets are separated by a comma (',').

**|code=value , code=value , code=value , .....|** - (spacing added for clarity only)

The contents of OBR-18/19 Placer fields are undefined.

The following elements are defined for OBR-20: (January 2002)

**CP** This is a copy result – that is, the receiving doctor is not the requesting doctor.

This is useful for the receiving site when a result is received and no corresponding order can be located or the result is for a patient that has no history at this surgery.

This item is not required when the receiving doctor is the requesting doctor.

Example: **CP=Y** - for Yes

**DR** The doctor code or provider number used by the department for the *Receiving Doctor*.

Example: **DR=ABC12** - doctor code

**DR=123456XY** - provider number

**LN** Department Number assigned by the department to the investigation.

For electronic orders the Filler Order Number is used to acknowledge receipt of the order. This may not necessarily correspond to the department's identifier for the result. This value must be retained – and displayed - by the PMS because referral to the performing department will usually require this number to be quoted **NOT** the Filler Order Number.

In cases where no electronic order was made – and consequently no Filler Order Number was returned in an Order Acknowledgment (ORR message), the result message may contain the Department Number in the 'Filler Order Number' field. For consistency it should be recorded under the 'LN' item.

Example: **LN=1234567-XYZ\T\LBA**

Note the sub-component separator '\T\' . See discussion below in **RC**.

**RC** Request Complete

HL7 only allows an 'order' to be flagged complete – not a list of orders that formed a request.

As outlined above, the tests that are ordered may be reported under a different test name. The PMS needs to be aware when all results for the request have been reported. This is indicated via the 'RC = Placer group number' item.

Example: **RC=1249\|RX32615492\|ROCK\|L**

Note: The \| separators in the *Placer group number*. The normal '^' component separators have been replaced in the Placer Group Number to avoid parsing conflicts.

Also refer to Section 13.12 Display format results

## VI. BATCHING OF TRANSACTIONS

### HL7 batch protocol

Transmission of batches of HL7 messages may be useful between systems which are not connected in real time or to reduce overheads of encrypted file transmission. The rules for acknowledgment of batches vary from those for single message transmissions and will be discussed in this Standard.

**Use of the batch header and trailer segments**

The following diagram describes the HL7 batch structure.

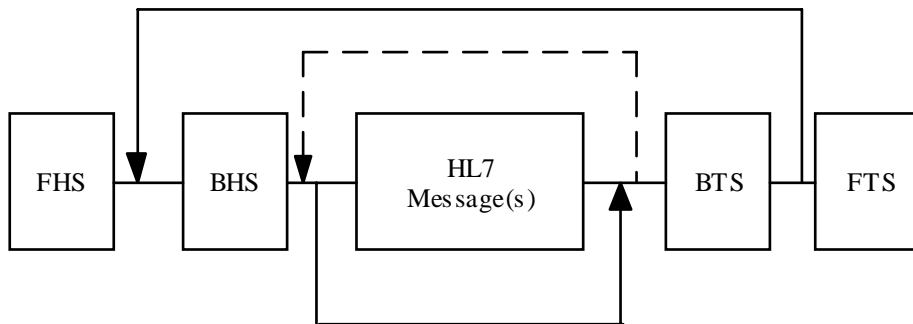


FIGURE 1 HL7 BATCH STRUCTURE

NOTES: The FHS (File Header Segment) and FTS (File Trailer Segment) are optional.

The simplified batch control appears as below. The HL7 batch protocol allows one or more messages within a batch. The diagram shows that a message within a batch is both optional and may repeat. There is no restriction to the number of messages that may be contained in a batch.

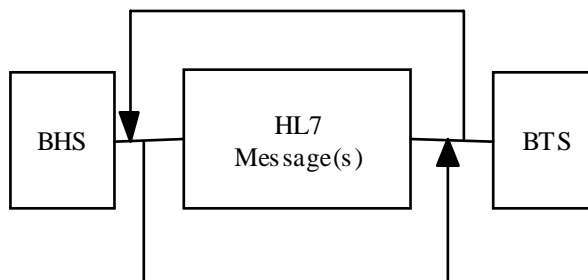


FIGURE 2 SIMPLIFIED BATCH CONTROL

NOTES: Whilst HL7 allows for batch file operation and the possibility of empty batch file return, this is not recommended and individual message acknowledgment is preferred.

**Batch acknowledgment**

There are several implications in using HL7 batch protocol for the acknowledgment of messages. Refer HL7 V2.3.1 Section 2.23.3.3.

**VII. MESSAGES**

**Communications overview**

1. *Order*

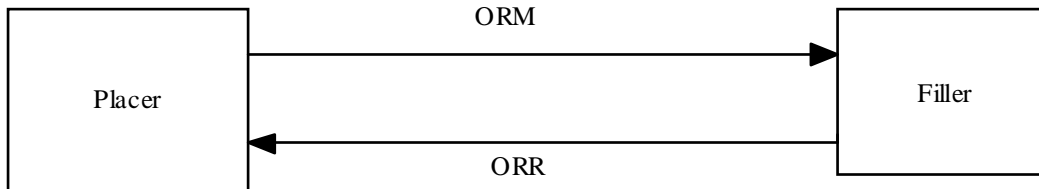


FIGURE 3 ORDER AND RESPONSE

See Figure 3, which shows the simple form of acknowledgment. Refer to HL7 V2.3.1 Clause 2.12.1.2.2, which describes how enhanced acknowledgment rules also apply. Usage of ORM and ORR is described in Clause 0. The acknowledgment for the order message is with an ACK message. The ORR is used when the specimen is received and the status changes to SC from IP.

2. *Observation report*

Observations may be transmitted in a solicited (in response to a query) or unsolicited mode. In the solicited mode, a user requests a set of observations according to criteria transmitted by the user. The sending system responds with existing data to satisfy the query (subject to access controls). Queries do not elicit new observations by the target system, they simply retrieve old observations.

3. *Observation report — Unsolicited mode*

The ‘unsolicited mode’ is used to send the observation reports (or portions of reports) that either:  
 have not been specifically requested;  
 are updates of observation reports that have already been transmitted; or  
 are provided in a deferred fashion to avoid continuous polling by the requesting system.

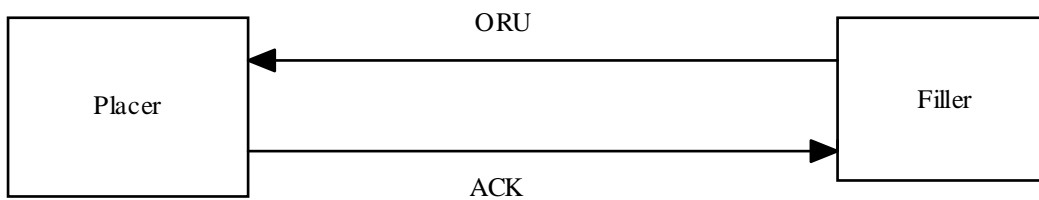


FIGURE 4 OBSERVATION REPORT AND ACKNOWLEDGMENT

### Message structural overview

Figure 5 is an overview of the representation of an HL7 message. A line above a segment indicates that it may be repeated. A line below a segment indicates that the segment is optional.

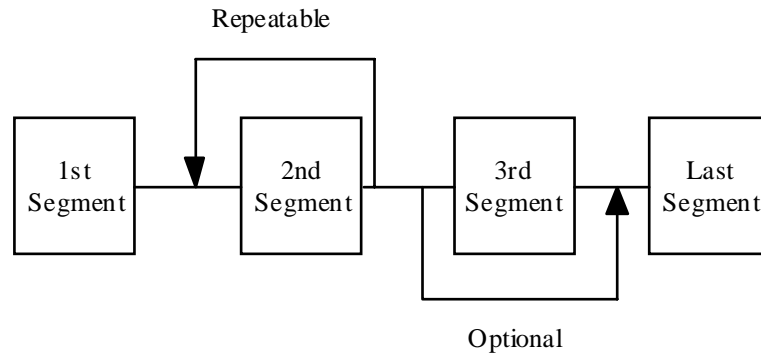


FIGURE 5 MESSAGE STRUCTURAL OVERVIEW

Only those segments that have been identified as relevant have been included in the Australian implementation Standard. Refer to the HL7 V2.3.1 protocol for all other message segments. Also refer to AS 4700.1 for general and patient-related segments.

- 01 THE NTE SEGMENT IS NOT USED IN THIS STANDARD AND MAY BE DISCARDED BY SOME RECEIVING APPLICATIONS. THIS MEANS THAT IMPORTANT INFORMATION SHALL NOT BE PLACED IN AN NTE SEGMENT, E.G. CLINICAL HISTORY SHALL BE PLACED IN *OBR-13-RELEVANT CLINICAL INFO*.

### Order messages

#### 4. *ORM Order message*

The diagram shown in Figure 6 is an overview of the general order message (ORM) and consists of the segments as detailed. Refer to HL7 V2.3.1 Section 4.2.1. The following applies:

*Message overview diagram*

See Figure 6.

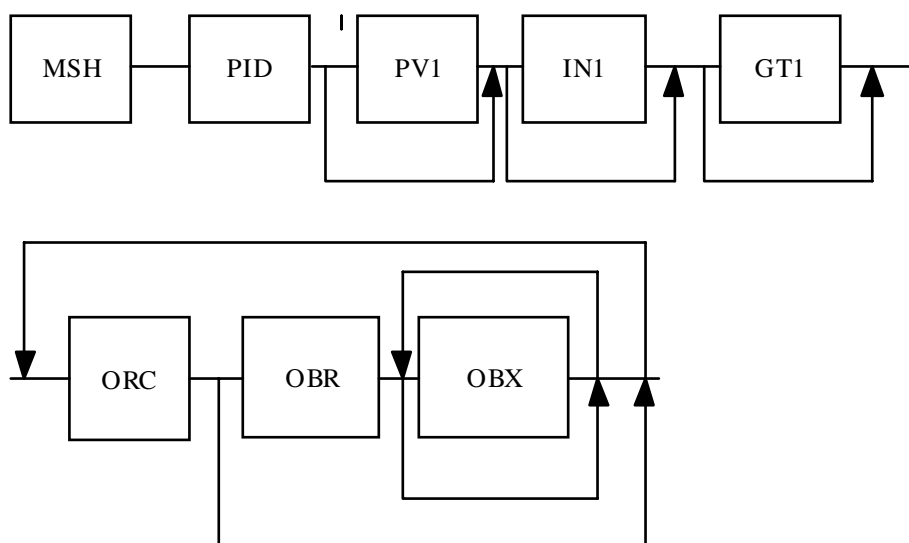


FIGURE 6 ORM MESSAGE OVERVIEW DIAGRAM

*Function*

The ORM message is for information about an order. This includes placing new orders, cancellation of existing orders, discontinuation, holding, etc. ORM messages usually originate with a placer, but may originate from a filler, or an interested third party. ORM messages can also be used to refer orders from one department to another department or to a Knowledge Base application.

*Trigger event*

The trigger event for this message is any change to an order. Such changes include submission of new orders, cancellations and updates.

*Required message header*

Message header (MSH) segment. See AS 4700.1.

*Patient related segments**Required segment*

Patient identification (PID) segment—See AS 4700.1, Table 6.6, for the Australian implementation of the patient identification segment. In the context of this document PID is ‘required’. De-identified data is handled within the PID segment.

*Optional segments*

Patient visit (PV1) segment—See AS 4700.1, Table 6.7, for Australian implementation of patient visit segment data elements and usage notes.

*Order related segments**Required segment*

Common order (ORC) segment—See Clause 6.2. At least one ORC is required. However, additional ORC segments may be used to provide information on previous orders.

*Optional segments*

Order detail (OBR) segment—See Clause 6.3. If an additional ORC is used to provide information on previous orders, this segment may be used to provide details of the previous order such as clinical history or referring doctor.

The OBR segment is used for common ordering messaging. However, when sending a cancel order message, then the OBR segment is not required.

Observation/results (OBX) segment—See Clause 6.4. This segment is used to detail physical clinical details, such as height, weight, or previous results. It is not used to return results of the current order. This segment may be repeated for a given OBR segment, but its use is optional.

#### 5. *ORR Order response message*

Refer to HL7 V2.3.1 Section 4.2.2. The following applies:

##### *Message overview diagram*

See Figure 7.

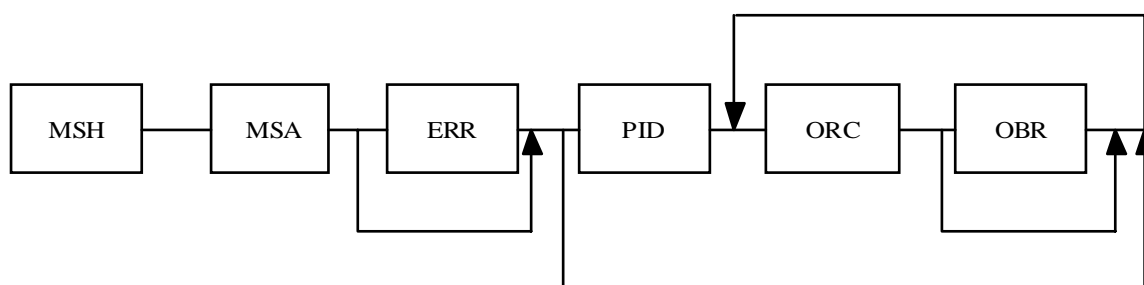


FIGURE 7 ORR MESSAGE OVERVIEW DIAGRAM

##### *Function*

The function of this message is to notify the status of an order.

Radiology results are not transmitted in an ORR message; they are transmitted in an ORU message

##### *Trigger event*

An ORR message is the response to an ORM message.

##### *Required segments*

Message header (MSH) segment—See AS 4700.1.

Message acknowledgment (MSA) segment—See AS 4700.1.

##### *Optional acknowledgment related segment*

Error (ERR) segment—See AS 4700.1.

##### *Returned segments*

As a general principle, whatever is sent in the ORM message is returned. For example:

Patient identification (PID) segment—See AS 4700.1.

Common order (ORC) segment.

Order detail (OBR) segment.

### Observational report messages

#### 6. *ORU Observational report (unsolicited) message*

Refer to HL7 V2.3.1 Section 7.2.1. The following applies:

#### *Message overview diagram*

See Figure 8.

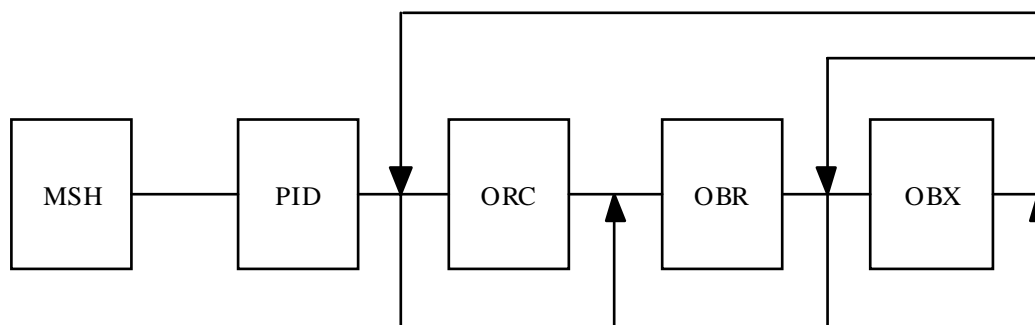


FIGURE 8 ORU MESSAGE OVERVIEW DIAGRAM

#### *Function*

The function of an ORU is to report a result. Note that in this document results, although able to include images, are not intended to fulfill the requirement for transmitting fully detailed diagnostic images. Such images and transactions are recommended by IHE to be performed using the DICOM Query/Retrieve SOP Classes and the DICOM Image Storage Classes. Refer to IHE Technical Framework, vol II, section 4.16.

#### *Trigger event*

The observational result is ready to report from the department.

#### *Required message header*

Message header (MSH) segment—See AS 4700.1.

#### *Required patient segment*

For further information on patient identification and business processes see AS 4700.1 and Client ID standard AS 5017.

Message control ID is sent in *MSH-10-Message control ID*.

When a message is assembled it requires a unique message identifier called the **Message control ID**. It is generated by the sending system to distinguish this message from every other message that is sent from this site.

#### NOTES:

- A.1 This is not an order number for a request nor is it an investigation number identifier used by the Radiology provider. It is a unique internal identifier for this one message originating from a particular site in the context of Radiology Messaging.
- A.2 As this is an internal field in a message it will not conflict nor cause problems when two messages with the same Message Control Id are received from two different placers/fillers. All systems should ensure that data tables are not keyed uniquely on this value.

For the receiver of the message the primary use for the id is to indicate to the sending system which message is being acknowledged.

If a patient has results for multiple tests and these are all returned under one Message Control Id (i.e. one MSH with multiple OBRs) then if one result has an error - all results in this message are rejected - not just the one in error. This occurs because there is only one message reference (Message Control Id) to which an error can be attached.

However, when multiple results are sent - each with individual MSH segments - then only the result in error is rejected and the others can be accepted because each result has its own Message Control Id.

The suggested format for the **Message Control Id** is a combination of two, or three, parts.

The first part is a control stub identifying the sending facility

The second - and optional - part is the date in YYYYMMDD format

The third part is a counter - an ever-incrementing number starting at 1.

NOTES: The "sending facility" in this context is not intended to be the form "QML^2184^AUSNATA" - it is not correct usage as the "AUSNATA" component is being used out of context. A shortened version is recommended with a compromise being the first component of the sending facility only.

The use of the date in the id is useful for obvious reasons.

### *Report segments*

*Required*—common order (ORC) segment. An ORC is returned if the ORU is the result of an ORM message. However, an ORC could be created by information in a paper request.

*Required*—order detail (OBR) segment. The OBR segment relates to one discrete panel or test code. The patient episode may involve several discrete tests. For orders this requires an {ORC-OBR} pair for each identifiable panel. For results there may be multiple OBRs with each ORC.

*Optional*—observation/results (OBX) segment. Findings reported by the filler (Radiology department) appear here, i.e. investigational test results. They can be numeric or text. Each OBX segment relates to an individual result, or in the context of orders, it will carry any clinical information required for interpretation of the result. The 'investigation results' will contain as many OBX segments as are required to report the results. In the case of narrative-type results the complete result may be included in a single OBX segment with embedded text formatting control sequences.

Refer to HL7 V2.3.1 Clause 7.4 for example transactions.

If there is a display format result (eg HTML, PIT) then it shall be in the last OBX segment.

### *Additional Usage Constraints*

Separate episodes shall be transmitted as separate HL7 messages. An exception is where a report contains interpretive information based on several different episodes, in which case the supporting results on which the interpretation is based can be included in a single message.

#### 7. *ACK Acknowledgment of an observational report message*

Refer to HL7 V2.3.1 Section 2.13. The following applies:

#### *Message overview diagram*

See Figure 9.

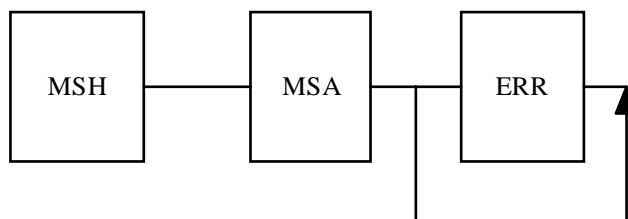


FIGURE 9 ACK MESSAGE OVERVIEW DIAGRAM

#### *Function*

The function of this message is to acknowledge an ORU message.

#### *Trigger event*

An ACK message is the application acknowledgment to an ORU message.

#### *Required segments*

Message header (MSH) segment—See AS 4700.1.

Message acknowledgment (MSA) segment—See AS 4700.1.

#### *Optional acknowledgment related segment*

Error (ERR) segment—See AS 4700.1.

## VIII. MESSAGE SEGMENTS

### **General**

Except where defined in this Standard, all HL7 V2.3.1 protocol message segment definitions, types and descriptions apply. The associated data element definition, formats and usage apply unless otherwise indicated.

The following applies:

#### *Sequence (Seq)*

The sequence number of the data element within the segment.

#### *Length (Len)*

The indicated field length is the length specified by the HL7 V2.3.1 Standard document (section 2.6.2); in some cases these are impractical or contradictory. The next version of HL7 (V2.4) addresses this issue and increases the length of the CE, CK, CN, CNE, CWE, CX, PPN, XAD, XCN, XON, XPN and XTN data types to 250 characters, and hence has been reflected in this document.

#### *Data type (DT)*

Applies to the restrictions on the contents of the data element.

*Optionality*—One of the following applies for each data element:

#### *Required (R)*

Data element must be present for every transmission.

#### *Conditional (C)*

Data element must be present for specified trigger events.

*Optional (O)*

Data element need not be present for any transmission.

*Backward compatibility (B)*

Data element superseded. Appears for backward compatibility only.

*Repetition (Rp#)*

Indicates whether the data element may repeat. A 'Y' indicates that repetition is indefinite or site determined. An integer indicates repetition to the number of times specified in the integer.

*Table (Tbl#)*

The number of the HL7 V2.3.1 table that defines the values for the data element. These values should be followed unless otherwise indicated.

*ID number (Item#)*

The small integer that uniquely identifies the HL7 V2.3.1 data element.

*Element name*

The descriptive name for the data element.

*Usage notes*

Usage notes are provided for data elements to assist health institutions and health information technology vendors with data element interpretation, use and implementation in the Australian health information technology environment.

### Message header segment (MSH)

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS4700.1 or Table 1 below. The following applies:

*Function*

The MSH segment defines the intent, source, destination, and some specifics of the syntax of a message.

*Data elements and usage notes*

For relevant data elements and usage notes specific to Radiology messaging, see Table 1.

**TABLE 1**  
**MESSAGE HEADER (MSH) SEGMENT**

| Seq | Len | DT | Opt | Rp/# | Tbl# | Element Name        | Local usage notes and references   |
|-----|-----|----|-----|------|------|---------------------|--|
| 1   | 1   | ST | R   |      |      | Field Separator     |  |
| 2   | 4   | ST | R   |      |      | Encoding Characters |  |
| 3   | 180 | HD | O   |      |      | Sending Application |  |
| 4   | 180 | HD | O   |      |      | Sending Facility    | Identifies the location where the message was generated<br>for guidance on facility codes. |

| Seq | Len | DT  | Opt | Rp/# | Tbl#                 | Element Name                    | Local usage notes and references   |
|-----|-----|-----|-----|------|----------------------|---------------------------------|--|
| 5   | 180 | HD  | O   |      |                      | Receiving Application           | <p>There are multiple scenarios for use of this field. The common use is to identify the receiving application.</p> <p>Where it is necessary to identify the doctor to whom results are addressed, the HD data type format is used to identify the specific doctor.</p> <p><b>ALERT: Variance to HL7</b></p> <p>For doctors with Medicare provider numbers:<br/>                     &lt;namespace ID&gt; =<br/>                     AUSHICPR.&lt;Medicare provider number&gt;<br/>                     &lt;universal ID&gt; = &lt;Medicare provider number&gt;.&lt;family name&gt;.&lt;given name&gt;.&lt;middle initial or name&gt;.&lt;suffix&gt;.&lt;prefix&gt;<br/>                     &lt;universal ID type&gt; = L</p> <p>For doctors without Medicare provider numbers:<br/>                     &lt;namespace ID&gt; = LOCxxxx.&lt;Local Code&gt;<br/>                     &lt;universal ID&gt; = &lt;Local Code&gt;.&lt;family name&gt;.&lt;given name&gt;.&lt;middle initial or name&gt;.&lt;suffix&gt;.&lt;prefix&gt;<br/>                     &lt;universal ID type&gt; = L</p> <p>Example:<br/>                     MSH ... . . .AUSHICPR.1234567X.Jones.Bill.W..Dr^L ...</p> |
| 6   | 180 | HD  | O   |      |                      | Receiving Facility              | The use of MSH-6 for identifying the patient facility means that the receiving system can use MSH-6 as a processing trigger.   |
| 7   | 26  | TS  | O   |      |                      | Date/Time of Message            | Time stamps should be specified to minimum precision of minutes. Time zone shall be included in timestamps.  |
| 8   | 40  | ST  | O   |      |                      | Security                        |  |
| 9   | 7   | CM  | R   |      | 0076<br>0003<br>0354 | Message Type                    |  |
| 10  | 20  | ST  | R   |      |                      | Message Control ID              |  |
| 11  | 3   | PT  | R   |      | 0103/0207            | Processing ID                   |  |
| 12  | 60  | VID | R   |      | 0104                 | Version ID                      |  |
| 13  | 15  | NM  | O   |      |                      | Sequence Number                 |  |
| 14  | 180 | ST  | O   |      |                      | Continuation Pointer            |  |
| 15  | 2   | ID  | O   |      | 0155                 | Accept Acknowledgment Type      |  |
| 16  | 2   | ID  | O   |      | 0155                 | Application Acknowledgment Type |  |

| Seq | Len | DT | Opt | Rp/# | Tbl# | Element Name                            | Local usage notes and references |
|-----|-----|----|-----|------|------|---|----------------------------------|
| 17  | 3   | ID | O   |      |      | Country Code                            |                                  |
| 18  | 16  | ID | O   | 0..Y | 0211 | Character Set                           |                                  |
| 19  | 250 | CE | O   |      |      | Principal Language of Message           |                                  |
| 20  | 20  | ID | O   |      | 0356 | Alternate Character Set Handling Scheme |                                  |
| 21  | 10  | ID | O   | Y    | 0449 | Conformance ID Statement                | Not defined                      |
|     |     |    |     |      |      |   |                                  |
|     |     |    |     |      |      |   |                                  |

### Patient identification (PID) segment

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS 4700.1 or Table 2 below.

The following applies:

#### *Function*

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

#### *Data elements and usage notes*

For relevant data elements and usage notes specific to Radiology messaging, see Table 2.

**TABLE 2**  
**PATIENT IDENTIFICATION (PID) SEGMENT**

| Seq | Len | DT  | Opt | Rp/# | Tbl#      | Item# | Element name              | Usage notes  |
|-----|-----|-----|-----|------|-----------|-------|---------------------------|--|
| 1   | 4   | SI  | O   |      |           | 00104 | Set ID—PID                | Required for swaps and merges  |
| 2   | 250 | CX  | B/X |      |           | 00105 | Patient ID                | Retained in the HL7 V2.3.1 protocol for backward compatibility<br>Use PID-3-Patient identifier list for all patient identifiers  |
| 3   | 250 | CX  | R   | Y    | 0363 0203 | 00106 | Patient identifier list   | Refer to AS4700.1.<br>The DVA card type ('colour') should be sent in PID-3.5 as:<br>VAW DVA Card - White<br>VAG DVA Card - Gold<br>VAO DVA Card - Orange<br><b>ALERT: Variance to AS4700.1 DVA card type encoding</b><br>For Local Medical Record Number :<br><ID> = medical record number<br><check digit> = null<br><code identifying check digit scheme employed> = null<br><assigning authority> -<br><identifier type code> = MR<br><assigning facility> = null |
| 4   | 250 | CX  | B/X | Y    |           | 00107 | Alternate patient ID -PID | Do not use.  |
| 5   | 250 | XPN | R   | Y    |           | 00108 | Patient name              |  |
| 6   | 250 | XPN | O   |      |           | 00109 | Mother's maiden name      |  |
| 7   | 26  | TS  | C   |      |           | 00110 | Date/time of birth        |  |
| 8   | 1   | IS  | O   |      | 0001      | 00111 | Sex                       |  |
| 9   | 250 | XPN | O   | Y    |           | 00112 | Patient alias             |  |
| 10  | 250 | CE  | O   |      | 0005      | 00113 | Race                      |  |
| 11  | 250 | XAD | O   | Y    |           | 00114 | Patient address           | Full street address of patient<br>AS 4590 references:<br><street address><city><br><state or province><zip or postal code><br>See also NHDD 000016 'Area of usual residence'<br>See also <census tract>  |
| 12  | 4   | IS  | B/X |      |           | 00115 | County code               |  |

| Seq | Len | DT  | Opt | Rp/# | Tbl# | Item# | Element name                    | Usage notes  |
|-----|-----|-----|-----|------|------|-------|---------------------------------|--|
| 13  | 250 | XTN | O   | Y    |      | 00116 | Phone number—Home               |  |
| 14  | 250 | XTN | O   | Y    |      | 00117 | Phone number—Business           |  |
| 15  | 250 | CE  | O   |      | 0296 | 00118 | Primary language                |  |
| 16  | 250 | CE  | O   |      | 0002 | 00119 | Marital status                  |  |
| 17  | 250 | CE  | O   |      | 0006 | 00120 | Religion                        |  |
| 18  | 250 | CX  | O   |      |      | 00121 | Patient account number          |  |
| 19  | 16  | ST  | O   |      |      | 00122 | SSN Number—Patient              | Do not use.  |
| 20  | 25  | DLN | O   |      |      | 00123 | Driver's licence number—Patient |  |
| 21  | 250 | CX  | O   | Y    |      | 00124 | Mother's identifier             |  |
| 22  | 250 | CE  | O   |      | 0189 | 00125 | Ethnic group                    |  |
| 23  | 60  | ST  | O   |      |      | 00126 | Birth place                     |  |
| 24  | 2   | ID  | O   |      | 0136 | 00127 | Multiple birth indicator        |  |
| 25  | 2   | NM  | O   |      |      | 00128 | Birth order                     |  |
| 26  | 250 | CE  | O   | Y    | 0171 | 00129 | Citizenship                     |  |
| 27  | 250 | CE  | O   |      | 0172 | 00130 | Veterans military status        | Do not use. Refer to PID-3-Patient Identifier List |
| 28  | 250 | CE  | O   |      | 0212 | 00739 | Nationality                     |  |
| 29  | 26  | TS  | O   |      |      | 00740 | Patient death date and time     |  |
| 30  | 1   | ID  | O   |      | 0136 | 00741 | Patient death indicator         |  |

### Patient visit (PV1) segment

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS4700.1 or Table 3 below.

**TABLE 3**  
**PATIENT VISIT (PV1) SEGMENT**

| Seq | Len | DT | Opt | Rp/# | Tbl# | Element Name              | Local usage notes and references |
|-----|-----|----|-----|------|------|---------------------------|----------------------------------|
| 1   | 4   | SI | O   |      |      | Set ID - PV1              |                                  |
| 2   | 1   | IS | R   |      | 0004 | Patient Class             |                                  |
| 3   | 80  | PL | O   |      |      | Assigned Patient Location |                                  |
| 4   | 2   | IS | O   |      | 0007 | Admission Type            |                                  |
| 5   | 250 | CX | O   |      |      | Pre-admit Number          |                                  |

| Seq | Len | DT  | Opt | Rp/# | Tbl# | Element Name             | Local usage notes and references  |
|-----|-----|-----|-----|------|------|--------------------------|---|
| 6   | 80  | PL  | O   |      |      | Prior Patient Location   |   |
| 7   | 250 | XCN | O   | Y    | 0010 | Attending Doctor         |   |
| 8   | 250 | XCN | O   | Y    | 0010 | Referring Doctor         | This field should contain the Medicare provider number of the original ordering provider for this episode.<br>To encode Medicare provider number:<br><ID number> = provider number<br><source table> = AUSHICPR<br>To encode local identifiers:<br><ID number> = local ID number<br><source table> = LOCxxxxx (user defined)  |
| 9   | 250 | XCN | B   | Y    | 0010 | Consulting Doctor        |   |
| 10  | 3   | IS  | C   |      | 0069 | Hospital Service         |   |
| 11  | 80  | PL  | O   |      |      | Temporary Location       |   |
| 12  | 2   | IS  | O   |      | 0087 | Pre-Admit Test Indicator |   |
| 13  | 2   | IS  | O   |      | 0092 | Re-Admission Indicator   |   |
| 14  | 3   | IS  | O   |      | 0023 | Admit Source             |   |
| 15  | 2   | IS  | O   | Y    | 0009 | Ambulatory Status        |   |
| 16  | 2   | IS  | O   |      | 0099 | VIP Indicator            |   |
| 17  | 250 | XCN | O   | Y    | 0010 | Admitting Doctor         |   |
| 18  | 2   | IS  | O   |      | 0018 | Patient Type             |   |
| 19  | 250 | CX  | O   |      |      | Visit Number             |   |
| 20  | 50  | FC  | C   | Y    | 0064 | Financial Class          | Refer to AS4700-1<br>Recommended values for user-defined table 0064 (from NHDD 000632 'Funding source for hospital patient'):<br>01 Australian Health Care Agreements (in the community setting, this can be used to indicate Medicare funding)<br><b>ALERT: Variance to NHDD version 11.</b><br>02 Private health insurance<br>03 Self-funded<br>04 Worker's compensation<br>05 Motor vehicle third party personal claim<br>06 Other compensation (eg. public liability, common law, medical negligence)<br>07 Department of Veterans' Affairs<br>08 Department of Defence<br>09 Correctional facility<br>10 Other hospital or public authority (contracted care)<br>11 Reciprocal health care agreements (with other countries)<br>12 Other<br>99 Not known |

| Seq | Len | DT | Opt | Rp/# | Tbl# | Element Name              | Local usage notes and references   |
|-----|-----|----|-----|------|------|---------------------------|--|
| 21  | 2   | IS | O   |      | 0032 | Charge Price Indicator    | Recommended values for user defined table 0032:<br>AUSM85 85% of Medicare schedule fee<br>AUSM75 75% of Medicare schedule fee<br>AUSM100 Medicare scheduled fee<br>AUSAMA AMA recommended fee<br>Local codes may be used by site-specific agreement. |
| 22  | 2   | IS | O   |      | 0045 | Courtesy Code             |  |
| 23  | 2   | IS | O   |      | 0046 | Credit Rating             |  |
| 24  | 2   | IS | O   | Y    | 0044 | Contract Code             |  |
| 25  | 8   | DT | O   | Y    |      | Contract Effective Date   |  |
| 26  | 12  | NM | O   | Y    |      | Contract Amount           |  |
| 27  | 3   | NM | O   | Y    |      | Contract Period           |  |
| 28  | 2   | IS | O   |      | 0073 | Interest Code             |  |
| 29  | 1   | IS | O   |      | 0110 | Transfer to Bad Debt Code |  |
| 30  | 8   | DT | O   |      |      | Transfer to Bad Debt Date |  |
| 31  | 10  | IS | O   |      | 0021 | Bad Debt Agency Code      |  |
| 32  | 12  | NM | O   |      |      | Bad Debt Transfer Amount  |  |
| 33  | 12  | NM | O   |      |      | Bad Debt Recovery Amount  |  |
| 34  | 1   | IS | O   |      | 0111 | Delete Account Indicator  |  |
| 35  | 8   | DT | O   |      |      | Delete Account Date       |  |
| 36  | 3   | IS | O   |      | 0112 | Discharge Disposition     |  |
| 37  | 25  | CM | O   |      | 0113 | Discharged to Location    |  |
| 38  | 250 | CE | O   |      | 0114 | Diet Type                 |  |
| 39  | 2   | IS | O   |      | 0115 | Servicing Facility        |  |
| 40  | 1   | IS | B   |      | 0116 | Bed Status                |  |
| 41  | 2   | IS | O   |      | 0117 | Account Status            |  |
| 42  | 80  | PL | O   |      |      | Pending Location          |  |
| 43  | 80  | PL | O   |      |      | Prior Temporary Location  |  |
| 44  | 26  | TS | O   |      |      | Admit Date/Time           |  |
| 45  | 26  | TS | O   |      |      | Discharge Date/Time       |  |
| 46  | 12  | NM | O   |      |      | Current Patient Balance   |  |

| Seq | Len | DT  | Opt | Rp/# | Tbl# | Element Name              | Local usage notes and references |
|-----|-----|-----|-----|------|------|---------------------------|----------------------------------|
| 47  | 12  | NM  | O   |      |      | Total Charges             |                                  |
| 48  | 12  | NM  | O   |      |      | Total Adjustments         |                                  |
| 49  | 12  | NM  | O   |      |      | Total Payments            |                                  |
| 50  | 250 | CX  | O   |      | 0203 | Alternate Visit ID        |                                  |
| 51  | 1   | IS  | O   |      | 0326 | Visit Indicator           |                                  |
| 52  | 250 | XCN | B   | Y    | 0010 | Other Healthcare Provider |                                  |

### Guarantor (GT1) segment

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS4700.1 or Table 4 below.

The following applies:

*Function* The GT1 segment identifies the person or organisation responsible for payment of the patient account for services. For example, where the patient is a minor the parent will normally be responsible and therefore their name and address is required by the laboratory.

It is recommended that the GT1 segment be always populated. If the patient is the same person who is responsible for payment, then their details should be sent in the GT1 segment.

*Data elements and usage notes* For relevant data elements and usage notes specific to Radiology messaging, see Table 4.

**TABLE 4**  
**GUARANTOR (GT1) SEGMENT**

| Seq | Len | DT  | Opt | Rp/# | Tbl# | Element name                 | Local usage notes and references   |
|-----|-----|-----|-----|------|------|------------------------------|--|
| 1   | 4   | SI  | R   |      |      | Set ID - GT1                 |  |
| 2   | 59  | CX  | O   | Y    |      | Guarantor number             | Organisational identifiers may be used here. They should be fully specified. |
| 3   | 250 | XPN | R   | Y    |      | Guarantor name               |  |
| 4   | 250 | XPN | O   | Y    |      | Guarantor spouse name        |  |
| 5   | 250 | XAD | O   | Y    |      | Guarantor address            |  |
| 6   | 250 | XTN | O   | Y    |      | Guarantor ph num - Home      |  |
| 7   | 250 | XTN | O   | Y    |      | Guarantor ph num - Business  |  |
| 8   | 26  | TS  | O   |      |      | Guarantor date/time of birth |  |
| 9   | 1   | IS  | O   |      | 0001 | Guarantor sex                |  |
| 10  | 2   | IS  | O   |      | 0068 | Guarantor type               | Funding source is specified in PVI-20-Financial class                        |
| 11  | 250 | CE  | O   |      | 0063 | Guarantor relationship       |  |
| 12  | 11  | ST  | O   |      |      | Guarantor SSN                | Do not use.  |

| Seq | Len | DT  | Opt | Rp/# | Tbl# | Element name                      | Local usage notes and references |
|-----|-----|-----|-----|------|------|-----------------------------------|----------------------------------|
| 13  | 8   | DT  | O   |      |      | Guarantor date - Begin            |                                  |
| 14  | 8   | DT  | O   |      |      | Guarantor date - End              |                                  |
| 15  | 2   | NM  | O   |      |      | Guarantor priority                |                                  |
| 16  | 250 | XPN | O   | Y    |      | Guarantor employer name           |                                  |
| 17  | 250 | XAD | O   | Y    |      | Guarantor employer address        |                                  |
| 18  | 250 | XTN | O   | Y    |      | Guarantor employer phone number   |                                  |
| 19  | 250 | CX  | O   | Y    |      | Guarantor employee ID number      |                                  |
| 20  | 2   | IS  | O   |      | 0066 | Guarantor employment status       |                                  |
| 21  | 250 | XON | O   | Y    |      | Guarantor organization name       |                                  |
| 22  | 1   | ID  | O   |      | 0136 | Guarantor billing hold flag       |                                  |
| 23  | 250 | CE  | O   |      | 0341 | Guarantor credit rating code      |                                  |
| 24  | 26  | TS  | O   |      |      | Guarantor death date and time     |                                  |
| 25  | 1   | ID  | O   |      | 0136 | Guarantor death flag              |                                  |
| 26  | 250 | CE  | O   |      | 0218 | Guarantor charge adjustment code  |                                  |
| 27  | 10  | CP  | O   |      |      | Guarantor household annual income |                                  |
| 28  | 3   | NM  | O   |      |      | Guarantor household size          |                                  |
| 29  | 250 | CX  | O   | Y    |      | Guarantor employer ID number      |                                  |
| 30  | 250 | CE  | O   |      | 0002 | Guarantor marital status code     |                                  |
| 31  | 8   | DT  | O   |      |      | Guarantor hire effective date     |                                  |
| 32  | 8   | DT  | O   |      |      | Employment stop date              |                                  |
| 33  | 2   | IS  | O   |      | 0223 | Living dependency                 |                                  |
| 34  | 2   | IS  | O   | Y    | 0009 | Ambulatory status                 |                                  |
| 35  | 250 | CE  | O   | Y    | 0171 | Citizenship                       |                                  |
| 36  | 250 | CE  | O   |      | 0296 | Primary language                  |                                  |
| 37  | 2   | IS  | O   |      | 0220 | Living arrangement                |                                  |
| 38  | 250 | CE  | O   |      | 0215 | Publicity code                    |                                  |
| 39  | 1   | ID  | O   |      | 0136 | Protection indicator              |                                  |
| 40  | 2   | IS  | O   |      | 0231 | Student indicator                 |                                  |

| Seq | Len | DT  | Opt | Rp/# | Tbl#       | Element name                           | Local usage notes and references |
|-----|-----|-----|-----|------|------------|--|----------------------------------|
| 41  | 250 | CE  | O   |      | 0006       | Religion                               |                                  |
| 42  | 250 | XPN | O   | Y    |            | Mother's maiden name                   |                                  |
| 43  | 250 | CE  | O   |      | 0212       | Nationality                            |                                  |
| 44  | 250 | CE  | O   | Y    | 0189       | Ethnic group                           |                                  |
| 45  | 250 | XPN | O   | Y    |            | Contact person's name                  |                                  |
| 46  | 250 | XTN | O   | Y    |            | Contact person's telephone number      |                                  |
| 47  | 250 | CE  | O   |      | 0222       | Contact reason                         |                                  |
| 48  | 2   | IS  | O   |      | 0063       | Contact relationship                   |                                  |
| 49  | 20  | ST  | O   |      |            | Job title                              |                                  |
| 50  | 20  | JCC | O   |      | 0327/ 0328 | Job code/class                         |                                  |
| 51  | 250 | XON | O   | Y    |            | Guarantor employer's organization name |                                  |
| 52  | 2   | IS  | O   |      | 0295       | Handicap                               |                                  |
| 53  | 2   | IS  | O   |      | 0311       | Job status                             |                                  |
| 54  | 50  | FC  | O   |      | 0064       | Guarantor financial class              |                                  |
| 55  | 250 | CE  | O   | Y    | 0005       | Guarantor race                         |                                  |

**Insurance (IN1) segment**

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS4700.1 or Table 5 below.

The following applies:

*Function* The IN1 segment is used to provide insurance policy coverage information. It should only be used for private health insurers.

*Data elements and usage notes* For relevant data elements and usage notes specific to Radiology messaging, see Table 5.

**TABLE 5  
INSURANCE (IN1) SEGMENT**

| Seq | Len | DT | Opt | Rp/# | Tbl# | Element name         | Local usage notes and references |
|-----|-----|----|-----|------|------|----------------------|----------------------------------|
| 1   | 4   | SI | R   |      |      | Set ID - IN1         |                                  |
| 2   | 250 | CE | R   |      | 0072 | Insurance Plan ID    |                                  |
| 3   | 250 | CX | R   | Y    |      | Insurance Company ID |                                  |

| Seq | Len | DT  | Opt | Rp/# | Tbl# | Element name                      | Local usage notes and references |
|-----|-----|-----|-----|------|------|-----------------------------------|----------------------------------|
| 4   | 250 | XON | O   | Y    |      | Insurance Company Name            |                                  |
| 5   | 250 | XAD | O   | Y    |      | Insurance Company Address         |                                  |
| 6   | 250 | XPN | O   | Y    |      | Insurance Co Contact Person       |                                  |
| 7   | 250 | XTN | O   | Y    |      | Insurance Co Phone Number         |                                  |
| 8   | 12  | ST  | O   |      |      | Group Number                      |                                  |
| 9   | 250 | XON | O   | Y    |      | Group Name                        |                                  |
| 10  | 250 | CX  | O   | Y    |      | Insured's Group Emp ID            |                                  |
| 11  | 250 | XON | O   | Y    |      | Insured's Group Emp Name          |                                  |
| 12  | 8   | DT  | O   |      |      | Plan Effective Date               |                                  |
| 13  | 8   | DT  | O   |      |      | Plan Expiration Date              |                                  |
| 14  | 250 | CM  | O   |      |      | Authorization Information         |                                  |
| 15  | 3   | IS  | O   |      | 0086 | Plan Type                         |                                  |
| 16  | 250 | XPN | O   | Y    |      | Name Of Insured                   |                                  |
| 17  | 250 | CE  | O   |      | 0063 | Insured's Relationship To Patient |                                  |
| 18  | 26  | TS  | O   |      |      | Insured's Date Of Birth           |                                  |
| 19  | 250 | XAD | O   | Y    |      | Insured's Address                 |                                  |
| 20  | 2   | IS  | O   |      | 0135 | Assignment Of Benefits            |                                  |
| 21  | 2   | IS  | O   |      | 0173 | Coordination Of Benefits          |                                  |
| 22  | 2   | ST  | O   |      |      | Coord Of Ben. Priority            |                                  |
| 23  | 1   | ID  | O   |      | 0136 | Notice Of Admission Flag          |                                  |
| 24  | 8   | DT  | O   |      |      | Notice Of Admission Date          |                                  |
| 25  | 1   | ID  | O   |      | 0136 | Report Of Eligibility Flag        |                                  |
| 26  | 8   | DT  | O   |      |      | Report Of Eligibility Date        |                                  |
| 27  | 2   | IS  | O   |      | 0093 | Release Information Code          |                                  |
| 28  | 15  | ST  | O   |      |      | Pre-Admit Cert (PAC)              |                                  |
| 29  | 26  | TS  | O   |      |      | Verification Date/Time            |                                  |
| 30  | 250 | XCN | O   | Y    |      | Verification By                   |                                  |
| 31  | 2   | IS  | O   |      | 0098 | Type Of Agreement Code            |                                  |

| Seq | Len | DT  | Opt | Rp/# | Tbl# | Element name                 | Local usage notes and references                                 |
|-----|-----|-----|-----|------|------|------------------------------|--|
| 32  | 2   | IS  | O   |      | 0022 | Billing Status               |  |
| 33  | 4   | NM  | O   |      |      | Lifetime Reserve Days        |  |
| 34  | 4   | NM  | O   |      |      | Delay Before L.R. Day        |  |
| 35  | 8   | IS  | O   |      | 0042 | Company Plan Code            |  |
| 36  | 15  | ST  | O   |      |      | Policy Number                |  |
| 37  | 12  | CP  | O   |      |      | Policy Deductible            |  |
| 38  | 12  | CP  | B   |      |      | Policy Limit - Amount        |  |
| 39  | 4   | NM  | O   |      |      | Policy Limit - Days          |  |
| 40  | 12  | CP  | B   |      |      | Room Rate - Semi-Private     |  |
| 41  | 12  | CP  | B   |      |      | Room Rate - Private          |  |
| 42  | 250 | CE  | O   |      | 0066 | Insured's Employment Status  |  |
| 43  | 1   | IS  | O   |      | 0001 | Insured's Administrative Sex |  |
| 44  | 250 | XAD | O   | Y    |      | Insured's Employer's Address |  |
| 45  | 2   | ST  | O   |      |      | Verification Status          |  |
| 46  | 8   | IS  | O   |      | 0072 | Prior Insurance Plan ID      |  |
| 47  | 3   | IS  | O   |      | 0309 | Coverage Type                |  |
| 48  | 2   | IS  | O   |      | 0295 | Handicap                     |  |
| 49  | 250 | CX  | O   | Y    |      | Insured's ID Number          | Do not use for Commonwealth identifiers. They are sent in PID3.. |

### Common order (ORC) segment

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS 4700.1 or Table 6 below.

The following applies:

*Function* The ORC segment is used to provide information on the order.

*Data elements and usage notes* For relevant data elements and usage notes specific to Radiology messaging, see Table 6.

**TABLE 6  
COMMON ORDER (ORC) SEGMENT**

| Seq | Len | DT | Opt | Rp# | Tbl# | Item# | Element name        | Usage notes   |
|-----|-----|----|-----|-----|------|-------|---------------------|---|
| 1   | 2   | ID | R   |     | 0119 | 00215 | Order control       | Equivalent to event type, this data element indicates the transaction type<br><br>For a new order use 'NW', to cancel an order use 'CA', to   |
|     |     |    |     |     |      |       |                     | provides information on previous results to facilitate, for example, the interpretation of that order's results, use 'RE'   |
| 2   | 22  | EI | C   |     |      | 00216 | Placer order number | ORC-2-placer order number is the same as OBR-2-placer order number. Both shall be populated with the same value.<br><br>Components:<br><entity identifier> = unique order number as assigned by the placer application<br><namespace ID>= value from User Table 0300<br><br>HL7 2.3.1 Clause 2.8.20 describes usage of <namespace ID> as a local identifier. Uncontrolled use of local identifiers will not guarantee uniqueness unless all communicating sites agree on the identifier system.<br><b>ALERT: Variance to H17</b><br><universal ID> = unique identifier in a particular namespace<br><universal ID type>=L<br><b>ALERT: Variance to HL7 2.3.1. ORC-2-Placer order number is described as a conditional field No conditions are specified. The use of a &lt;null&gt; value to transmit copy reports is unclear. This may cause problems for some systems.</b> |

(continued)

| Seq | Len | DT  | Opt | Rp# | Tbl# | Item# | Element name             | Usage notes  |
|-----|-----|-----|-----|-----|------|-------|--------------------------|--|
| 3   | 22  | EI  | C   |     |      | 00217 | Filler order number      | <p>ORC-3-filler order number is the same as OBR-3-filler order number</p> <p>If the filler order number is not present in the ORC, it must be present in the associated OBR</p> <p>This is particularly important when results are transmitted in an ORU message, an ORC is not required, and the identifying filler order number shall be present in the OBR segments</p> <p>A local coding system should be introduced using the name of the knowledge base and supplier</p> <p>&lt;entity identifier&gt; = Unique number assigned by the laboratory</p> <p>&lt;namespace ID&gt; = &lt;lab no&gt;.AUSNATA</p> <p>&lt;universal ID&gt; = NATA laboratory No.</p> <p>&lt;universal ID type&gt; = L</p> |
| 4   | 22  | EI  | O   |     |      | 00218 | Placer group number      | <p>This is equivalent to a Radiology request identifier. It links the group of ordered tests into a single episode</p> <p>It is recommended that the Placer group number be the Placer order number without the "counter" part</p> <p>For example, if ORC-2 is ...1249-1^32615492^ROCK... then ORC-4 is ...1249^32615492^ROCK...</p>   |
| 5   | 2   | ID  | O   |     | 0038 | 00219 | Order status             |  |
| 6   | 1   | ID  | O   |     | 0121 | 00220 | Response flag            |  |
| 7   | 200 | TQ  | O   |     |      | 00221 | Quantity/timing          |  |
| 8   | 200 | CM  | O   |     |      | 00222 | Parent                   |  |
| 9   | 26  | TS  | O   |     |      | 00223 | Date/time of transaction | <p>Actual date/time that the order was entered into the ordering application.</p> <p>Time stamps should be specified to minimum precision of minutes. Time zone shall be included in timestamps. NOTE: Refer also ORC-15-order effective date/time and OBR-7-observation date/ time and OBR-8-observation end date/time</p>  |
| 10  | 250 | XCN | O   | Y   |      | 00224 | Entered by               |  |
| 11  | 250 | XCN | O   | Y   |      | 00225 | Verified by              |  |

| Seq | Len | DT  | Opt | Rp# | Tbl# | Item# | Element name              | Usage notes  |
|-----|-----|-----|-----|-----|------|-------|---------------------------|--|
| 12  | 250 | XCN | O   | Y   |      | 00226 | Ordering provider         | To encode Medicare provider number:<br><ID number> = provider number<br><source table> = AUSHICPR<br>To encode local identifiers:<br><ID number> = local ID number<br><source table> = LOCxxxxx<br>(user defined)<br>Use Medicare provider number for ID component if available<br>Use ORC-21 to ORC-24 for ordering provider location details<br>This field shall be replicated in OBR-16-ordering provider.<br>NOTE: For add-on tests ordered by a different provider, this field will not be the same as the initial referring doctor for this episode, in PV1-8-referring doctor |
| 13  | 80  | PL  | O   |     |      | 00227 | Enterer's location        | Medicare provider number in ORC-12-ordering provider implies site  |
| 14  | 250 | XTN | O   | Y/2 |      | 00228 | Call back phone number    | Telephone number to call for clarification of a request or other information regarding the order<br>This can include extension number and/or beeper number when applicable<br>There is a typographical error in HL7 V2.3.1 Clause 4.3.1.14<br>This is <u>not</u> the same as OBR-17-order call back phone number   |
| 15  | 26  | TS  | O   |     |      | 00229 | Order effective date/time | Expected date of observation<br>Time stamps should be specified to minimum precision of minutes. Time zone shall be included in timestamps NOTE: Refer also<br>ORC-9-date/time of transaction and<br>OBR-7-observation date/time and<br>OBR-8-observation end date/time<br>Used for booking future investigations, e.g. INR in 2 weeks   |
| 16  | 250 | CE  | O   |     |      | 00230 | Order control code reason |  |
| 17  | 250 | CE  | O   |     |      | 00231 | Entering organization     |  |
| 18  | 250 | CE  | O   |     |      | 00232 | Entering device           |  |

| Seq | Len | DT  | Opt | Rp# | Tbl# | Item# | Element name                     | Usage notes                    |
|-----|-----|-----|-----|-----|------|-------|----------------------------------|--------------------------------|
| 19  | 250 | XCN | O   | Y   |      | 00233 | Action by                        |                                |
| 20  | 250 | CE  | O   |     | 0339 | 01310 | Advanced beneficiary notice code | New data element in HL7 V2.3.1 |
| 21  | 250 | XON | O   | Y   |      | 01311 | Ordering facility name           | New data element in HL7 V2.3.1 |
| 22  | 250 | XAD | O   | Y   |      | 01312 | Ordering facility address        | New data element in HL7 V2.3.1 |
| 23  | 250 | XTN | O   | Y   |      | 01313 | Ordering facility phone number   | New data element in HL7 V2.3.1 |
| 24  | 250 | XAD | O   | Y   |      | 01314 | Ordering provider address        | New data element in HL7 V2.3.1 |

### Observation request (OBR) segment

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS4700.1 or Table 7 below.

The following applies:

#### Function

The OBR segment is used to transmit information specific to an order for a diagnostic study or observation, physical examination, or assessment.

#### Data elements and usage notes

For relevant data elements and usage notes specific to Radiology messaging, see Table 7.

**TABLE 7**

### OBSERVATION REQUEST (OBR) SEGMENT

| Seq | Len | DT | Opt | Rp# | Tbl# | Item# | Element name        | Usage notes   |
|-----|-----|----|-----|-----|------|-------|---------------------|---|
| 1   | 4   | SI | C   |     |      | 00237 | Set ID OBR          | Required if more than one OBR segment is sent with the order  |
| 2   | 250 | EI | C   |     |      | 00216 | Placer order number | <p>ORC-2-placer order number is the same as OBR-2-placer order number</p> <p>If the placer order number is not present in the ORC, it shall be present in the associated OBR and vice versa</p> <p>If both fields, ORC-2-placer order number and OBR-2-placer order number are valued, they shall contain the same value</p> <p>When results are transmitted in an ORU message, an ORC is not required, and the identifying placer order number shall be present in the OBR segments</p> <p><b>ALERT: Variance to HL7</b></p> |

| Seq | Len | DT  | Opt | Rp# | Tbl# | Item# | Element name              | Usage notes   |
|-----|-----|-----|-----|-----|------|-------|---------------------------|---|
| 3   | 250 | EI  | C   |     |      | 00217 | Filler order number       | To be inserted by the filler of the order<br>Refer to ORC-3-filler order number<br>A local coding system should be introduced using the name of the knowledge base and supplier.<br><b>ALERT: Variance to HL7</b>   |
| 4   | 250 | CE  | R   |     |      | 00238 | Universal service ID      | Code used for requested service<br><identifier> = test or test group code<br><text> = description of test or test group code<br><name of coding system> = the filler's NATA No. and optional extension to distinguish between different versions of test code tables for that department<br>NOTE: Uncoded requests may be transmitted where a controlled identifier is not available. In that case, <identifier> = <null> |
| 5   | 2   | ID  | B   |     |      | 00239 | Priority                  | Superseded<br>Refer to OBR-27-quantity/ timing, component 6   |
| 6   | 26  | TS  | B   |     |      | 00240 | Requested date/time       | Superseded<br>Refer to OBR-27-quantity/ timing, component 4   |
| 7   | 26  | TS  | C   |     |      | 00241 | Observation date/time     | Specimen collection date/time.<br>Time stamps should be specified to minimum precision of minutes.<br>Time zone shall be included in timestamps<br>This data element is required if it is transmitted as part of a request and a sample or specimen has been sent along as part of the request  |
| 8   | 26  | TS  | O   |     |      | 00242 | Observation end date/time | Time stamps should be specified to minimum precision of minutes.<br>Time zone shall be included in timestamps   |
| 9   | 20  | CQ  | O   |     |      | 00243 | Collection volume         |   |
| 10  | 250 | XCN | O   | Y   |      | 00244 | Collector identifier      |   |
| 11  | 1   | ID  | O   |     | 0065 | 00245 | Specimen action code      |   |
| 12  | 250 | CE  | O   |     |      | 00246 | Danger code               |   |
| 13  | 300 | ST  | O   |     |      | 00247 | Relevant clinical info    | Preferred location of clinical notes<br>Certain clinical histories determine the result interpretation and billing directly. It is desirable to have standard codes for the benefit of automatic result and billing systems   |

| Seq | Len | DT  | Opt | Rp# | Tbl# | Item# | Element name                 | Usage notes  |
|-----|-----|-----|-----|-----|------|-------|------------------------------|--|
| 14  | 26  | TS  | C   |     |      | 00248 | Specimen received date/time  | Date/time specimen received at Radiology department.<br>Time stamps should be specified to minimum precision of minutes.<br>Time zone shall be included in timestamps  |
| 15  | 300 | CM  |     |     | 0070 | 00249 | Specimen source              |  |
| 16  | 250 | XCN | O   | Y   |      | 00226 | Ordering provider            | ORC-12-ordering provider is the same as OBR-16-ordering provider<br>If the ordering provider is not present in the ORC, it shall be present in the associated OBR and vice versa<br>If both fields, ORC-12-ordering provider and OBR-16-ordering provider are valued, they shall contain the same value<br>When results are transmitted in an ORU message, an ORC is not required, and the identifying ordering provider shall be present in the OBR segments<br>Refer also PV1-8-referring doctor |
| 17  | 250 | XTN | O   | Y/2 |      | 00250 | Order call-back phone number | Telephone number to advise results or other information regarding the report<br>Not the same as ORC-14 call back phone number  |
| 18  | 60  | ST  | O   | Y   |      | 00251 | Placer field 1               | Data element may repeat<br><b>Alert: Variance to HL7</b>   |
| 19  | 60  | ST  | O   | Y   |      | 00252 | Placer field 2               | Data element may repeat<br><b>Alert: Variance to HL7</b>   |
| 20  | 60  | ST  | O   | Y   |      | 00253 | Filler field 1               | Radiology provider reference to ordering provider<br>Data element may repeat<br><b>Alert: Variance to HL7</b><br>A flag in OBR.20 will indicate if the receiver is a copy doctor (CP=Y).   |
| 21  | 60  | ST  | O   | Y   |      | 00254 | Filler field 2               | To be inserted by the filler of the order<br>Can be used for contact details for OBR-32 to OBR-35<br>Data element may repeat<br><b>Alert: Variance to HL7</b>  |

| Seq | Len | DT  | Opt | Rp# | Tbl# | Item# | Element name                            | Usage notes  |
|-----|-----|-----|-----|-----|------|-------|---|--|
| 22  | 26  | TS  | C   |     |      | 00255 | Results rpt/status chng -date/time      | To be inserted by the filler of the order<br>Time stamps should be specified to minimum precision of minutes.<br>Time zone shall be included in timestamps                           |
| 23  | 40  | CM  | O   |     |      | 00256 | Charge to practice                      | To be inserted by the filler of the order  |
| 24  | 10  | ID  | O   |     | 0074 | 00257 | Diagnostic serv sect ID                 |  |
| 25  | 1   | ID  | C   |     | 0123 | 00258 | Result status                           | To be inserted by the filler of the order  |
| 26  | 400 | CM  | O   |     |      | 00259 | Parent result                           | To be inserted by the filler of the order  |
| 27  | 200 | TQ  | O   | Y   |      | 00221 | Quantity/timing                         | Subfield 4 is order date and time.<br>Time stamps should be specified to minimum precision of minutes.<br>Time zone shall be included in timestamps.<br>Subfield 6 is order priority |
| 28  | 250 | XCN | O   | Y/5 |      | 00260 | Result copies to                        | Repeating field in which all copy doctors details are included.<br>See PVI-8-Referring Doctor in Table 3 for encoding details.   |
| 29  | 200 | CM  | O   |     |      | 00261 | Parent                                  |  |
| 30  | 20  | ID  | O   |     | 0124 | 00262 | Transportation mode                     |  |
| 31  | 300 | CE  | O   | Y   |      | 00263 | Reason for study                        |  |
| 32  | 200 | CM  | O   |     |      | 00264 | Principal result interpreter            | To be inserted by the filler of the order  |
| 33  | 200 | CM  | O   | Y   |      | 00265 | Assistant result interpreter            | To be inserted by the filler of the order  |
| 34  | 200 | CM  | O   | Y   |      | 00266 | Technician                              | To be inserted by the filler of the order  |
| 35  | 200 | CM  | O   | Y   |      | 00267 | Transcriptionist                        | To be inserted by the filler of the order  |
| 36  | 26  | TS  | O   |     |      | 00268 | Scheduled date/time                     | To be inserted by the filler of the order<br>Time stamps should be specified to minimum precision of minutes.<br>Time zone shall be included in timestamps                           |
| 37  | 4   | NM  | O   |     |      | 01028 | Number of sample containers             |  |
| 38  | 250 | CE  | O   | Y   |      | 01029 | Transport logistics of collected sample |  |
| 39  | 250 | CE  | O   | Y   |      | 01030 | Collector's comment                     |  |

| Seq | Len | DT | Opt | Rp# | Tbl# | Item# | Element name                         | Usage notes                    |
|-----|-----|----|-----|-----|------|-------|--------------------------------------|--------------------------------|
| 40  | 250 | CE | O   |     |      | 01031 | Transport arrangement responsibility |                                |
| 41  | 30  | ID | O   |     | 0224 | 01032 | Transport arranged                   |                                |
| 42  | 1   | ID | O   |     | 0225 | 01033 | Escort required                      |                                |
| 43  | 250 | CE | O   | Y   |      | 01034 | Planned patient transport comment    |                                |
| 44  | 250 | CE | O   |     | 0088 | 00393 | Procedure code                       | New data element in HL7 V2.3.1 |
| 45  | 250 | CE | O   | Y   | 0340 | 01316 | Procedure code modifier              | New data element in HL7 V2.3.1 |

### Observation result (OBX) segment

The HL7 V2.3.1 data element definitions, formats and usage shall be followed, unless otherwise indicated in AS 4700.1 or Table 8 below.

The following applies:

#### *Function*

The OBX segment is used to transmit a single observation or observation fragment. Within the context of a result or report, it represents the smallest indivisible unit of a report. Within the context of an Order, the OBX segment may be used to transmit codified information, which may be relevant to the filler.

**NB:** In some applications, such information is relegated to a localised “Z” segment. Due to the highly implementation specific nature of “Z” segments, it is strongly recommended that they be avoided wherever possible. There is rarely a case where such information cannot be transmitted using a properly constructed OBX segment.

#### *Data elements and usage notes*

For relevant data elements and usage notes specific to Radiology messaging, see Table 7.

**TABLE 8**  
**OBSERVATION RESULT (OBX) SEGMENT**

| Seq | Len | DT | Opt | Rp# | Tbl# | Item# | Element name                             | Usage notes  |
|-----|-----|----|-----|-----|------|-------|--|--|
| 1   | 4   | SI | O   |     |      | 00569 | Set ID - OBX                             |  |
| 2   | 3   | ID | C   |     | 0125 | 00570 | Value type                               | <p>For atomic numeric results, use 'NM' or 'SN'</p> <p>For atomic text results, use 'ST' . 'TX' is not recommended.</p> <p>For full text reports, use 'FT' or 'ED' .</p> <p>The last OBX segment may contain the report in full text, with the value types of 'ED' for TIFF, FAX, JPEG, MSWORD, etc. or 'FT' for HTML, PIT, RTF, and other ASCII formats</p> <p>While ED can be used for HTML and RTF it is also acceptable to use the FT data type.</p> <p>The text should start with the 'no-wrap' command ('\nf\'), HL7 delimiter escape sequences apply and the 'begin new output line' command ('\br\') replaces carriage return and/or line feed</p> |
| 3   | 250 | CE | R   |     |      | 00571 | Observation identifier                   | <p>The LOINC identifier shall be sent in the first triplet of the CE data type The department's result code is sent in the second triplet.</p> <p>Example:  2160-0^CREATINE^LN^Cr^CREATINE^NATA1234-007 ..</p> <p>LOINC coding can be sent without the department's codes e.g.</p> <p> 2160-0^CREATINE^LN </p>   |
|     |     |    |     |     |      |       | Observation identifier ( <i>cont'd</i> ) | <p>The department can identify the version of its local code table in the third subcomponent, using:</p> <p>&lt;name of alternate coding system&gt; = NAT Ax{ xxx}[-n{ nnn}]</p> <p>where x{ xxx} is the NATA number for the department and n{ nnn} is the version number of the item.</p> <p>Both xxxx and nnnn are variable length and need only contain significant digits.</p>   |
| 4   | 20  | ST | C   |     |      | 00572 | Observation sub-ID                       |  |

| Seq | Len       | DT      | Opt | Rp# | Tbl# | Item# | Element name                 | Usage notes   |
|-----|-----------|---------|-----|-----|------|-------|------------------------------|---|
| 5   | 655<br>36 | *       | C   | Y   |      | 00573 | Observation value            | The length of the observation value field is variable, depending upon value type<br><br>The data element may repeat for multipart, single answer results with appropriate data types, e.g. CE, TX and FT data types                             |
| 6   | 250       | CE      | O   |     |      | 00574 | Units                        |   |
| 7   | 60        | ST      | O   |     |      | 00575 | Reference range              | Any numeric result should have an appropriate reference range   |
| 8   | 5         | ID      | O   | Y/5 | 0078 | 00576 | Abnormal flags               |   |
| 9   | 5         | NM      | O   |     |      | 00577 | Probability                  |   |
| 10  | 2         | ID      | O   | Y   | 0080 | 00578 | Nature of abnormal test      |   |
| 11  | 1         | ID      | R   |     | 0085 | 00579 | Observation result status    |   |
| 12  | 26        | TS      | O   |     |      | 00580 | Date last obs normal values  |   |
| 13  | 20        | ST      | O   |     |      | 00581 | User defined access checks   | Use of this field is discouraged.   |
| 14  | 26        | TS      | O   |     |      | 00582 | Date/Time of the observation | Date/time test performed in the Radiology department  |
| 15  | 250       | CE      | O   |     |      | 00583 | Producer's ID                | A local coding system should be introduced using the name of the knowledge base and supplier.<br><br>If Producer's ID is null, then observation sender = producer<br><identifier> = NATA department No.<br><br><name of coding system> = 'NATA' |
| 16  | 250       | XC<br>N | O   |     |      | 00584 | Responsible observer         |   |
| 17  | 250       | CE      | O   | Y   |      | 00936 | Observation method           | LOINC encoding implies observational method<br><br>Refer OBX-3-observation identifier   |

### *Images as an Observation (OBX)*

Results and Observations, although able to include images, are not intended to fulfil the requirement for transmitting fully detailed diagnostic images. Such images and transactions are recommended by IHE to be performed using the DICOM Query/Retrieve SOP Classes and the DICOM Image Storage Classes. Refer to IHE Technical Framework, vol II, section 4.16.

In general, images can be encapsulated within an HL7 message as Base64 MIM encoded binary data. The method for achieving this is via an HL7 Encapsulated Data (ED) Type. Since the OBX-5 element is of variable type, it may be set to ED via OBX-3.

**Example 1:** A laboratory may wish to send a low-resolution sample of an image resulting from a test, to the ordering General Practitioner, for information purposes (not diagnostic purposes). In this example, the laboratory has conducted a CT Brain scan, and uses LOINC codes as identifiers. The image being transmitted is a low-res JPEG file.

|                        |   |
|------------------------|---|
| OBX-2 (Value type)     | ED  |
| OBX-3 (Obs'n ID)       | 24590-2^CT Brain^LN   |
| OBX-5.2 (Type of Data) | IM  |
| OBX-5.3 (Subtype)      | JPEG  |
| OBX-5.4 (Encoding)     | Base64  |
| OBX-5.5 (Data)         | <base64 encoding character stream – refer table for valid characters> |

**Example 2:** An ordering GP may wish to send a copy of a faxed specialist report that was subsequently scanned by the GP for the information of the laboratory. In this example, the GP system has not codified the report category.

|                        |  |
|------------------------|--|
| OBX-2 (Value type)     | ED   |
| OBX-3 (Obs'n ID)       | ^Specialist Report^  |
| OBX-5.2 (Type of Data) | IM   |
| OBX-5.3 (Subtype)      | TIFF   |
| OBX-5.4 (Encoding)     | Base64   |
| OBX-5.5 (Data)         | <base64 encoding character stream (text) – refer table for valid characters> |

Many other “types” and “sub-types” of data may be transmitted using the ED data type. Refer to HL7 v2.3.1 section 2.9.16 for further information.

#### *Localised and Specific Information as an Observation (OBX)*

NB: In some applications, localised and/or specific information not specifically supported by an explicitly defined HL7 element, is relegated to a localised “Z” segment. Due to the highly implementation specific nature of “Z” segments, it is strongly recommended that they be avoided wherever possible. There is rarely a case where such information cannot be transmitted using a properly constructed relevant OBX segment.

The advantage that an OBX segment has over a locally defined Z segment, is that a receiving system does not need to implement any additional processing logic, beyond any appropriate local code tables, to process an OBX. If the receiving system does not recognise a locally specifically coded OBX, it should still record the information, rather than a Z segment which may be ignored by a receiving system.

When transmitting such information via an OBX, the critical consideration should be the data type and the codification of the information being transmitted. In this way, the combination of OBX-2 and OBX-3 can be used by the receiver to interpret the type and format of the information being transmitted.

**Example 1:** An ordering GP may wish to send a locally agreed codification of additional study types to be performed.

|                    |                         |
|--------------------|-------------------------|
| OBX-2 (Value type) | IS                      |
| OBX-3 (Obs'n ID)   | ^Study Types Requested^ |

OBX-5.1 (Code) <code from locally agreed code table>

OBX-5.2 (Description) <descriptor of code in table being referenced>

**Example 2:** A laboratory may wish to send information relating to the gestation and weight of a patient relative to the time of the investigation being performed. Such information would need to be transmitted via two separate OBX observation segments.

**1<sup>st</sup> OBX**

OBX-2 (Value type) NM  
 OBX-3 (Obs'n ID) 8350-1^Weight^LN  
 OBX-5 (numeric) 90  
 OBX-6 (units) Kg^Kilo grams^ISO+  
 OBX-14 (date/time of obs'n) 20040101+1000

**2<sup>st</sup> OBX**

OBX-2 (Value type) NM  
 OBX-3 (Obs'n ID) GEST^E stimated Gestation^LOCAL0002  
 OBX-5 (numeric) 23  
 OBX-6 (units) Wk^Weeks^ISO+  
 OBX-14 (date/time of obs'n) 20040101+1000

*Base 64 Encoding in an ED data type***Reference: Chapter 2.8.16.4 HL7 2.3.1**

Base64 is defined as follows (adapted from MIME Internet standard RFC 1521, which has precedence over this description). Proceeding from left to right across a 24-bit input group (three octets), each 6-bit group is used as an index into an array of 64 printable characters. The character referenced by the index is placed in the encoded string. These characters are shown in *MIME base64 encoding characters*, and are selected so as to be universally representative.

Special processing is performed if fewer than 24 bits are available in an input group at the end of data. A full encoding quantum is always completed at the end of data. When fewer than 24 input bits are available in an input group, zero bits are added (on the right) to form an integral number of 6-bit groups. Output character positions which are not required to represent actual input data are set to the character “=”. Since all canonically encoded output is an integral number of octets, only the following cases can arise:

- (1) the final quantum of input is an integral multiple of 24 bits; here, the final unit of encoded output will be an integral multiple of 4 characters with no “=” padding,
- (2) the final quantum of input is exactly 8 bits; here, the final unit of encoded output will be two characters followed by two “=” padding characters, or
- (3) the final quantum of input is exactly 16 bits; here, the final unit of encoded output will be three characters followed by one “=” padding character.

| Value | Code |
|-------|------|
| 0     | A    |
| 1     | B    |
| 2     | C    |
| 3     | D    |
| 4     | E    |
| 5     | F    |
| 6     | G    |
| 7     | H    |
| 8     | I    |
| 9     | J    |
| 10    | K    |
| 11    | L    |
| 12    | M    |
| 13    | N    |
| 14    | O    |
| 15    | P    |
| 16    | Q    |
| 17    | R    |
| 18    | S    |
| 19    | T    |
| 20    | U    |
| 21    | V    |
| 22    | W    |
| 23    | X    |
| 24    | Y    |
| 25    | Z    |
| 26    | a    |
| 27    | b    |
| 28    | c    |

| Value | Code |
|-------|------|
| 29    | d    |
| 30    | e    |
| 31    | f    |
| 32    | g    |
| 33    | h    |
| 34    | i    |
| 35    | j    |
| 36    | k    |
| 37    | l    |
| 38    | m    |
| 39    | n    |
| 40    | o    |
| 41    | p    |
| 42    | q    |
| 43    | r    |
| 44    | s    |
| 45    | t    |
| 46    | u    |
| 47    | v    |
| 48    | w    |
| 49    | x    |
| 50    | y    |
| 51    | z    |
| 52    | 0    |
| 53    | 1    |
| 54    | 2    |
| 55    | 3    |
| 56    | 4    |
| 57    | 5    |

| Value | Code |
|-------|------|
| 58    | 6    |
| 59    | 7    |
| 60    | 8    |
| 61    | 9    |
| 62    | +    |
| 63    | /    |
| (pad) | =    |

*Table 1 - MIME base64 encoding characters*

The interpretation of the encoded octets by any of the encoding methods, beyond what is either implicit or specified in the represented data type (such as their ordering within 16-bit or 32-bit binary words on the destination application), is determined by the destination application and is beyond the scope of the Standard.

***Special Note:*** When implementing Base64 encoding within an HL7 data type such as a String (ST), certain reserved characters need to be “escaped”. Of particular note is the instances of CRLF (carriage return/linefeed ) character pairs which may be inserted in the Base64 encoded file due to the limitation of 76 character length for Base64 encoded lines. ***Each instance of a CRLF pair should be replaced with |X0D||X0A| to represent the hex codes of those non-printing characters.***