



Hospital Information & Interface Specification Document for Healthlink Online (Suppliers)

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1.1 Version History

Document History	
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Introduction

2.1 Document Purpose

This document gives overall information about enabling the Healthlink services for Hospitals and Health Care facilities. It explains in detail how the hospital system should produce the physical message files and the requirement for pickup and deposit of these files.

To know more about Healthlink Online Message Specification then, please refer to Healthlink Online Message Specification.pdf for further details.

This document IS NOT an attempt to inform the reader about HL7. Please refer to the HL7 specification for further detail on the full HL7 specification.

2.2 Overview

Healthlink is a National Messaging System, allowing any Hospital, or secondary healthcare facility, to send messages to GP's via a central database managed by Healthlink. Healthlink provides a web interface for GP's to view and download messages that are addressed to them.

Healthlink Online exclusively supports HL7 Version 2.4

The Abstract Message Definitions for the HL7 Message Types that Healthlink uses are included in Appendix 1 on Healthlink Online Message Specification.pdf. Due to their complexity the schema's are not suitable for inclusion in this document. They are available at this web address: visit <http://www.hl7.org/Special/committees/xml/drafts/v24-200303.zip> link. We recommend XML Spy Professional for viewing the schema's in a readable format.

There are certain fields in the various HL7 segments that have special meaning within the Healthlink Implementation. This means that raw data available from a Hospital Information System, in many cases, may need to be mapped to a standard code before including this data in a HL7 message destined for Healthlink. Failure to map to these standard codes will, at best, reduce the meaning of the message to the Healthlink end users, where at worst it will cause the message to fail parsing into the database and the message will not be delivered.

2.3 Message Types

There are two distinct meanings for the term *message type* in this document. HL7 Defines a message type, such as ORU R01 which is an *Unsolicited Transmission of Observation Message*. We will refer to such a message type as a HL7 Message Type.

Healthlink also defines its own message types. For example, the ORU R01 HL7 message type is used for two *Healthlink* message types: the Laboratory Result Message and the Radiology Result Message.

2.4 Message Encoding

In version 2.4 there are two options for message encoding: the standard encoding or XML encoding.

The National Healthlink Project conforms to the Irish National Messaging standards for message exchange between Primary and Secondary care providers (HeBE Messaging Standards). This standard is based on HL7 v2.4 in XML encoding. Healthlink can accept HL7 2.4 messages in standard encoding by running them through its conversion utility. This utility is only suitable for messages that conform to this documents expected fields and segments per message type and will not strip out unexpected HL7 segments or fields.

The messages supplied must at least conform to the corresponding Abstract Message Structure definition for standard encoding, or the corresponding XML Schema for XML encoding.

Implementation Recommendation: Please produce messages using the XML encoding method wherever possible.

3 The Healthlink Messages

3.1 Healthlink Message Types

Hlink Message Type	HL7 Abstract Message Type	Healthlink Link Message Type ID
Laboratory Order	OML O21	1
Inpatient Admission	ADT A01	2
Outpatient Clinic Letter	REF I12	3
A&E Notification	ADT A01	4
Discharge Summary	REF I12	5
Death Notification	ADT A03	6
Radiology Result	ORU R01	7
OPD Appointment	SIU S12	8
Waiting List	SIU S12	9
Laboratory Result	ORU R01	10
Laboratory NACK	ORL_O22	11
Discharge Notification	ADT A03	12
Acknowledgement	ACK	13
Neurology Referral	REF_I12	14
Neurology Referral Response	RRI_I12	15
Co-op Discharge	REF_I12	16
Cardiology Result	ORU R01	17
Oesophageal and Gastric Cancer Referral	REF_I12	18
A&E Letter	REF I12	19
Prostate Cancer Referral	REF_I12	20
Prostate Cancer Referral Response	RRI_I12	21
Breast Cancer Referral	REF_I12	22
Breast Cancer Referral Response	RRI_I12	23
Lung Cancer Referral	REF_I12	24
Lung Cancer Referral Response	RRI_I12	25
Chest Pain Referral	REF I12	26
Chest Pain Referral Response	RRI I12	27
MRI Request	REF I12	28
MRI Request Response	RRI I12	29
General Referral	REF I12	30
General Referral Response	RRI I12	31

3.2 How Healthlink Handles Exceptions

Messages may deviate somewhat from the specification laid out in this document, while still being fully compatible with the system.

3.2.1 Additional Elements & Fields

Healthlink Online Version 3 will allow hospitals to provide any valid HL7 v 2.4 messages. Healthlink recommend that for integration purposes that you should allow for any valid HL7 message to integrate into your system. If a message contains additional elements and fields that you do not require, they should not cause an integration error.

3.2.2 Additional Repeating Segments

In general the only repeating segments that are expected in Healthlink are the repeating OBR and OBX segments in the Laboratory Results message. Healthlink Online Version 3 will however allow for any valid repeating segments.

3.3 General Guidelines

3.3.1 Hospitals Filling CE Data Type Components

Hospitals are given the following guidelines when filling the CE data types.

The CE Data Type has CE components labelled CE.1 through to CE.6 in the XML Encoding.

With Healthlink, Hospitals should use the CE element for the following:

- holding data that is based on defined tables (Healthlink Online Message Specification.pdf)
- holding data based on defined and recognised coding systems
- holding data that is not bound to any tables or coding systems, i.e. free text

- holding data that is based on local hospital tables or coding systems

When filling data that is based on defined tables from Healthlink Online Message Specification.pdf:

CE.1 must contain the reference to a *value* in the used table

CE.2 must contain meaningful descriptive text

CE.3 must contain a reference, for example:

HL7#### (# is a digit [0-9]) for HL7 Defined tables

L to indicate Local code

LN to indicate LOINC code

When filling data that is based on the local hospital tables or coding systems

CE.1 - Enter the code here

CE.2 - Must contain a meaningful description

CE.3 - Must contain the name of the coding system used in CE.1

Note: CE.1 and CE.3 should uniquely identify value in CE.2

3.4 Special Characters and Escape Sequences

Escape sequences are most used when messages are encoded in the standard way, although they are still required for certain situations in the XML encoding.

3.4.1 Special Characters

Healthlink will not accept deviations from the suggested special characters:

Delimiter	Suggested Value	Encoding Character Position	Usage
Segment Terminator	<cr> (hex 0D)	-	Terminates a segment record. This value cannot be changed by implementors.
Field Separator		-	Separates two adjacent data fields within a segment. It also separates the segment ID from the first data field in each segment.
Component Separator	^	1	Separates adjacent components of data fields where allowed.
Subcomponent Separator	&	4	Separates adjacent subcomponents of data fields where allowed. If there are no subcomponents, this character may be omitted.
Repetition Separator	~	2	Separates multiple occurrences of a field where allowed.
Escape Character	\	3	Escape character for use with any field represented by an ST, TX or FT data type, or for use with the data (fourth) component of the ED data type. If no escape characters are used in a message, this character may be omitted. However, it must be present if subcomponents are used in the message.

The above characters should be replaced by the following:

\E\ Escape character converted to escape character (e.g., '\')

\F\ Field separator converted to field separator character (e.g., '|')

\R\ Repetition separator converted to repetition separator character (e.g., '~')

\S\ Component separator converted to component separator character (e.g., '^')

\T\ Subcomponent separator converted to subcomponent separator character (e.g., '&')

3.4.2 Formatted Text

Healthlink Online Version 3 allows for the following valid HL7 v 2.4 formatting commands in XML encoding only.

Escape character to be used in v2 XML encoding	Meaning
<code><escape V="".br"/></code>	Begin new output line. Set the horizontal position to the current left margin and increment the vertical position by 1.
<code><escape V="".inn"/></code> where <i>n</i> = number	Indent <code><number></code> of spaces, where <code><number></code> is a positive integer. This command cannot appear after the first printable character of a line.

The following five characters should not be used in XML documents:

`<`, `>`, `&`, `'`, `"`

They should be replaced with:

`<` for `<`

`>` for `>`

`&` for `&`

`'` for `'`

`"` for `"`

3.5 Common Segments to all Messages

Note: Please refer to [Healthlink Online Message Specification.pdf](#) for all Healthlink Message Segments.

4 Interfacing with Healthlink Online

The following details Healthlink Online's requirements for how the hospital system produces the physical files containing the messages and the requirements for access to these locations.

4.1 Outbound Pickup Directories

An outbound HL7 Pickup Directory is a location where outbound messages (from the perspective of the hospital) are saved ready for pickup by the bridge.

The files (messages) must be named as follows:

`SendingHospitalHIPECode_MessageControlID.ext` (ext= XML/HL7)

Note that:

- Sending Hospital HIPE Code corresponds to the value found in MSH.4 Sending Application (HD.2)
- Message Control ID corresponds to the value found in MSH.10 Message Control ID.
- The value pair of HIPE Code and Message Control ID must be unique.

For each Healthlink Message type being produced by a Hospital, there will be a corresponding Outbound HL7 Pickup directory on the Hospital LAN where messages of that type will be saved. It is a crucial requirement that the routine(s) that produce HL7 messages save each message type to a pickup directory accessible to the bridge via FTP.

Each HL7 Pickup directory should be a child directory of the root FTP directory. The Pickup directories themselves should be named with a one or two character name that represents the [Healthlink Message Type ID](#) as listed in the Message Type Table. Each root FTP must contain at least one directory for a Healthlink Message type, but there is no restriction on the range of Healthlink Message pickup directories that a single root FTP directory may contain. In the case of the Mater Hospital for example all the supported Healthlink Message types are found in the one root FTP directory and thereby the bridge only has to connect to a single FTP location to retrieve messages.

The hospital is responsible for set-up of any FTP server(s) to allow access to retrieve files from the directories within each FTP location. See the example Hospital Set-up described in the next section.

4.1.1 Example Hospital Set-up

Below is a table outlining a sample set of how the path names containing the HL7 messages required for pickup should be. The key here is that the path name is the **same**. It does not have to be E:\Healthlink\ftppickuproot.

Pickup Directory containing this Healthlink Message:	Location and Name:
Inpatient Admission	E:\Healthlink\FTPPickupRoot\2
AE Notification	E:\Healthlink\FTPPickupRoot\4
Discharge Summary Notification	E:\Healthlink\FTPPickupRoot\5
Death Notification	E:\Healthlink\FTPPickupRoot\6
Radiology Result	E:\Healthlink\FTPPickupRoot\7
OPD Appointment	E:\Healthlink\FTPPickupRoot\8
Waiting List	E:\Healthlink\FTPPickupRoot\9
Lab Result	E:\Healthlink\FTPPickupRoot\10
Discharge Notification	E:\Healthlink\FTPPickupRoot\12
COOP – Out of Hours	E:\Healthlink\FTPPickupRoot\16
Cardiology Result	E:\Healthlink\FTPPickupRoot\17
Audit Files	E:\Healthlink\FTPPickupRoot\audit
Error Files	E:\Healthlink\FTPPickupRoot\error
Acknowledgement Messages	E:\Healthlink\FTPPickupRoot\Ack\<message type id>

Healthlink configures the Bridge Software so the routine accesses each FTP Root Pickup directory in turn, processing each Healthlink Message type directory in turn for any new messages. The Bridge Software has configurable settings that indicate FTP connection details for each root FTP Folder it needs to process, and the Healthlink Message types' pickup directories that are contain within each of these folders.

Note:

- There is an audit and error folder required also, the error logs should be placed in the \error path and the audit files in the \audit path.
- The \Ack folder is available for both inbound and outbound message types

4.1.2 National Projects with centralised message feeds

For National Projects, where the feed for more then one hospital is coming from a central location, the directory structure must include the hospital HIPE code below the root directory. For Example

For Mater hospital (HIPE Code: 908)
 (Radiology Message Folder)
[\\root\908\7](#)
[\\root\908\audit](#)
[\\root\908\error](#)
[\\root\908\ACK](#)
[\\root\908\NACK](#)

For Beaumont hospital (HIPE Code: 923)
 (Radiology Message Folder)
[\\root\923\7](#)
[\\root\923\audit](#)
[\\root\923\error](#)
[\\root\923\ACK](#)
[\\root\923\NACK](#)

4.2 Flexibility

Due to the variety of information systems involved in this project, flexibility of the Healthlink Online system has been of utmost importance. The system is flexible in the following respects:

- It will accept HL7 messages encoded in either standard encoding or XML encoding as described in section 2 of this document (Healthlink uses HL7 Version 2.4). Further more it will accept a mixture of HL7 standard encoded messages and XML encoded messages.
- It allows for messages that may be produced by different information systems within a single hospital. There is no restriction on the location that each Healthlink Message type is saved out to other than it being accessible from the bridge machine by FTP. This also means the solution is open to the many operating system that can provide FTP service.

4.3 Dealing with Messages to and From Agency Hospitals

Healthlink deals primarily with the exchange of messages between hospitals and GP's. In certain instances it is necessary to exchange information with specialist agencies or hospital departments. The common segments outlined in this document pertain to the exchange of information between hospitals and GP's. The MSH.4 and MSH.6 fields will be as follow's for Agency messages:

Outbound: (e.g. Lab Result Messages from a Hospital to an Agency)

4	Sending Facility MSH/MSH.4/HD.1	RNC	50		N	The name of the sending hospital	For Lab Order this will be HealthlinkOnline as this is where the message is being generated.
4	Sending Facility MSH/MSH.4/HD.2	RC	50		Y*	The DOH Code as assigned by the Dept of Health. For Inbound messages (Lab Orders and Referrals) this is GP Code or Medical Council Number	This is a Key Field in that this field must map to a Primary Key in our Hospital Table. *The displayed hospital name is derived by a mapping of the DOH code to the associated name in the Healthlink Central Database.
4	Sending Facility MSH/MSH.4/HD.3	RNC	50		N	The string 'DOH' to indicate the coding system used to identify the sending facility.	
6	Receiving Facility MSH/MSH.6/HD.1	RNC	50		N	The Agency Name	The name in the format Surname, First name
6	Receiving Facility MSH/MSH.6/HD.2	RC	50		N	The Hospital's Agency Code that identifies the Agency on the Hospital Information System. Note This must be a unique code on the HIS. The receiving facility regardless of whether it's a GP or an Agency must be unique for each hospital	Agency messages will not affect the Practice Management System Vendors integration modules, as the GP is not the recipient.
6	Receiving Facility MSH/MSH.6/HD.3	RNC	50		N	The coding system used in HD2	Should be L to represent Local coding

Inbound Messages (e.g. Lab Orders from the Agency to the Hospital Laboratory):

4	Sending Facility MSH/MSH.4/HD.1	RNC	50		N	This field will contain the Agency or department name along with the name of the person in that Agency who placed the order (Surname, Firstname). It is in the following format: AgencyName.Username e.g St Mary's. Symth, Mary	
4	Sending Facility MSH/MSH.4/HD.2	RC	50		Y*	The DOH code of the sending agency and the Healthlink UserID in the format DOHCode.UserID e.g 100.2134 where 100 is the DOH code for St Mary's and 2134 is the Healthlink User ID for Mary Smyth.	This is a Key Field in that this field must map to a Primary Key in our Hospital Table. *The displayed hospital name is derived by a mapping of the DOH code to the associated name in the Healthlink Central Database.
4	Sending Facility MSH/MSH.4/HD.3	RNC	50		N	The string 'DOH' to indicate the coding system used to identify the sending facility.	
5	Receiving Application MSH/MSH.5/HD.1					This identifies the receiving application within the receiving hospital. E.g Lab information system or radiology information system within the Regional hospital LIS.Healthlink.1	
5	Receiving Application MSH/MSH.5/HD.2					The receiving application pickup folder number.	Usually the same as the Healthlink message number
5	Receiving Application MSH/MSH.5/HD.3					L	
6	Receiving Facility MSH/MSH.6/HD.1	RNC	50		N	The Hospital's Name	
6	Receiving Facility MSH/MSH.6/HD.2	RC	50		N	The receiving hospital code (from the DOH Code list	
6	Receiving Facility MSH/MSH.6/HD.3	RNC	50		N	The coding system used in HD2	Should be L to represent Local coding

5 Healthlink Hospital Requirements

5.1 Acknowledgement

Healthlink Online V3 allows Hospitals to send and receive Acknowledgement messages i.e., when the Hospital sends a message to Healthlink, an acknowledgement message will be sent back to Hospital with appropriate acknowledgement code. Similarly when Healthlink sends a message to Hospital an acknowledgment message is expected back from the Hospital with appropriate acknowledgement code.

Healthlink Message Type ID: 13

Note: Please refer to ACK_Message_Hospital_Specification_V0_3 or higher for Acknowledge Messages Implementation.

5.2 Auditing

Each hospital can have two levels of auditing:

- System Audit - The System Audit will include all the messages the source system produces for the Healthlink process.
- Conversion Audit – The Conversion Audit will record details of all files sent from the source system that were successfully converted into HL7 files.

Both audit files can be sent but **one** will suffice. The preferred audit file is the Conversion Audit if possible as this contains more information for the Healthlink System.

The **minimum** requirement for Healthlink is one audit file sent **daily**.

An audit file can be generated a number of times per day, depending on how the source system produces messages. If the source system produces messages in batch, an audit file can be sent after the batch is sent.

If the source system produces real time messages, an audit file can be sent every few hours.

The System Audit XML filename convention is:

-HospitalID_log_messageid_hospitalssystem_yyyymmddhhmmss.xml

where Hospital ID is the ID used in MSH.4/HD.2, log is static, messageid is ID for Healthlink Message Type, eg. 10 for lab result, hospitalssystem is static and yyyymmddhhmmss containing date/time for when the file was created.

Sample XML System Audit:

```
<?xml version="1.0" encoding="UTF-8" ?>
- <!-- Healthlink Development Unit, Hospital System Audit File -->
- <!--TodayDate , CreationDate and DateTimeOfMessage= dd/MM/yyyy hh:mm:ss -->
= <Hospital HipeCode="908" TodayDate="12/03/2005 08:00:01" NumMessages="2">
  = <Message UniqueID="1111" CreationDate="12/03/2005 11:00:01">
    <MessageType>10</MessageType>
    - <!--If message type is 10 - lab result, the populate subdept and specimen no. CH=Biochemistry-->
    <SubDept>CH</SubDept>
    <!--the specimen no. relates to the specimen code that will uniquely identify a set of tests done on the
    one specimen-->
    <SpecimenNo>BB343433</SpecimenNo>
    <DateTimeOfMessage>19/03/2005 10:12:02</DateTimeOfMessage>
    <!--The value in WhoReceived should be the GP Code-->
    <WhoReceived>31232</WhoReceived>
  </Message>
  = <Message UniqueID="2222" CreationDate="12/03/2005 11:00:02">
    <MessageType>10</MessageType>
    - <!-- If message type is 10 - lab result, the populate subdept and specimenno. EDO=Endocrinology-->
    <SubDept>EDO</SubDept>
    <!--the specimen no. relates to the specimen code that will uniquely identify a set
    of tests done on the one specimen-->
    <SpecimenNo>BB343433</SpecimenNo>
    <DateTimeOfMessage>19/03/2005 10:13:01</DateTimeOfMessage>
    <!--The value in WhoReceived should be the GP Code-->
    <WhoReceived>KEOM</WhoReceived>
  </Message>
</Hospital>
```

Note: This is an example of two different messages within the <Hospital> tag.

The Conversion Audit XML filename convention is:

-HospitalID_log_messageTypeID_hospitalconversion_yyyymmddhhmmss.xml

where Hospital ID is the ID used in MSH.4/HD.2, log is static, messageTypeID is ID for Healthlink Message Type, eg. 10 for lab result, hospitalconversion is static and yyyymmddhhmmss containing date/time for when the file was created.

Sample XML Conversion Audit:

```
<?xml version="1.0" encoding="UTF-8" ?>
- <!-- Healthlink Development Unit, Hospital Conversion Audit File -->
- <!-- TodayDate , CreationDate and DateTimeOfMessage= dd/MM/yyyy hh:mm:ss -->
= <Hospital HipeCode="300" TodayDate="12/03/2005 08:00:01" NumMessages="2">
  = <Message ControlID="1111" CreationDate="12/03/2005 11:00:01">
    <FileName Type="10">xpto.xml</FileName>
    - <!-- If message type is 10 - lab result, the populate subdept and specimenno. HM=Haematology -->
    <SubDept>HM</SubDept>
    <!--the specimen no. relates to the specimen code that will uniquely identify a set of tests done on the one specimen-->
    <SpecimenNo>BB343433</SpecimenNo>
    <DateTimeOfMessage>19/03/2005 10:12:02</DateTimeOfMessage>
    <!--The value in WhoReceived should be the GP Code-->
    <WhoReceived>KEOM</WhoReceived>
  </Message>
  = <Message ControlID="2222" CreationDate="12/03/2005 11:00:01">
    <FileName Type="10">xpto2.xml</FileName>
    - <!-- If message type is 10 - lab result, the populate subdept and specimenno.CH=Biochemistry -->
    <SubDept>CH</SubDept>
    <!--the specimen no. relates to the specimen code that will uniquely identify a set of tests done on the one specimen-->
    <SpecimenNo>BB343433</SpecimenNo>
    <DateTimeOfMessage>19/03/2005 12:00:03</DateTimeOfMessage>
    <!--The value in WhoReceived should be the GP Code-->
    <WhoReceived>31232</WhoReceived>
  </Message>
</Hospital>
```

It is the responsibility of the participating hospital to ensure that this auditing is undertaken and made available to the National Healthlink Project for pickup via the Healthlink Bridge Application.

It is the responsibility of the National Healthlink project to monitor the audit files supplied by the participating hospitals and to ensure that all messages generated by the source system are successfully delivered to the specified Healthlink user.

Note: Healthlink recommends Hospitals to use the Acknowledgement Messages to complete the full audit process.

5.3 Scheduling

Some hospitals use real time triggers to send their messages. It is important to know the setup of each hospital in order to provide accurate details for users and development requirements. If real time triggers are not used, the function that converts hospital messages into HL7 messages should be scheduled. This information should be forwarded to the Healthlink Development Unit.

If any changes are required to the scheduling of source systems it is the responsibility of the participating hospital to inform the National Healthlink Project of this change.

5.4 Message Clear down and regeneration

The Healthlink Bridge application is responsible for the clear down of messages from the source directory upon successful transfer to the Healthlink Bridge server.

Each hospital must have the ability to regenerate messages from the source system based on the date and time of message creation for up to three months.

5.5 Error Trapping

Any errors that are produced while converting the proprietary message to the HL7 message should produce an error log and place in the \error directory outlined in section 4.1.1.

The file name affected should be clearly identified with dates/times and the error that occurred.

5.6 Procedures for Making Changes to the source system

The procedure for making any required changes to the source system that generates Healthlink messages is as follows:

1. Participating Hospital must inform Healthlink of their intension to implement a change to the source system.
2. A detailed account of the change must be supplied to Healthlink.
3. A specification of the new message format must be supplied to Healthlink.
4. Test messages must be generated by the source system in a test environment and not in the live environment.
5. Sample test message structures must be sent to Healthlink for validation.
6. Healthlink must test these new messages in the Healthlink test environment, which encompasses a test message agent, test database, the test Healthlink Online application and testing with each of the practice management systems that integrate Healthlink messages.
7. Once full testing has been completed Healthlink will contact the participating hospital and schedule when the agreed change can be implemented to the live environment.

When any new message types are being produced from the source system, they should be tested on a test environment before being pushed out for live Healthlink message delivery. The procedures outlined above must also be followed for any new messages being added to the Healthlink messaging service.

Anyone involved in the Healthlink project from the Hospital side should be given a copy of this document and all procedures outlined in this document should be adhered to. This will facilitate the Healthlink project to continue to offer a standardised quality based service to the primary care community on a national level.