

HL7 Customization Guide

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Intended Audience

This document is intended for use by integration professionals to modify the HL7 report generated by the Hologic Bone Densitometer. It is assumed that the user has a working knowledge of HL7, Microsoft Access and the Hologic Report Writer. Please direct any questions via email to hl7interface@hologic.com.

1. Overview

1.1 Introduction

The Hologic Bone Densitometer DxReport, generated by the Physician's Report Writer, may be transferred to EMRs and HIS/RIS systems via HL7. HL7 (the de facto standard for moving patient data between applications) is a framework for communications and not a specification for creating messages. Each application has its own specification for the message(s) it generates and/or the message(s) it accepts.

The purpose of this document is to provide guidance in comparing specifications and making modifications, if required, to the outbound HL7 report message generated by Report Writer.

The Hologic QDR Bone Densitometers do not accept inbound HL7 messages.

1.2 HL7 Overview

HL7 stands for Health Level Seven. It is accredited by the American National Standards Institute to produce standards for messaging clinical and administrative data in the healthcare arena.

HL7 is not a specification for the contents of a message but rather a framework for messaging. It defines the overall form of the message and is flexible enough to support different implementations of the same message. HL7 has four basic messaging types:

- Patient Administration
- Order Entry
- Financial Management
- Observation Reporting.

Hologic QDR Bone Density messaging is restricted to Observation Reporting.

The basic unit of an HL7 message is a segment and begins with a three-character mnemonic. For example, a Message header segment starts with the characters MSH.

```
MSH|^~\&|HOLOGIC DEXA|||20060616102044||ORU^R01|20060616102044|P|2.3
```

Segments contain data fields and the data fields contain components and subcomponents. For instance, the 9th field in the MSH segment defines the Message Type (in the example above it is ORU^R01). The subcomponent “ORU” defines this as an unsolicited results observation. The subcomponent “R01” says that the event is the transmission of the unsolicited results observation.

Segments may be formed into groups. For instance, a series of NTE segments may be used to send lines of a text report (see the following example):

```
NTE|22||Bone Density:
NTE|23||-----
NTE|24||Region      Exam Date   BMD   T-Score Z-Score Classification
NTE|25||-----
NTE|26||AP Spine (L1-L4) 06/16/2006 1.069 0.2   1.0   Normal
NTE|27||-----
```

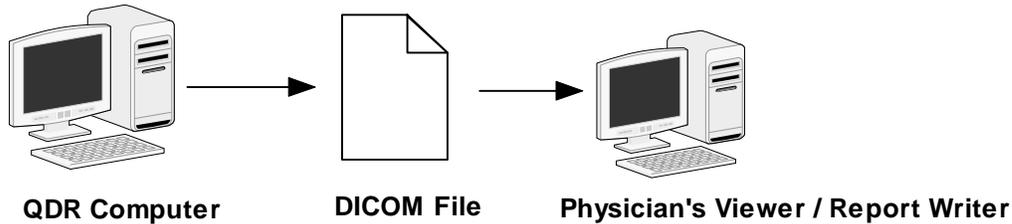
1.3 Report Formats

There are three basic HL7 outbound message formats supported by the Hologic HL7 Interface: *Unsolicited Results Report without Notes*, *Unsolicited Results Report with Notes* and *Document Notification*.

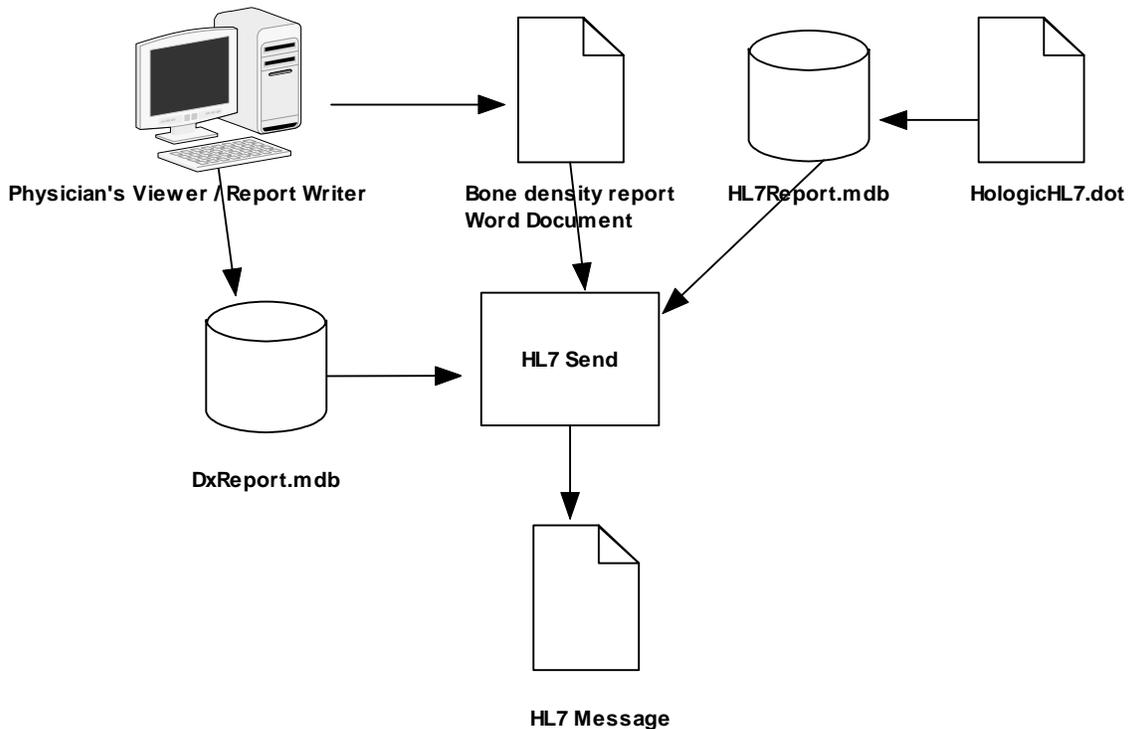
- *Unsolicited Results Report without Notes* is an HL7 message with the text of the cover letter contained in multiple OBX segments.
- *Unsolicited Results Report with Notes* is an HL7 message with one OBX segment and the text of the cover letter report contained as NTE segments.
- *Document Notification* is an HL7 message that provides a pointer to the entire Microsoft Word document generated by Report Writer.

1.4 Interface Workflow

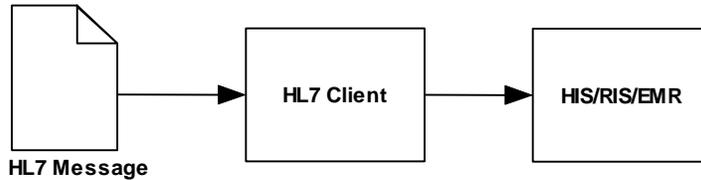
The QDR Bone Densitometer is used to acquire the raw scan data, analyze it, and generate the data used to create the bone density report. The data is sent in the form of a DICOM file to the Physician's Viewer/ Report Writer.



The bone density report (a Word document) is generated using Report Writer. From the HL7 option in Report Writer, an HL7 message is generated. The format of the message is controlled by the message definitions in the file **HL7Report.mdb** that uses VB macros stored in **HologicHL7.dot**. The report content is defined by the Word Document; the patient demographics and study information is obtained from the file **DxReport.mdb**.



The HL7 Client then communicates the HL7 message to the HIS/RIS/EMR.



If the site is using an interface engine, or some other middleware, the HL7 client may be configured to transmit the message to that package. In either case, the HIS/RIS/EMR or middleware may monitor the directory where the HL7 message is created and the HL7 Client may not be used at all.

1.5 Integration Steps

- Review specification(s)
 - Compare the HL7 message accepted by the EMR and the HL7 specification of the message generated by Hologic to determine which message format is compatible.
- Prototype a message
 - Generate a test message in the selected message format
 - If changes are proposed, modify the message manually
- Validate prototype in test environment
 - Have prototype message loaded into EMR to confirm message will be accepted
- Modify message generation
 - Implement changes in message formatting as required by prototype validation
- Configure Software as required
 - Configure QDR, Physician's Viewer and HL7 as needed
- Verify message generation in test environment
 - Verify that the HL7 message is properly generated by software
- Implement interface in production

2. Comparing specifications

MAN-00017 is the QDR for Windows XP HL7 Results Interface Specification. This document details the message definitions for the three outbound message types that may be generated.

Compare the import specification (for the package to which the message will be sent) to MAN-00017 to determine whether the Hologic message contains the required segments and data fields for integration.

2.1 Message Type

The message type is defined in the 9th field of the MSH segment (MSH-9). Although there are three report formats that can be generated by the Hologic interface there are two basic message types:

- Unsolicited results message (indicated by ORU)
- Medical Document Management message (indicated by MDM)

The message type may (optionally) be followed by a trigger code. For instance, the Hologic unsolicited results code ORU in MSH-9.1 is followed by the trigger code R01 in MSH-9.2; therefore, in the message type field it appears as ORU^R01.

2.2 Required Segments

Once the correct message type has been found, check that the required segments within the message are present. The specification will list the segments that are part of the HL7 message, whether they are required and/or whether they repeat.

For example, the ORU message contains 6 segments as shown in the following table (extracted from Section 5.1 of MAN-00017).

ORU Message	
Segment	Description
MSH	Message Header
PID	Patient Identification
PV1	Patient Visit
ORC	Order Common
OBR	Observation Report ID
{OBX}	Observation/Result

This table lists the segments that are included in the message and the braces {} around OBX indicate that the OBX segment may repeat.

2.3 Segment Contents

The next step is to determine if the required fields are present within the segments. Each field in the segment can be Required, Optional, Conditional or Ignored.

3. Overview HL7Report Formatting

3.1 Overview

The HL7 message format is defined by an Access 2000 database, **HL7Report.mdb**. The database is stored in the directory C:\Program Files\Hologic\Physician's Viewer\Options\DxReport\Temporary.

This database defines which message segments are to be included in the message and how the data fields within the segments are populated. The fields may be empty, a constant, populated with a database variable or generated by a macro function. The macros are stored in the file **HologicHL7.dot** which is installed in the startup folder for Word, for example C:\Program Files\Microsoft Office\Office\Startup. The data for the report is extracted from the file **DxReport.mdb** that is generated by Report Writer in the directory:

C:\Program Files\HOLOGIC\Physician's Viewer\Options\DxReport\Temporary.
The available macros and database values are described later in this document.

3.2 HL7Report.mdb

3.2.1 Schemas

The HL7 configuration has a drop down for selecting Report Schema. This drop down is populated from the Schemas table in the HL7Report database.

HL7 Configuration

HL7 Results Message Configuration

Interface Enabled

Report Files

File Prefix: file

Output Directory: C:\temp\input

Message Format

Report Schema: Document Notification

Report Maximum Ch: Document Notification, Unsolicited Results Report with Notes, Unsolicited Results Report without Notes

Logs

Enabled

Automatic Purging Enabled

Entries Eligible For Purging After: 30 Days

OK Cancel

Schemas Table

Schemas		
Schema	Description	SchemaTable
Document Notification	Document Notification	Schema_MDM
Unsolicited Results Report without Notes	Unsolicited Results Report using OBX segments	Schema_ORU
Unsolicited Results Report with Notes	Unsolicited results interface using NTE segments	Schema_Notes

Each selection in the Schema table has a Schema name, description and SchemaTable entry. The SchemaTable entry points to the database table describing the segments in the message. For example, the Schema listed as *Unsolicited Results Report without Notes* points to the table Schema_ORU. This means if *Unsolicited Results Report without Notes* is selected, the segments defined in the table Schema_ORU are included in the message.

3.2.2 SchemaTable

The SchemaTable defines the segments that are available for the selected schema. The following is the table Schema_ORU that corresponds to the *Unsolicited Results Report without Notes* report schema. This table shows that the default message consists of an MSH, PID, PV1, ORC, OBR and repeating OBX segments.

Schema_ORU			
SegmentTable	SegmentType	Include	Repeats
SegmentMSH_ORU	MSH	√	
SegmentPID_ORU	PID	√	
SegmentPV1_ORU	PV1	√	
SegmentORC_ORU	ORC	√	
SegmentOBR_ORU	OBR	√	
SegmentOBX_ORU	OBX	√	√

The table consists of 4 columns and some number of rows. Each row represents a segment that can be included in the message.

The SegmentTable entry is the name of the table describing the segment. For instance, the MSH segment is defined by the table SegmentMSH_ORU.

The SegmentType entry is one of the available types. The available segment types are listed in the table HL7SegmentTypes.

The Include column contains a checkbox that specifies if the segment should be included in the message. The segment is not included unless the box is checked.

The Repeats column contains a checkbox that specifies if the segment should be repeated in the message. The segment is repeated for each line in the cover letter if the box is checked.

3.2.3 Message Segments

The message segments tables define the contents of the actual segments.

SegmentMSH_ORU											
SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME	USE	MAP TYPE	MAP VALUE	NOTES
1	1	ST	R			00001	Field Separator				
2	4	ST	R			00002	Encoding Characters	√	CONSTANT	^~\&	
3	180	HD	O		0361	00003	Sending Application	√	CONSTANT	HOLOGIC DEXA	
4	180	HD	O		0362	00004	Sending Facility	√	DATABASE	InstitutionName	
5	180	HD	O		0361	00005	Receiving Application				
6	180	HD	O		0362	00006	Receiving Facility				
7	26	TS	R			00007	Date/Time Of Message	√	FUNCTION	TimestampTS	
8	40	ST	O			00008	Security				
9	7	CM	R		0076	00009	Message Type	√	CONSTANT	ORU^R01	
10	20	ST	R			00010	Message Control ID	√	FUNCTION	TimestampTS	
11	3	PT	R		0103	00011	Processing ID	√	CONSTANT	P	
12	60	VID	R		0104	00012	Version ID	√	CONSTANT	2.3	
13	15	NM	O			00013	Sequence Number				
14	180	ST	O			00014	Continuation Pointer				
15	2	ID	O		0155	00015	Accept Ack Type				
16	2	ID	O		0155	00016	Application Ack Type				
17	2	ID	O			00017	Country Code				
18	16	ID	O	Y	0211	00692	Character Set				
19	60	CE	O			00693	Principal Language Of Message				
20	20	ID	O		0356	01317	Alternate Character Set Handling Scheme				

The table contains an entry for each field in the segment. The first 8 columns describe the format of the fields and normally should not be changed.

The Use column contains a checkbox that specifies if the field should be included in the segment. The field is not included unless the box is checked.

The Map Type column is a dropdown with three selections: Constant, Database and Function.

The Map Value column is defined by the Map Type selection.

- If Constant is selected for the Map Type, the value as entered under Map Value is entered into the field.
- If Database is selected for the Map Type, then this is a field name in the DxReport database that is entered into the HL7 segment.
- If Function is selected for the Map Type, then a Macro by that name in the HologicHL7 template file is in the Microsoft Word startup directory.

4. HL7Report Database Tables

4.1 HL7DataTypes

The following HL7DataTypes table is provided for informational purposes. It shows the meaning of the data type mnemonics.

Mnemonic	Description
AD	Address
CD	Channel definition
CE	Coded element
CF	Coded element with formatted values
CK	Composite ID with check digit
CM	Composite
CN	Composite ID number and name
CP	Composite price
CQ	Composite quantity with units
CX	Extended composite ID with check digit
DLN	Driver's license number
DR	Date/time range
DT	Date
ED	Encapsulated data
EI	Entity identifier
FC	Financial class
FT	Formatted text
HD	Hierarchic designator
ID	Coded value for HL7 tables

Mnemonic	Description
IS	Coded value for user-defined table
JCC	Job code/class
MA	Multiplexed array
MO	Money
NA	Numeric array
NM	Numeric
PL	Person location
PN	Person name
PPN	Performing person time stamp
PT	Processing type
QIP	Query input parameter list
QSC	Query selection criteria
RCD	Row column definition
RI	Repeat interval
RP	Reference pointer
SCV	Scheduling class value pair
SI	Sequence ID
SN	Structured numeric
ST	String
TN	Telephone number
TQ	Timing/quantity
TS	Time stamp
TX	Text data
VH	Visiting hours
VID	Version ID
XAD	Extended address
XCN	Extended composite ID number and name
XON	Extended composite name and ID number for organizations
XPN	Extended person name
XTN	Extended telecommunications numbers

4.2 HL7Segment Types

The following HL7SegmentTypes table is provided for informational purposes. It shows the meaning of the segment type mnemonics.

Mnemonic	Description
EVN	Event Type
MSA	Message Acknowledgement
MSH	Message Header
NTE	Notes and Comments
OBR	Observation Request
OBX	Observation/Result
ORC	Common Order
PID	Patient Identification
PV1	Patient Visit
TXA	Transcription Document Header

4.3 Log

The log table contains the HL7 Send log.

ID	Date	Sender	AccessionNumber	PatientName	PatientID	ReSend
1	6/16/2006 8:40:03 AM	QDR	1234	A613	4	No
2	6/16/2006 8:40:25 AM	QDR	1234	A613	4	Yes

4.4. MLP

Each message transmitted by HL7 communication Protocol (MLP) is preceded with a start block and terminated with an end block. The MLP table contains the ASCII value of the start block and end block characters. This table is rarely changed.

StartBlockChar	EndBlockChar
11	28

4.5 Param

The Param table is used to save the HL7 configuration.

InterfaceEnabled	FilePrefix	OutputDirectory	LogEnabled	LogAutoPurgeEnabled	LogPurgeDelay	ReportMaxCharsPerLine	ReportSchema
Yes	file	c:\temp\Input	Yes	Yes	30	80	Unsolicited Results Report without Notes

4.6 Schemas

The Schemas table defines the report schemas available for selection in the HL7 Configuration. The table contains 3 columns: Schema, Description and SchemaTable. The Schema column is displayed as a dropdown box in HL7 configuration. When a Schema is selected, it is stored in the Param table and the corresponding entry in the SchemaTable column shows the table that defines the segments in the message. For example, the segments for the *Unsolicited Results Report without Notes* message are defined in the table Schema_ORU.

Schemas		
Schema	Description	SchemaTable
Document Notification	Document Notification	Schema_MDM
Unsolicited Results Report without Notes	Unsolicited Results Report using OBX segments	Schema_ORU
Unsolicited Results Report with Notes	Unsolicited results interface using NTE segments	Schema_Notes

4.7 Unsolicited Results Report without Notes Message Segments

Unsolicited Results Report without Notes is an HL7 message with the text of the cover letter contained in multiple OBX segments.

The segments shown in the table below define the *Unsolicited Results Report without Notes* message. A detailed description of each segment is in the HL7 Results Interface Specifications.

Schema_ORU			
SegmentTable	SegmentType	Include	Repeats
SegmentMSH_ORU	MSH	√	
SegmentPID_ORU	PID	√	
SegmentPV1_ORU	PV1	√	
SegmentORC_ORU	ORC	√	
SegmentOBR_ORU	OBR	√	
SegmentOBX_ORU	OBX	√	√

4.8 Unsolicited Results Report with Notes Message Segments

Unsolicited Results Report with Notes is an HL7 message with one OBX segment and the text of the cover letter report contained as NTE segments.

The segments shown in the table below define the *Unsolicited Results Report with Notes* message. A detailed description of each segment is in the HL7 Results Interface Specifications.

Schema_Notes			
SegmentTable	SegmentType	Include	Repeats
SegmentMSH_Notes	MSH	√	
SegmentPID_Notes	PID	√	
SegmentPV1_Notes	PV1		
SegmentORC_Notes	ORC	√	
SegmentOBR_Notes	OBR	√	
SegmentOBX_Notes	OBX	√	
SegmentNTE_Notes	NTE	√	√

4.9 Document Notification Message Segments

Document Notification is an HL7 message that provides a pointer to the entire Microsoft Word document generated by Report Writer.

The segments shown in the table below define the *Document Notification* message. A detailed description of each segment is in the HL7 Results Interface Specifications.

Schema_Report		
SegmentTable	SegmentType	Include
SegmentMSH_MDM	MSH	√
SegmentEVN_MDM	EVN	√
SegmentPID_MDM	PID	√
SegmentPV1_MDM	PV1	√
SegmentTXA_MDM	TXA	√
SegmentOBR_MDM	OBR	√
SegmentOBX_MDM	OBX	√

4.9.1 Modifying Message Contents

Both the segments that are included in the message and the contents of the segments may be modified.

4.10 Modifying the contents of a message segment

To change the contents of a segment, it is necessary to determine the table in HL7Report.mdb that defines the contents of the field. To do this, first find the schema that defines the segment tables by opening the table Schemas and then get the name of the SchemaTable that corresponds to the Schema selected.

For example, from the illustration below you can see that the table Schema_ORU corresponds to the report schema *Unsolicited Results Report without Notes*.

Schemas		
Schema	Description	SchemaTable
Document Notification	Document Notification	Schema_MDM
Unsolicited Results Report without Notes	Unsolicited Results Report using OBX segments	Schema_ORU
Unsolicited Results Report with Notes	Unsolicited results interface using NTE segments	Schema_Notes

The table Schema_ORU, below, lists the tables that describe the different segment types. For example, the MSH segment is defined to be the SegmentMSH_ORU table. To omit a segment uncheck it in the Include column. If the segment is to repeat for each entry in the cover letter then check the Repeats column. The Repeats checkbox is used to put each line in the cover letter in a different segment.

SegmentTable	SegmentType	Include	Repeats
SegmentMSH_ORU	MSH	√	
SegmentPID_ORU	PID	√	
SegmentPV1_ORU	PV1	√	
SegmentORC_ORU	ORC	√	
SegmentOBR_ORU	OBR	√	
SegmentOBX_ORU	OBX	√	√

The table SegmentMSH_ORU, below, defines the contents of the MSH segment.

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME	USE	MAP TYPE	MAP VALUE	NOTES
1	1	ST	R			00001	Field Separator				
2	4	ST	R			00002	Encoding Characters	√	CONSTANT	^~\&	
3	180	HD	O		0361	00003	Sending Application	√	CONSTANT	HOLOGIC DEXA	
4	180	HD	O		0362	00004	Sending Facility	√	DATABASE	InstitutionName	
5	180	HD	O		0361	00005	Receiving Application				
6	180	HD	O		0362	00006	Receiving Facility				
7	26	TS	R			00007	Date/Time Of Message	√	FUNCTION	TimestampTS	
8	40	ST	O			00008	Security				
9	7	CM	R		0076	00009	Message Type	√	CONSTANT	ORU^R01	
10	20	ST	R			00010	Message Control ID	√	FUNCTION	TimestampTS	
11	3	PT	R		0103	00011	Processing ID	√	CONSTANT	P	
12	60	VID	R		0104	00012	Version ID	√	CONSTANT	2.3	

To delete a field, uncheck the Use checkbox.

To add a field, check the Use checkbox. Select the Map Type (Constant, Function or Database).

In the Map Value field, enter the constant, macro function name or database field.

4.11 Adding / Removing a Segment from a message

To add or remove a segment from a message it is necessary to determine the table in HL7Report.mdb that defines the segments in the message. To do this, first find the schema that defines the segment tables by opening the table Schemas and then get the name of the SchemaTable that corresponds to the Schema selected.

For example, from the illustration below you can see that the table Schema_ORU corresponds to the report schema *Unsolicited Results Report without Notes*.

Schemas		
Schema	Description	SchemaTable
Document Notification	Document Notification	Schema_MDM
Unsolicited Results Report without Notes	Unsolicited Results Report using OBX segments	Schema_ORU
Unsolicited Results Report with Notes	Unsolicited results interface using NTE segments	Schema_Notes

On opening the table Schema_ORU, it lists the tables that describe the different segment types. For example, the MSH segment is defined to be the SegmentMSH_ORU table.

Schema_ORU		
SegmentTable	SegmentType	Include
SegmentMSH_ORU	MSH	√
SegmentPID_ORU	PID	√
SegmentPV1_ORU	PV1	√
SegmentORC_ORU	ORC	√
SegmentOBR_ORU	OBR	√
SegmentOBX_ORU	OBX	√

To remove a segment, uncheck the Include checkbox.

To add a segment, insert a row. Give the SegmentTable a unique name. Select the SegmentType from the HL7SegmentTypes table and check the Include checkbox.

The final step is to create a table with the unique name you gave the SegmentTable. The easiest way is to copy an existing table and then modify it as appropriate.

Appendix A: Standard Macro Functions

TimeStampTS

Return time stamp of message creation as a string.

StudyDate

Return study date as a string.

PrincipalResultsInterpreter

Return Interpreting Physician as a string in the form
Code^LastName^FirstName^MI

PatientEthnicity

Return Patient Ethnicity as a string using the following values:

Value	Definition
O	Asian
B	Black
H	Hispanic
U	Infant
U	Pediatric
W	White

ReportLineText

Return next line in cover letter as a string.

ReportLineCount

Increment line count and return as a string.

ReportFilePath

Return path to word report as a string in the format FileName.doc^ Bone Density Report

ReportFilePath2

Return path to word report as a string in the format FileName.doc^^AP^DOC

ReferringPhysician

Return as a string the referring physician in the form
Code^LastName^FirstName^MI

Appendix B: Creating new Macro Functions

In some cases additional macro functions may be required. For example, the Hologic interface specifies a patient sex as either F for female or M for Male. If the EMR expects the words Male or Female then a macro function can be written to reformat the field.

The macro functions are stored in the template file HologicHL7.dot in the Windows startup folder. The functions are stored in the HL7 Module. Instructions for how to create VBA Macros is beyond the scope of this document.

Appendix C: Database Entries

Study Data Fields

These are fields that apply to all scans in a study and contain patient information.

Database Entry	Description	Source	Format
PatientName	Last, First MI	QDR New / Edit Patient Dialog	Text
PatientSSN	Patient's first numeric identifier such as Social Security Number	QDR New / Edit Patient Dialog	Text
PatientID	Patient's second numeric identifier (Optional)	QDR New / Edit Patient Dialog	Text
PatientSex	Patient's gender.	QDR New / Edit Patient Dialog	Text
PatientEthnicity	Patient's ethnic background. White. Black, Hispanic or Asian	QDR New / Edit Patient Dialog	Text
PatientHeight	Patient's height in cms.	QDR New / Edit Patient Dialog	Text
PatientWeight	Patient's weight in kgs.	QDR New / Edit Patient Dialog	Text
PatientDOB	Patient's date of birth. mm/dd/yyyy	QDR New / Edit Patient Dialog	Date/Time
PatientAge	Patient's age.	QDR New /	Numeric

Database Entry	Description	Source	Format
		Edit Patient Dialog	
PatientMenopauseAge	The year the patient reached menopause - only for female patients.	QDR New / Edit Patient Dialog	Numeric
ReferringPhysician	Referring Physician.	QDR New / Edit Patient Dialog	Text
InstitutionName	Name of Institution	QDR Report Configuration	Text
InstitutionStreetAddress	Street address of Institution	QDR Report Configuration	Text
InstitutionCityAddress	City address of Institution	QDR Report Configuration	Text
InstitutionPhone	Phone number of Institution	QDR Report Configuration	Text
InstitutionFax	Fax number of Institution	QDR Report Configuration	Text
InstitutionEmail	Email address of Institution	QDR Report Configuration	Text
AccessionNumber	DICOM Accession number	Patient Confirmation Dialog	Text
InterpretingPhysician	The Interpreting Physician field contains the name and title of the physician preparing the report.	Physician's Viewer Configuration	Text
QDR may be configured to prompt for 3 user defined fields. The configuration is done from the QDR System Configuration screen. The data is entered on the patient confirmation screen when starting a study.			
HL71Name	Prompt for field	QDR / patient Confirmation	Text
HL71Value	Valued entered for field	QDR / patient Confirmation	Text
HL72Name	Prompt for field	QDR / patient Confirmation	Text
HL72Value	Valued entered for field	QDR / patient Confirmation	Text
HL73Name	Prompt for field	QDR / patient Confirmation	Text

Database Entry	Description	Source	Format
HL73Value	Valued entered for field	QDR / patient Confirmation	Text

Appendix D: Vendor Specific Requirements¹

The following recommendations have been found necessary to integrate with the listed EMRs at specific sites. Depending on the EMR installation and configuration, more or less changes may be required. Review the HL7 specification for the EMR that you are integrating with, and determine if these recommendations are applicable.

A4 Health Systems

- Select Message Type = ORU
- By default OBR.32 is populated with Interpreting Physician, this should be moved to OBR.16.
- Universal Service ID
 - If this is a constant for the site enter it as a constant in OBR.4
 - If this is a variable then the HL7 Field 2 that populates OBR.4 will have to be configured in QDR to prompt for Universal Service ID.

IDX

- Select Message Type = ORU
- Configure DxReport to use 65 Character Template.

Centricity

- Select Message Type = MDM
- Map document to absolute path on a networked drive that is accessible from Physician's Viewer and Logician.

Medinotes

- Select Message Type = ORU_Notes

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Meditech

- Select Message Type = ORU
- Configure DxReport to use 65 Character Template.
- OBR.22 Populated with time of message creation
- OBR.32 Populated with constant RAD.DEXA.

Misys

- Select Message Type = ORU_Notes
- Populate MSH.4 with constant for Sending Facility
- Populate MSH.5 with a constant identifying the receiving application
- Populate MSH.6 with a constant identifying the Receiving Facility
- Change the format of PID.7 to DT.
- Populate PID.19 with database value PatientSSN.
- Populate PV1.8 with function ReferringPhysician
- Universal Service ID
 - If this is a constant for the site enter it as a constant in OBR.4
 - If this is a variable then the HL7 Field 2 that populates OBR.4 will have to be configured in QDR to prompt for Universal Service ID.
- Populate OBR.16 with function ReferringPhysician

NextGen

- Select Message Type = MDM
- Populate MSH.9 with the constant MDM^T02
- Populate MSH.12 with the constant 2.5
- Populate TXA.3 with the constant RP
- Populate TXA.4 with the function StudyDate
- Populate OBX.2 with the constant RP
- Populate OBX.5 with function ReportFilePath2
- Remove OBR Segment

Appendix E: Example Message Modification

In this example the specification for the Hologic Results Report without Notes message has been compared to that for the Acme EMR. Acme uses different values to represent the ethnicity of the patient.

Looking at the Hologic Specification we see that PID-10 is populated with the patient ethnicity from the QDR database as Black, White, Asian and Hispanic.

SEQ	LEN	DT	OPT	ELEMENT NAME	HOLOGIC USE
1	4	SI	O	Set ID - Patient ID	NOT USED
2	20	CX	C	Patient ID	NOT USED
3	20	CX	R	Patient Identifier List	<i>Patient's ID</i>
4	20	CX	C	Alternate Patient ID - PID	<i>Patient's ID 2</i>
5	48	XPN	R	Patient Name	<i>Patient's Name</i>
6	48	XPN	O	Mother's Maiden Name	NOT USED
7	26	TS	O	Date/Time of Birth	<i>Patient's DOB</i>
8	1	IS	O	Sex	<i>Patient's Sex²</i>
9	48	XPN	O	Patient Alias	NOT USED
10	80	CE	O	Race	<i>Patient's Ethnicity³</i>
11	106	XAD	O	Patient Address	NOT USED
12	4	IS	O	County Code	NOT USED
13	40	XTN	O	Phone Number - Home	NOT USED
14	40	XTN	O	Phone Number - Business	NOT USED
15	60	CE	O	Primary Language	NOT USED
16	80	CE	O	Marital Status	NOT USED
17	80	CE	O	Religion	NOT USED
18	20	CX	O	Patient Account Number	NOT USED
19	16	ST	O	SSN Number - Patient	NOT USED
20	25	DLN	O	Driver's License Number - Patient	NOT USED
21	20	CX	O	Mother's Identifier	NOT USED
22	80	CE	O	Ethnic Group	NOT USED
23	60	ST	O	Birth Place	NOT USED
24	1	ID	O	Multiple Birth Indicator	NOT USED
25	2	NM	O	Birth Order	NOT USED
26	80	CE	O	Citizenship	NOT USED
27	60	CE	O	Veterans Military Status	NOT USED
28	80	CE	O	Nationality	NOT USED
29	26	TS	O	Patient Death Date and Time	NOT USED
30	1	ID	O	Patient Death Indicator	NOT USED

[3] Patient Ethnicities

Asian
Black
Hispanic
White

Looking at the ACME specification it uses B for black, W for White, A for Asian and O for all other ethnicities.

To accomplish this we will need to add VB function to map these to values accepted by an ACME EMR.

The first step is to locate the field to be changed in the file HL7Report.mdb.

First open the file in Access 2000 and find the segment to be modified. To do this we select the top-level table named Schemas, which defines the schemas for the different message type.

Schemas		
Schema	Description	SchemaTable
Document Notification	Document Notification	Schema_MDM
Unsolicited Results Report without Notes	Unsolicited Results Report using OBX segments	Schema_ORU
Unsolicited Results Report with Notes	Unsolicited results interface using NTE segments	Schema_Notes

This table shows Schema_ORU defines the segments in the Unsolicited Results Report without Notes message.

Schema_ORU			
SegmentTable	SegmentType	Include	Repeats
SegmentMSH_ORU	MSH	Yes	No
SegmentPID_ORU	PID	Yes	No
SegmentPV1_ORU	PV1	Yes	No
SegmentORC_ORU	ORC	Yes	No
SegmentOBR_ORU	OBR	Yes	No
SegmentOBX_ORU	OBX	Yes	Yes

This table shows that the table SegmentPID_ORU defines the PID segment.

SegmentPID_ORU											
SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME	USE	MAP TYPE	MAP VALUE	NOTES
1	4	SI	O			00104	Set ID - PID	No			
2	20	CX	B			00105	Patient ID	No			
3	20	CX	R	Y		00106	Patient Identifier List	Yes	DATABASE	PatientID	
4	20	CX	B	Y		00107	Alternate Patient ID - PID	Yes	DATABASE	PatientSSN	
5	48	XPN	R	Y		00108	Patient Name	Yes	DATABASE	PatientName	
6	48	XPN	O	Y		00109	Mother's Maiden Name	No			
7	26	TS	O			00110	Date/Time of Birth	Yes	DATABASE	PatientDOB	
8	1	IS	O		0001	00111	Sex	Yes	DATABASE	PatientSex	
9	48	XPN	O	Y		00112	Patient Alias	No			
10	80	CE	O	Y	0005	00113	Race	Yes	DATABASE	PatientEthnicity	

SegmentPID_ORU											
SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME	USE	MAP TYPE	MAP VALUE	NOTES
11	106	XAD	O	Y		00114	Patient Address	No			
12	4	IS	B		0289	00115	County Code	No			

This Table shows that PID-10 is populated from the Database field PatientEthnicity. This field is replaced by changing the Map_Type from Database to Function and then by changing the Map_Value to MyPatientEthnicity.

SegmentPID_ORU											
SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM#	ELEMENT NAME	USE	MAP TYPE	MAP VALUE	NOTES
1	4	SI	O			00104	Set ID - PID	No			
2	20	CX	B			00105	Patient ID	No			
3	20	CX	R	Y		00106	Patient Identifier List	Yes	DATABASE	PatientID	
4	20	CX	B	Y		00107	Alternate Patient ID - PID	Yes	DATABASE	PatientSSN	
5	48	XP	R	Y		00108	Patient Name	Yes	DATABASE	PatientName	
6	48	XP	O	Y		00109	Mother's Maiden Name	No			
7	26	TS	O			00110	Date/Time of Birth	Yes	DATABASE	PatientDOB	
8	1	IS	O		0001	00111	Sex	Yes	DATABASE	PatientSex	
9	48	XP	O	Y		00112	Patient Alias	No			
10	80	CE	O	Y	0005	00113	Race	Yes	FUNCTION	MyPatientEthnicity	
11	106	XAD	O	Y		00114	Patient Address	No			
12	4	IS	B		0289	00115	County Code	No			

Next the function must be added to the HologicHL7.dot file in the Microsoft Word startup folder. Open the template and insert the following code at the end of the HL7 module.

```
Function MyPatientEthnicity() As String
' This is a new function to map ethnicity as stored in the DxReport database to
```

```
' values accepted by the ACME EMR
Dim ethnicity As String
ethnicity = rstData!PatientEthnicity
If ethnicity = "Black" Then
    MyPatientEthnicity = "B"
ElseIf ethnicity = "White" Then
    MyPatientEthnicity = "W"
ElseIf ethnicity = "Asian" Then
    My PatientEthnicity = "A"
Else
    MyPatientEthnicity = "O"
End If
End Function
```