

# **SonoSite Workflow Solutions HL7 Interface Specification**

---

This document contains confidential information that is proprietary to SonoSite. Neither the document nor the information contained therein should be disclosed or reproduced in whole or in part, without express written consent of SonoSite.

Document Number: D09103

Revision: A

Copyright © 2016 FUJIFILM SonoSite, Inc. All rights reserved

# CONTENTS

<b>CHAPTER 1</b> .....	<b>1</b>
<b>INTRODUCTION</b> .....	<b>1</b>
About this document.....	1
Changes in this version.....	1
Definitions .....	2
Reference documents.....	2
<b>CHAPTER 2</b> .....	<b>3</b>
<b>IMPLEMENTATION MODEL</b> .....	<b>3</b>
<b>CHAPTER 3</b> .....	<b>5</b>
<b>ORU SPECIFICATION</b> .....	<b>5</b>
ORU R01 .....	5
MSH.....	5
MSH-1 Field Separator.....	6
MSH-2 Encoding Characters .....	6
MSH-3 Sending Application.....	6
MSH-4 Sending Facility.....	6
MSH-5 Receiving Application.....	6
MSH-6 Receiving Facility .....	6
MSH-7 Date/Time of Message.....	6
MSH-9 Message Type .....	6
MSH-10 Message Control ID.....	7
MSH-11 Processing ID.....	7
MSH-12 Version ID.....	7
MSH-18 Character Set.....	7
PID.....	7
PID-1 Set ID - PID.....	8
PID-3 Patient Identifier List.....	8
PID-5 Patient Name .....	8
PID-7 Date/Time of Birth.....	9
PID-8 Administrative Sex.....	9
OBR.....	9
OBR-1 Set ID - OBR.....	9
OBR-2 Placer Order Number .....	10
OBR-3 Filler Order Number .....	10
OBR-4 Universal Service Identifier.....	11
OBR-7 Observation Date/Time .....	11
OBR-16 Ordering Provider .....	11
OBR-22 Results Rpt/Status Change – Date/Time .....	11
OBR-25 Result Status.....	11

OBR-32 Principal Result Interpreter .....	12
OBX (Textual) .....	12
OBX-1 Set ID – OBX (Textual).....	16
OBX-2 Value Type (Textual) .....	16
OBX-3 Observation Identifier (Textual) .....	16
OBX-5 Observation Value (Textual).....	16
OBX-11 Observation Result Status (Textual).....	17
OBX (Encapsulated) .....	17
OBX-1 Set ID – OBX (Encapsulated).....	18
OBX-2 Value Type (Encapsulated) .....	18
Observation Identifier (Encapsulated).....	18
OBX-5 Observation Value (Encapsulated).....	18
OBX-11 Observation Result Status (Encapsulated).....	19

**APPENDIX A ..... 21**

**BASE 64 ENCODING ..... 21**

**APPENDIX B ..... 23**

**SAMPLE MESSAGES ..... 23**

HL7 Message with Encapsulated PDF.....	23
HL7 Message as Textual OBX with Two Embedded JPEGs.....	23
HL7 Message as Textual OBX, No Embedded JPEGs.....	24





# CHAPTER 1

## Introduction

### About this document

This document describes the SonoSite Workflow Solutions' (SWS™) HL7 interface. It provides the necessary information to perform gap analysis between the SWS™ application's HL7 interfaces and those of the system to which it communicates. Familiarity with HL7 is assumed.

SWS™ is a server software application for archiving and organizing ultrasound exams performed upon patients, reviewing images and clips, and creating reports. This HL7 interface specification describes the SWS application's interface for exporting ORU messages containing report data to destination Electronic Medical Record (EMR) systems.

The document is structured to present a chapter for each message supported by SonoSite Workflow Solutions (SWS™). The syntactical structure of the message is provided. For each optional or required segment in the message, a subsection details the fields populated by SWS for that segment. For outgoing message types, HL7-optional fields that are always populated by SWS are marked required. For outgoing message types, HL7-optional fields that are never populated by SWS are omitted from the specification.

**Table 1-1** provides an overview of the HL7 messages supported by the SWS™ server application.

Table 1-1: HL7 Messages

HL7 Message	HL7 2.X Chapter	Trigger
ORU	7	R01

Throughout this document, SWS is assumed to communicate with either a Hospital Information System, or an Electronic Medical Record System; such system shall be referred to as HIS/EMR.

### Changes in this version

Revision	Description of Change
A	Initial release

## Definitions

DICOM	Digital Imaging and Communications in Medicine
EMR	Electronic Medical Record
Filler	System/Department that completes an order
HIS	Hospital Information System
HL7	Health Level 7
IHE	Integrating the Healthcare Enterprise
MIME	Multipurpose Internet Mail Extensions
MRN	Medical Record Number
PDF	Portable Document Format
Placer	System/Department that places an order

### Note

For definitions of specific referenced HL7 messages, segments, fields, components, sub-components, data types, and HL7 defined tables, the interested reader is referred to the HL7 messaging standard.

## Reference documents

HL7 Version 2.6, 2007

IHE Radiology Technical Framework, Volume II Transactions Revision 9.0, June 27, 2008



# CHAPTER 2

## Implementation Model

The workflow that ends with successful transmission of an ORU message to HIS/EMR starts on the ultrasound system.

Patient information is entered into the ultrasound system, either by typing it in user the keyboard, or through importation via DICOM modality worklist. In other environments, a barcode reader may be used to automatically enter data encoded in a barcode (such as a patient MRN).

A filler order number (accession number) may similarly be entered manually into the ultrasound system, or through importation via DICOM modality worklist.

After demographics are entered (or occasionally before in the case of trauma situations), scanning is performed, and selected images or clips are saved, measurements are performed, and sometimes comments are entered in worksheets directly on the ultrasound system.

Following collection of all images and data that must be performed on the ultrasound system, the exam is ended, and transferred to SWS.

On SWS, the interpreting physician queries for and locates the study, performs necessary reconciliations – such as correcting the patient ID and order (accession) number. Also, the physician finalizes findings and interpretation in worksheets. The same or possibly a different credentialed physician marks the worksheet complete (serving as an electronic signature). For purposes of matching the report to a placer order, the physician or assistant manually enters the Placer Order Number and Requested Service ID, and selectively sends the report to HIS/EMR.

Depending on SWS configuration, an ORU message containing either multiple textual OBX segments, or an ORU containing embedded PDF in an ED data type in a single OBX segment, is generated and sent to the configured HIS/EMR destination.

SWS logs sent messages to the log directory in hl7Messages.log. 20 such log files are filled before rolling over.



# CHAPTER 3

## ORU Specification

### ORU R01

A single ORU^R01 message shall contain only the results for a single examination performed upon a single patient.

ORU^R01^ORU_R01	Unsolicited Observation Result Message	Chapter
MSH	Message Header	2
PID	Patient Identification	3
OBR	Observations Request	7
{ OBX }	Observation	7
ACK^R01^ACK	Acknowledgement	Chapter
MSH	Message Header	2
MSA	Message Acknowledgement	2

### MSH

Table 3-1: MSH Message Header

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
1	1	ST	R			00001	Field Separator
2	4	ST	R			00002	Encoding Characters
3	20	HD	R			00003	Sending Application
4	20	HD	R			00004	Sending Facility
5	20	HD	R			00005	Receiving Application
6	20	HD	R			00006	Receiving Facility
7	24	DTM	R			00007	Date/Time of Message
9	15	MSG	R			00009	Message Type

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
10	199	ST	R			00010	Message Control ID
11	1	PT	R			00011	Processing ID
12	3	VID	R			00012	Version ID
18	13	ID	R		0211	00692	Character Set

### MSH-1 Field Separator

The value shall be |.

### MSH-2 Encoding Characters

The value shall be ^~\&.

### MSH-3 Sending Application

The sending application value shall be configured by the user in the SWS HL7 Interface Configuration, and shall include only the Namespace ID component.

### MSH-4 Sending Facility

The sending facility value shall be configured by the user in the SWS HL7 Interface Configuration, and shall include only the Namespace ID component.

### MSH-5 Receiving Application

The receiving application value shall be configured by the user in the SWS HL7 Interface Configuration, and shall include only the Namespace ID component.

### MSH-6 Receiving Facility

The receiving facility value shall be configured by the user in the SWS HL7 Interface Configuration, and shall include only the Namespace ID component.

### MSH-7 Date/Time of Message

This element contains the date and time that the message was generated by SWS.

### MSH-9 Message Type

This element's value is defined by the following table.

Table 3-2: Message Type

Component	Component Value
Message Code (ID)	ORU
Trigger Event (ID)	R01
Message Structure (ID)	ORU_R01

### MSH-10 Message Control ID

This element shall contain the string representation of the value of a system call to get the current number of milliseconds since midnight, January 1, 1970 UTC. The actual value will depend on implementation by the OS on which SWS runs; for example, some systems may not provide this value to millisecond granularity.

### MSH-11 Processing ID

This element shall contain the value P.

### MSH-12 Version ID

This element shall contain the value 2.6.

### MSH-18 Character Set

This element shall contain the value `UNICODE UTF-8`, but transmitted text may be safely interpreted as ISO-8859-1 (8859/1).

## PID

Table 3-3: PID Patient Identification

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
1	4	SI	R			00104	Set ID - PID
3	64	CX	R			00106	Patient Identifier List
5	250	XPN	R			00108	Patient Name
7	8	DTM	O			00110	Date/Time of Birth

**Table 3-3: PID Patient Identification**

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
8	1	IS	O		0001	00111	Administrative Sex

### PID-1 Set ID - PID

This element contains the value 1.

### PID-3 Patient Identifier List

This element contains the value as originally entered or imported into the ultrasound system Patient ID field on the source ultrasound system, or as entered/edited in the SWS patient form Patient ID field for the patient associated with the report being created.

The value is always populated. Although SWS permits an empty Patient ID for other application functionality, the creation of an HL7 ORU message with an empty Patient ID is disallowed by the application.

Only one ID is sent (a list of size 1), and only the first component of this field is populated...that is the value is defined by <ID Number (ST)>. Neither check digits nor assigning authority information is provided.

### PID-5 Patient Name

This element contains the value as originally entered or imported into the ultrasound system Patient Name field(s) on the source ultrasound system, or as entered/edited in the SWS patient form Patient Name fields for the patient associated with the report being created. Only the Last Name, First Name, and Middle Name are supported.

Only one name is sent (a list of size 1), and component population is defined by the following table:

**Table 3-4: Patient Name Component Population**

Component	Component Value
Family Name (FN)	Value in Last Name field of SWS Patient Form
Given Name (ST)	Value in First Name field of SWS Patient Form
Second and Further Given Names or Initials Thereof (ST)	Value in Middle Name field of SWS Patient Form

For the Family Name component, only the Surname subcomponent is populated. Each component can be a maximum of 64 characters in length.

## PID-7 Date/Time of Birth

This element contains the value as originally entered or imported into the ultrasound system Patient Date of Birth field(s) on the source ultrasound system, or as entered/edited in the SWS patient form Patient Date of Birth fields for the patient associated with the report being created. Only the date is supported.

## PID-8 Administrative Sex

This element contains the single character identifier corresponding to the value as originally entered or imported into the ultrasound system Patient Gender field on the source ultrasound system, or as entered/edited in the SWS patient form Patient Gender field for the patient associated with the report being created. The field may be populated with the following values from HL7 Table 0001: F, M, O.

## OBR

Table 3-5: OBR Observations Request

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
1	4	SI	R			00237	Set ID - OBR
2	53	EI	R			00216	Placer Order Number
3	37	EI	R			00217	Filler Order Number
4	705	CWE	R		9999	00238	Universal Service Identifier
7	24	DTM	R			00241	Observation Date/Time
16	65	XCN	O			00226	Ordering Provider
22	24	DTM	R			00255	Results Rpt/Status Change – Date/Time
25	1	ID	R			00258	Result Status
32	250	NDL	R			00264	Principal Result Interpreter

## OBR-1 Set ID - OBR

This element contains the value 1.

## OBR-2 Placer Order Number

This value for this field is defined by the following table.

Table 3-6: Placer Order Number Value

Component	Component Value
Entity Identifier (ST)	Value in Placer Order Number field in SWS Worksheet Form for the series associated with the report being created. This field is required. The maximum length is 32.
Namespace ID (IS)	Value in Placer Application field in SWS Worksheet Form for the series associated with the report being created. This field is optional. A default value for the Placer Application can be configured in the SWS HL7 ORU Interface Configuration form. The maximum length is 20.

Because SWS does not receive orders (ORM messages), the values for the Placer Order Number and Placer Application must be manually entered by the SWS user. The Placer Order must contain a value in order for an ORU^R01 message to be created.

## OBR-3 Filler Order Number

This value for this field is defined by the following table.

Table 3-7: Filler Order Number

Component	Component Value
Entity Identifier (ST)	This component contains the value in the Accession field as originally entered or imported into the ultrasound system, or as entered into the Accession field in the SWS Patient Form for the study associated with the report being created.  This field is required. The maximum length is 16.
Namespace ID (IS)	Value in Filler Application field configured in the SWS HL7 ORU Interface Configuration form. This field is optional. The maximum length is 20.

The filler order number is defined by HL7 as uniquely and permanently identifying the order that has been filled among other orders filled by the filler. SWS is defined as the filler application, although ultrasound systems are used to do the work of filling an order. When DICOM modality worklist is used, the ultrasound system pulls the Accession Number from the worklist (RIS) server, and this is ultimately used as the filler order number when SWS creates the ORU result. When modality worklist is not used, the Accession Number can be manually entered on the ultrasound system. If the ultrasound system Accession Number contains a value, SWS retains that value, otherwise, SWS automatically generates a unique Accession Number. This value can be edited by the SWS user. Regardless, the Accession Number value is used for the filler order number. It is the responsibility of the SWS user to ensure that manually created filler order numbers are unique and permanent.



## OBR-4 Universal Service Identifier

This field contains an identifier code for the requested service. Its value is defined by the following table.

Table 3-8: Universal Service Identifier

Component	Component Value
Identifier (ST)	The value entered into the Requested Service ID field in the Worksheet Form in SWS.  This field is required. The maximum length is 20.
Text (ST)	Contains the same value as the Identifier. This field is required. The maximum length is 20.
Name of Coding System (ID)	Value in Requested Service Code System Name configured in the SWS HL7 ORU Interface Configuration form. This field is required. The maximum length is 20.

Because SWS does not receive orders (ORM) messages, the original requested service – as identified by Universal Service Identifier – is not directly available, but must be manually entered by the SWS user.

## OBR-7 Observation Date/Time

This field contains the date/time of the performed observation/procedure for which the report provides interpretation. The value is the DICOM series date/time for the series associated with the report being created.

## OBR-16 Ordering Provider

This field contains the name of the ordering provider. It contains the value in the Referring Physician field in the SWS Patient Form for the study corresponding to the report being created. This value, if non-empty, is placed in the second (Family Name) component of OBR-16.

## OBR-22 Results Rpt/Status Change – Date/Time

This field contains the date/time at which the interpreting physician signed (marked complete) the worksheet that is the source of the report (ORU).

## OBR-25 Result Status

All ORU messages (reports) created by SWS require that the interpreting physician electronically certify that the report is final. The value for this field is F.

## OBR-32 Principal Result Interpreter

This field contains the name of the physician responsible for the interpretation and findings being reported in the ORU message. The value of the field is defined by the following tables.

Table 3-9: Principal Result Interpreter Components

Component	Component Value
Name (CNN)	See following table

Table 3-10: Name Subcomponents

Subcomponent	Subcomponent Value
Family Name (ST)	Contains the value entered in the Last Name field for the SWS user who marked the source worksheet complete.
Given Name (ST)	Contains the value entered in the First Name field for the SWS user who marked the source worksheet complete.
Second and Further Given Names or Initials Thereof (ST)	Contains the value (possibly empty) entered in the Middle Name field for the SWS user who marked the source worksheet complete.
Degree (IS)	Contains the value entered in the Degree field for the SWS user who marked the source worksheet complete.

## OBX (Textual)

This section specifies the OBX segments sent when SWS is configured to send multiple textual OBX segments representing the report.

The following table specifies the sequence of OBX segments that are sent for an arbitrary ORU message. This table also serves as a Local Code Table for Observation Identifier.

Table 3-11: Sequencing of OBX Segments

Observation Name	Description	OPT
Title	Name of worksheet upon which the Report is based	R
PatientName	Name of patient	R
PatientID	ID of patient	R
PatientDOB	Date of birth of patient	O

Table 3-11: Sequencing of OBX Segments

Observation Name	Description	OPT
PatientIndications	Indications entered in Patient Form	O
PatientGender	Gender of patient	O
Accession	Accession Number	R
ReferringDr	Name of Referring Doctor	O
ReadingDr	Name of Reading Doctor	O
PatientExamGeneric1	Blood Pressure of Patient   Heart Rate of Patient   Height of Patient   Weight of Patient   Body Surface Area of Patient   Last Menstrual Period of Pregnant Patient   Estimated Due Date of Pregnant Patient	O
PatientExamGeneric2	Blood Pressure of Patient   Heart Rate of Patient   Height of Patient   Weight of Patient   Body Surface Area of Patient   Last Menstrual Period of Pregnant Patient   Estimated Due Date of Pregnant Patient	O
PatientExamGeneric3	Blood Pressure of Patient   Heart Rate of Patient   Height of Patient   Weight of Patient   Body Surface Area of Patient   Last Menstrual Period of Pregnant Patient   Estimated Due Date of Pregnant Patient	O
PatientExamGeneric4	Blood Pressure of Patient   Heart Rate of Patient   Height of Patient   Weight of Patient   Body Surface Area of Patient   Last Menstrual Period of Pregnant Patient   Estimated Due Date of Pregnant Patient	O
PatientExamGeneric5	Blood Pressure of Patient   Heart Rate of Patient   Height of Patient   Weight of Patient   Body Surface Area of Patient   Last Menstrual Period of Pregnant Patient   Estimated Due Date of Pregnant Patient	O
PatientExamGeneric6	Blood Pressure of Patient   Heart Rate of Patient   Height of Patient   Weight of Patient   Body Surface Area of Patient   Last Menstrual Period of Pregnant Patient   Estimated Due Date of Pregnant Patient	O

Table 3-11: Sequencing of OBX Segments

Observation Name	Description	OPT
WorksheetIndications	Indications specified in Worksheet Form, converted to sentence format.	O
ProcedureDetails	Detailed Findings and Observations specified in Worksheet Form, converted to sentence format.	O
Conclusions	Conclusions specified in Worksheet Form, converted to sentence format.	O
Comments	Comments specified in Worksheet Form, converted to sentence format.	O
TxClinician	(Cartcept worksheet type only) Naming information of clinician administering injection	O
TxInitiatedDate	(Cartcept worksheet type only) Start date of injection	O
TxInitiatedTime	(Cartcept worksheet type only) Start time of injection	O
TxCompletionDate	(Cartcept worksheet type only) End date of injection	O
TxCompletionTime	(Cartcept worksheet type only) End time of injection	O
TxDrugAndStrength1	(Cartcept worksheet type only) Name and Strength of Drug 1	O
TxDrugDosage1	(Cartcept worksheet type only) Dosage of Drug 1	O
TxDrugAndStrength2	(Cartcept worksheet type only) Name and Strength of Drug 2	O
TxDrugDosage2	(Cartcept worksheet type only) Dosage of Drug 2	O
TxDrugAndStrength3	(Cartcept worksheet type only) Name and Strength of Drug 3	O

Table 3-11: Sequencing of OBX Segments

Observation Name	Description	OPT
TxDrugDosage3	(Cartcept worksheet type only) Dosage of Drug 3	O
TxTotalVolDelivered	(Cartcept worksheet type only) Total volume of all drugs administered	O
TxRisksBenefitsReviewed	(Cartcept worksheet type only) Indication that Injection risks, benefits, and alternatives were reviewed with patient	O
TxPermissionReceived	(Cartcept worksheet type only) Indication that patient gave permission for the injection	O
TxPatientTolerated	(Cartcept worksheet type only) Indication that patient tolerated the injection procedure well	O
TxComments	(Cartcept worksheet type only) Comments specified as free text in Cartcept worksheet form	O
Signature	Electronic Signature statement	R
AttachedImage	Encapsulated JPEG (ED data type).	O (0-10). Images are included if SWS is configured to include selected images as encapsulated JPEGs (ED).

The following table specifies the sequence structure of each OBX segment.

Table 3-12: OBX Observation

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
1	4	SI	R			00569	Set ID - OBX
2	3	ID	R		0125	00570	Value Type
3	705	CWE	R		9999	00571	Observation Identifier

**Table 3-12: OBX Observation**

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
5	*	**	R			00573	Observation Value
11	1	ID	R		0085	00579	Observation Result Status

\* Depends on the Data Type's length as specified by the Value Type  
\*\* Varies depending on the Value Type

### OBX-1 Set ID – OBX (Textual)

This field identifies each OBX segment in the sequence of all OBX segments contained in the ORU message. It is a sequential number encoded as decimal ascii text. Its value starts at 1 (0001), and goes to a maximum of 9999 (9999). If more than 9999 OBX segments are required, the value rolls over to 1.

### OBX-2 Value Type (Textual)

This field's value is **TX** for all OBX segments, except AttachedImage, for which it is **ED**.

### OBX-3 Observation Identifier (Textual)

This field's value is defined by the following table.

**Table 3-13: Observation Identifier**

Component	Component Value
Identifier (ST)	One of the values in Observation Name column of Table 12 Sequencing of OBX Segments
Text (ST)	The DICOM Series Instance UID, except for AttachedImage, it is the DICOM SOP Instance UID.

### OBX-5 Observation Value (Textual)

With the exception of AttachedImage, the contents of this field appears as a Label followed by “:” followed by textual content. For example:

Creation Date: 20100405123106

Although the HL7 standard specifies that a separate OBX segment should be used for each independent observation, these OBX segments may contain more than one independent observation:

Table 3-14: Multiple Independent Observations

Observations that may contain multiple independent observations
WorksheetIndications
ProcedureDetails
Conclusions
Comments

For AttachedImage, a JPEG image is included as an ED data type. Its contents are defined by the following table.

Table 3-15: ED Data Type

ED Component	ED Component Value
Source Application	Value in Filler Application field configured in the SWS HL7 ORU Interface Configuration form. This field is optional. The maximum length is 20. It is placed in the Namespace ID subcomponent.
Type of Data	image
Data Subtype	image/jpeg
Encoding	Base64
Data	The Base-64 encoded JPEG (See Appendix A)

Although the HL7 standard specifies that the OBX-5 Observation Value containing an ED should appropriately contain a MIME package, which itself is encoded in ascii but contains the Base64 payload, SWS takes the approach of foregoing the MIME package, and directly providing the Base-64 encoded JPEG in the Data component (OBX-5.5-Data). As such, the Type of Data is specified as image, not multipart, and the Encoding is specified as Base64, not A.

## OBX-11 Observation Result Status (Textual)

The value of this field is F.

## OBX (Encapsulated)

This section specifies the OBX segments sent when SWS is configured to send report data as encapsulated content in an ED data type in an OBX segment. In such a configuration, the ORU message contains exactly one OBX segment.

Table 3-16: OBX Observation

SEQ	LEN	DT	OPT	RP/#	TBL/#	Item#	Element Name
1	4	SI	R			00569	Set ID - OBX
2	3	ID	R		0125	00570	Value Type
3	705	CWE	R		9999	00571	Observation Identifier
5	*	**	R			00573	Observation Value
11	1	ID	R		0085	00579	Observation Result Status

\* Depends on the Data Type's length as specified by the Value Type  
 \*\* Varies depending on the Value Type

### OBX-1 Set ID – OBX (Encapsulated)

This field's value is 1.

### OBX-2 Value Type (Encapsulated)

This field's value is ED.

### Observation Identifier (Encapsulated)

This field's value is defined by the following table.

Table 3-17: Observation Identifier

Component	Component Value
Identifier (ST)	Encapsulated Report
Text (ST)	The Series Instance UID

### OBX-5 Observation Value (Encapsulated)

The value is an instance of the ED data type. Its contents are defined by the following table.



Table 3-18: ED Data Type

ED Component	ED Component Value
Source Application	Value in Filler Application field configured in the SWS HL7 ORU Interface Configuration form. This field is optional. The maximum length is 20.
Type of Data	application
Data Subtype	application/pdf
Encoding	Base64
Data	The Base-64 encoded PDF (See Appendix A)

Although the HL7 standard specifies that the OBX-5 Observation Value should appropriately contain a MIME package, which itself is encoded in `ascii` but contains the Base64 payload, SWS takes the approach of foregoing the MIME package, and directly providing the Base-64 encoded PDF in the Data component (OBX-5.5-Data). As such, the Type of Data is specified as `text`, not `multipart`, and the Encoding is specified as `Base64`, not `A`.

### OBX-11 Observation Result Status (Encapsulated)

The value of this field is `F`.



# Appendix A

## Base 64 Encoding

Base 64 encoding adheres to RFC 2045 Multipurpose Internet Mail Extensions (MIME) Part One: format of Internet Message Bodies, Section 6.8 Base64 Content-Transfer-Encoding. The encoded data is not chunked.



# Appendix B

## Sample Messages

### HL7 Message with Encapsulated PDF

```
MSH|^~\&|SWSIMAGESRVR|SONOSITE_ENG|MIRTH|SONOSITE_ENG|20100719171917.926||ORU
^R01^ORU_R01|1279585157566|P|2.6||||UNICODE UTF-8
PID|1||SWS-F4263E6F|EXAMPLE^JOSEPHINE^DEVA||19641102|F
OBR|1|899911-333^fred|00112781^SWS_FILLERUP|077777-TCD^077777-
TCD^DEFAULT_RSCSN||20090923155556|||||^KENOB|||||F|||||&Da Ravinolvado-
Miranessa&Alfonse&&&&C.A.
OBX|1|ED|Encapsulated
Report^1.2.840.114340.3.8251016058117.2.20090923.155556.44||fred^application^application/p
df^Base64^<Base64 Encoded PDF>|||||F
```

### HL7 Message as Textual OBX with Two Embedded JPEGs

```
MSH|^~\&|SWSIMAGESRVR|SONOSITE_ENG|MIRTH|SONOSITE_ENG|20100719133858.504||ORU
^R01^ORU_R01|1279571938021|P|2.6||||UNICODE UTF-8
PID|1||SWS-F4263E6F|EXAMPLE^JOSEPHINE^DEVA||19641102|F
OBR|1|899911-333^fred|00112781^SWS_FILLERUP|077777-TCD^077777-
TCD^DEFAULT_RSCSN||20090923155556|||||^KENOB|||||F|||||&Da Ravinolvado-
Miranessa&Alfonse&&&&C.A.
OBX|1|TX|Title^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Report Title:
Cardiac|||||F
OBX|2|TX|PatientName^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Patient
Name: EXAMPLE, JOSEPHINE DEVA,|||||F
OBX|3|TX|PatientID^1.2.840.114340.3.8251016058117.2.20090923.155556.44||ID: SWS-
F4263E6F|||||F
OBX|4|TX|PatientDOB^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Date of Birth:
02 Nov, 1964|||||F
OBX|5|TX|PatientIndications^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Indicatio
ns: These are indications entered in the patient form|||||F
OBX|6|TX|PatientGender^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Gender:
female|||||F
OBX|7|TX|Accession^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Accession:
00112781|||||F
OBX|8|TX|ReferringDr^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Referring Dr.:
KENOB|||||F
OBX|9|TX|ReadingDr^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Reading Dr.:
YODA|||||F
OBX|10|TX|WorksheetIndications^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Ind
ications: Patient presents with shortness of breath, trauma, hypotension, hypoxia. Free text
indications entered in cardiac worksheet form|||||F
OBX|11|TX|ProcedureDetails^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Proced
ure Details: A subcostal view of the heart was obtained and demonstrated no evidence of
```

pericardial effusion. A parasternal view of the heart was obtained and demonstrated no evidence of pericardial effusion. An apical 4-chamber view of the heart was obtained and demonstrated no evidence of pericardial effusion.|||||F

OBX|12|TX|Conclusions^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Conclusions: This exam was: positive for cardiac activity, negative for tamponade physiology, negative for a pericardial effusion in the subcostal view, negative for a pericardial effusion in the parasternal view, negative for a pericardial effusion in the apical 4-chamber view.|||||F

OBX|13|TX|Comments^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Comments: Comments entered in Additional Notes in the Cardiac Worksheet During the exam, the following anatomical areas were not visualized due to example reason: example area.|||||F

OBX|14|TX|Signature^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Electronic Signature: This report was electronically signed by Da Ravinolvado-Miranessa, Alfonse, C.A. at 2010-Jul-19, 01:37 PM. Findings and interpretation were completed by Benson, Benjamin, MD at 2010-Jul-19, 01:36 PM.|||||F

OBX|15|ED|AttachedImage^1.2.840.114340.3.8251016058117.3.20090923.160940.349.4||fred^i  
mage^image/jpeg^Base64^<Base64 Encoded JPEG>|||||F

OBX|16|ED|AttachedImage^1.2.840.114340.3.8251016058117.3.20090923.161000.350.4||fred^i  
mage^image/jpeg^Base64^<Base64 Encoded JPEG>|||||F

## HL7 Message as Textual OBX, No Embedded JPEGs

MSH|^~\&|SWSIMAGESRVR|SONOSITE\_ENG|MIRTH|SONOSITE\_ENG|20100719171824.710||ORU  
^R01^ORU\_R01|1279585104679|P|2.6|||||UNICODE UTF-8

PID|1||SWS-F4263E6F||EXAMPLE^JOSEPHINE^DEVA||19641102|F

OBR|1|899911-333^fred|00112781^SWS\_FILLERUP|077777-TCD^077777-

TCD^DEFAULT\_RSCSN||20090923155556|||||^KENOB|||||F|||||&Da Ravinolvado-  
Miranessa&Alfonse&&&&C.A.

OBX|1|TX|Title^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Report Title:  
Cardiac|||||F

OBX|2|TX|PatientName^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Patient  
Name: EXAMPLE, JOSEPHINE DEVA,|||||F

OBX|3|TX|PatientID^1.2.840.114340.3.8251016058117.2.20090923.155556.44||ID: SWS-  
F4263E6F|||||F

OBX|4|TX|PatientDOB^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Date of Birth:  
02 Nov, 1964|||||F

OBX|5|TX|PatientIndications^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Indicatio  
ns: These are indications entered in the patient form|||||F

OBX|6|TX|PatientGender^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Gender:  
female|||||F

OBX|7|TX|Accession^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Accession:  
00112781|||||F

OBX|8|TX|ReferringDr^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Referring Dr.:  
KENOB|||||F

OBX|9|TX|ReadingDr^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Reading Dr.:  
YODA|||||F

OBX|10|TX|WorksheetIndications^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Ind  
ications: Patient presents with shortness of breath, trauma, hypotension, hypoxia. Free text  
indications entered in cardiac worksheet form|||||F

OBX|11|TX|ProcedureDetails^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Proced  
ure Details: A subcostal view of the heart was obtained and demonstrated no evidence of

pericardial effusion. A parasternal view of the heart was obtained and demonstrated no evidence of pericardial effusion. An apical 4-chamber view of the heart was obtained and demonstrated no evidence of pericardial effusion.|||||F

OBX|12|TX|Conclusions^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Conclusions: This exam was: positive for cardiac activity, negative for tamponade physiology, negative for a pericardial effusion in the subcostal view, negative for a pericardial effusion in the parasternal view, negative for a pericardial effusion in the apical 4-chamber view.|||||F

OBX|13|TX|Comments^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Comments: Comments entered in Additional Notes in the Cardiac Worksheet During the exam, the following anatomical areas were not visualized due to example reason: example area.|||||F

OBX|14|TX|Signature^1.2.840.114340.3.8251016058117.2.20090923.155556.44||Electronic Signature: This report was electronically signed by Da Ravinolvado-Miranessa, Alfonse, C.A. at 2010-Jul-19, 01:37 PM. Findings and interpretation were completed by Benson, Benjamin, MD at 2010-Jul-19, 01:36 PM.|||||F

**FUJIFILM**  
Value from Innovation

**SonoSite**

D09103