

OTObase HL7 Integration

Reference Manual

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Technical support

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Table of Contents

1	Overview	5
2	OTObase EMR connector for HL7 interface	6
3	Supported HL7 messages types	7
3.1	ORM (Observation/Order Request Order Message)	7
3.1.1	Placing a new Order request	7
3.1.1.1	Message Header (MSH) segment	7
3.1.1.2	Patient Identification (PID) segment	9
3.1.1.3	Patient Visit (PV1) segment	10
3.1.1.4	Common Order (ORC) segment	13
3.1.1.5	Observation Request (OBR) segment	14
3.1.2	Example of ORM Message for a new order request	16
3.2	ADT^A01 (Patient Admit Message)	16
3.2.1	Message Header (MSH) segment	16
3.2.2	Patient Identification (PID) segment	16
3.2.3	Patient Visit 1 (PV1) segment	16
3.2.4	Example of ADT^A01 message	16
3.3	ADT^A03 (Patient Discharge Message)	17
3.4	ADT^A04 (Patient Registration Message)	17
3.5	ADT^A08 (Patient Information Update Message)	18
3.6	ACK (Acknowledgment) message & ADT	18
3.6.1	Message Header (MSH) segment	19
3.6.2	Message Acknowledgment (MSA) segment	20
3.6.3	Example of Acknowledgment (ACK) message in case of success	20
3.6.4	Example of Acknowledgment (ACK) message in case of failure	20
3.7	QRY_A19 (Patient Query Request message)	21
3.7.1	Message Header (MSH) segment	21
3.7.2	Query Definition (QRD) segment	22
3.7.3	Example of QRY_A19 message	22
3.8	ADR_A19 (Patient Query Response message)	23
3.8.1	Message Header (MSH) segment	23
3.8.2	Message Acknowledgment (MSA) segment	24
3.8.3	Query Definition (QRD) segment	24
3.8.4	Patient Identification (PID) segment	25
3.8.5	Patient Visit (PV1) segment	25
3.8.6	Example of ADR_A19 message when patient found	25
3.8.7	Example of ADR_A19 message when patient not found	25
3.9	ORU (Observation Result Unsolicited message)	26
3.9.1	Message Header (MSH) segment	26
3.9.2	Common Order (ORC) segment	27
3.9.3	Observation Request (OBR) segment	28
3.9.4	Observation Result (OBX) segment	30
3.9.5	Example of ORU message	31
3.10	ACK (Acknowledgment message for ORU)	31
3.10.1	Message Header (MSH) segment	32
3.10.2	Message Acknowledgment (MSA) segment	33
3.10.3	Example of ORU Acknowledgment (ACK) message in case of success	33
3.10.4	Example of ORU Acknowledgment (ACK) message in case of failure	33

4	Communication protocol	34
5	Opening an existing order	35

1 Overview

The HL7 (Health Level Seven) standard was developed by a community of healthcare subject matter experts and information scientists collaborating to create standards for the exchange, management and integration of electronic healthcare information.

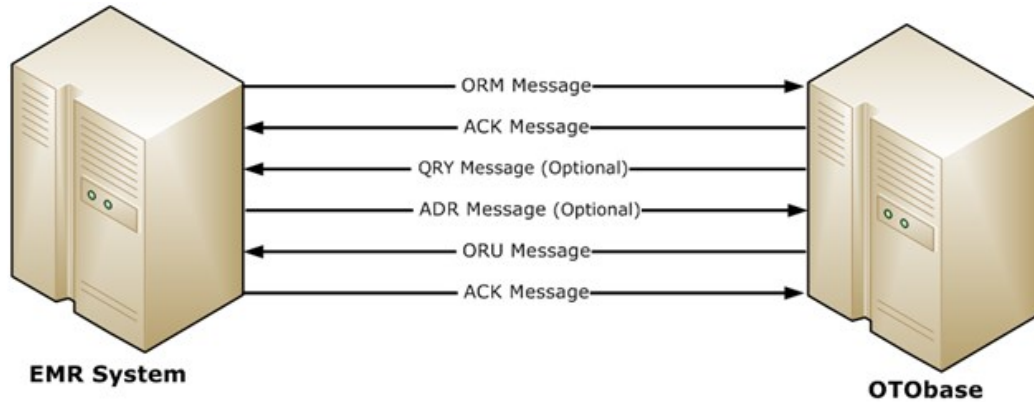
HL7 refers to the highest level of the international Standards Organization's (ISO) communication model for Open System Interconnection (OSI).

The application level addresses the data definition to be exchanged, the interchange timing, and the communication of certain errors to the application. The seventh level supports such functions as security checks, participant identification, availability checks, exchange mechanism negotiations and, most importantly, it supports the standard for exchange of data among healthcare applications.

2 OTObase EMR connector for HL7 interface

The OTObase EMR connector for HL7 interface provides a standard messaging format for transferring information from system to system. The OTObase EMR Connector provides a work flow to interchange the electronic data of patients such as demographic data and audiology measurement reports.

The following response paradigms relate to the communication between an EMR System and the OTObase HL7 interface.



- The EMR system sends ORM (Observation/Order Request Message) messages to OTObase. OTObase replies with an ACK (Acknowledgment) message and then OTObase sends an ORU (Observation Result Unsolicited) message containing the finished transcriptions back to the EMR system. The EMR system should send an ACK message to OTObase in reply to the ORU message.
- OTObase sends a QRY (Patient Query) message to the EMR System. The EMR System should send an ADR (Patient Query Response) message back to OTObase.

3 Supported HL7 messages types

The following HL7 message types are supported by the OTObase EMR Connector for HL7 Interface:

- [ORM \(Observation/Order Request Order Message\) ▶ 7](#)
- [ADT^A01 \(Patient Admit Message\) ▶ 16](#)
- [ADT^A03 \(Patient Discharge Message\) ▶ 17](#)
- [ADT^A04 \(Patient Registration Message\) ▶ 17](#)
- [ADT^A08 \(Patient Information Update Message\) ▶ 18](#)
- [ACK \(Acknowledgment\) message & ADT ▶ 18](#)
- [QRY_A19 \(Patient Query Request message\) ▶ 21](#)
- [ADR_A19 \(Patient Query Response message\) ▶ 23](#)
- [ORU \(Observation Result Unsolicited message\) ▶ 26](#)
- [ACK \(Acknowledgment message for ORU\) ▶ 31](#)

The tables in the following sections of the manual describe the elements in each of the message types.

The table rows are color coded to indicate whether the element is Required (R), Optional (O) or Unused (U), as follows:

Row type	Use identifier	Description
1	O	Optional
2	R	Required
3	U	Unused

3.1 ORM (Observation/Order Request Order Message)

The function of this message is to initiate the transmission of information about an order/observation. This includes placing a new observation request and registering a patient in OTObase.

3.1.1 Placing a new Order request

The HL7 Order message (ORM) should contain the following information in order to place a new observation/order request in OTObase.

3.1.1.1 Message Header (MSH) segment

Position	Element	Use	Example
1	Field Separator	R	Pipe symbol -
2	Encoding Characters	R	^~\&
	1. Component		^
	2. Repeat		~
	3. Escape		\
	4. Sub component		&

3 Supported HL7 messages types

Position	Element	Use	Example
3	Sending Application Name	R	OTObase (User defined during configuration)
4	Sending Facility Name	R	OTObase (User defined during configuration)
5	Receiving Application	R	EMR System (User defined during configuration)
6	Receiving Facility	R	EMR System (User defined during configuration)
7	Date and Time of Message	R	YYYYMMDDhhmmss 20130125052045
8	Security	U	
9	Message Type 1. Message Type 2. Trigger Event	R	“ORMO01” or “ADT^A01” or “ADT^A03” or “ADT^A04” or “ADT^A08” ORM/ADT O01/A01/A03/A04/A08 Note: Message type & trigger event will be different depending upon the type of message.
10	Message Control Identifier	R	ORM20130125052045
11	Processing ID	O	P = Production T= Training D= Debugging
12	HL7 Version	R	2.4,2.5,2.6,2.7.
13	Sequence Number	U	A non-null value in this field implies that the sequence number protocol is in use. This numeric field is incremented by one for each subsequent value.
14	Continuation Pointer	U	This field is used to define continuations in application-specific ways.
15	Accept Acknowledgment Type	U	AL = Always NE = Never ER = Erroneous conditions SU = Successful completion

Position	Element	Use	Example
16	Application Acknowledgment Type	U	AL = Always NE = Never ER = Erroneous conditions SU = Successful completion
17	Country Code	U	ISO 3166 provides a list of country codes.
18	Character Set	U	Alternate character sets not used.
19	Principle Language of Message	U	ISO 639 provides a list of codes.

3.1.1.2 Patient Identification (PID) segment

Position	Element	Use	Example
1	Set ID	R	
2	Patient ID – External ID	O	
3	Patient ID – Internal ID	R	00004
4	Alternate Patient ID	U	
5	Patient Name 1. Last Name 2. First Name 3. Middle Name 4. Suffix 5. Prefix	R	Mr. Fischer Martin
6	Mother's Maiden Name	U	
7	Date and Time of Birth	R	YYYYMMDDhhmmss 19730704063200
8	Sex	R	M
9	Patient Alias 1. Last Name 2. First Name 3. Middle Name 4. Suffix 5. Prefix	U	
10	Race	U	

Position	Element	Use	Example
11	Patient Address 1. Street Or Mailing Address 2. Other destination 3. City 4. State 5. Postal Code 6. Country	R	123 West St. Denver CO 80020 USA.
12	County Code	O	
13	Phone Number – Home	R	01-22010-4520
14	Phone Number – Business	R	01-22011-4520
15	Primary Language	O	
16	Marital Status	O	
17	Religion	O	
18	Patient Account Number	O	
19	Social Security Number	O	
20	Driver’s License Number	U	
21	Mother’s Identifier	U	
22	Ethnic Group	U	
23	Birth Place	U	
24	Multiple Birth Indicator	U	
25	Birth Order	U	
26	Citizenship	U	
27	Veteran’s Military Status	U	
28	Nationality	U	
29	Patient Death and Time	U	
30	Patient Death Indicator	U	

3.1.1.3 Patient Visit (PV1) segment

This is an optional segment. An ORM or ADT message may or may not contain this segment.

If this segment is included in the incoming message, then OTObase will use this segment to get the visit location detail. Based on that, the patient location filter will be populated. OTObase provides the patient visit location filter in the pending work list. This location filter can be used to get the list of patients that are expected to visit the specific facility/location.

Position	Element	Use	Example
1	Set ID	O	
2	Patient Class	O	
3	Assigned Patient Location Point of Care Room Bed Facility	R	
4	Admission type	U	
5	Pre admit Number	U	
6	Prior Patient Location	U	
7	Attending Doctor 1. Last Name 2. First Name 3. Middle Initial	O	
8	Referring Doctor 4. Last Name 5. First Name 6. Middle Initial	O	
9	Consulting Doctor 7. Last Name 8. First Name 9. Middle Initial	O	
10	Hospital Service	U	
11	Temporary Location	U	
12	Pre-admit Test Indicator	U	
13	Re-admission Indicator	U	
14	Admit Source	U	

3 Supported HL7 messages types

Position	Element	Use	Example
15	Ambulatory Status	U	
16	VIP Indicator	U	
17	Admitting Doctor	U	
18	Patient Type	U	
19	Visit Number	R	01-22011-4520
20	Financial Class	U	
21	Charge Price Indicator	U	
22	Courtesy Code	U	
23	Credit Rating	U	
24	Contract Code	U	
25	Contract Effective Date	U	
26	Contract Amount	U	
27	Contract Period	U	
28	Interest Code	U	
29	Transfer to Bad Debt Code	U	
30	Transfer to Bad Debt Date	U	
31	Bad Debt Agency Code	U	
32	Bad Debt Transfer Amount	U	
33	Bad Debt Recovery Amount	U	
34	Delete Account Indicator	U	
35	Delete Account Date	U	
36	Discharge Disposition	U	
37	Discharged to Location	U	
38	Diet Type	U	
39	Servicing Facility	U	
40	Bed Status	U	

Position	Element	Use	Example
41	Account Status	U	
42	Pending Location	U	
43	Prior Temporary Location	U	
44	Admit Date and Time	U	
45	Discharge Date and Time	U	
46	Current Patient Balance	U	
47	Total Charges	U	
48	Total Adjustments	U	
49	Total Payments	U	
50	Alternative Visit ID	U	
51	Visit Indicator	U	
52	Other Healthcare Provider	U	

3.1.1.4 Common Order (ORC) segment

Position	Element	Use	Example
1	Order Control	O	NW
2	Placer Order Number	O	3071014
3	Filler Order Number	U	
4	Placer Group Number	U	
5	Order Status	U	
6	Response Flag	U	
7	Quantity/Timing	U	
8	Parent	U	
9	Date and Time of Transaction	U	
10	Entered By	U	
11	Verified By	U	

Position	Element	Use	Example
12	Ordering Provider	U	
13	Enterer's Location	U	
14	Callback Phone Number	U	
15	Order Effective Date and Time	U	
16	Order Control Code Reason	U	
17	Entering Organization	U	
18	Entering Device	U	
19	Action By	U	

3.1.1.5 Observation Request (OBR) segment

Position	Element	Use	Example
1	Set ID	R	1
2	Placer Order Number	R	20060307110
3	Filler Order Number	O	0109
4	Universal Service Identifier	O	
5	Priority	U	
6	Requested Date and Time	U	
7	Observation Date and Time	U	
8	Observation End Date and Time	U	
9	Collection Volume	U	
10	Collector Identifier	U	
11	Specimen Action Code	U	
12	Danger Code	U	
13	Relevant Clinical Information	U	
14	Specimen Received Date and Time	U	

Position	Element	Use	Example
15	Specimen Source	U	
16	Ordering Provider	U	
17	Order Callback Phone Number	U	
18	Placer Field 1	U	
19	Placer Field 2	U	
20	Filler Field 1	U	
21	Filler Field 2	U	
22	Results Report/Status Change Date and Time	U	
23	Charge to Practice	U	
24	Diagnostic Service Section ID	U	
25	Result Status	U	
26	Parent Result	U	
27	Quantity / Timing	U	
28	Result Copies to	U	
29	Parent	U	
30	Transportation Mode	U	
31	Reason for Study	U	
32	Principal Result Interpreter	U	
33	Assistant Result Interpreter	U	
34	Technician	U	
35	Transcriptionist	U	
36	Scheduled Date and Time	U	
37	Number of Sample Containers	U	
38	Transport Logistics of Collected Samples	U	
39	Collector's Comment	U	

Position	Element	Use	Example
40	Transport Arrangement Responsibility	U	
41	Transport Arranged	U	
42	Escort Required	U	
43	Planned Patient Transport Comment	U	

3.1.2 Example of ORM Message for a new order request

The following is an example of an ORM message :

```
MSH|^~\&|EMR|EMR|OTObase|OTObase|20060307110114||ORM^O01|ORM20130125110113|P|2.7
PID|||00004||Fischer^Martin^^Mr.||19670824|M|||123 West St. ^^Denver^CO^80020^USA|||||
PV1||O|OP^PAREG^|||2342^Jones^Bob|||OP|||||||2|||||||20060307110111|
ORC|NW|20060307110114
OBR|1|20060307110114||003038^Urinalysis^L|||20060307110114
```

3.2 ADT^A01 (Patient Admit Message)

An Admit Patient Message (A01 event) is used for admitted patients only. These messages are sent when the patient begins the stay at the healthcare facility. Normally, this information is entered in the hospital information system and then sent to nursing units and ancillary systems, to notify the patients' arrival at the healthcare facility.

When OTObase receives this message, it extracts the patient demographic information. If the patient does not exist, OTObase creates the patient. If the patient exists, OTObase updates the existing patient. After that OTObase adds the patient appointment in the work list.

3.2.1 Message Header (MSH) segment

See [Message Header \(MSH\) segment](#) ► 7.

3.2.2 Patient Identification (PID) segment

See [Patient Identification \(PID\) segment](#) ► 9.

3.2.3 Patient Visit 1 (PV1) segment

See [Patient Visit \(PV1\) segment](#) ► 10.

3.2.4 Example of ADT^A01 message

The following is an example of an ADT^A01 message:


```
MSH|^~\&|ADT1|MCM|LABADT|MCM|198808181126|SECURITY|ADT^A01|MSG00001-|P|2.6
EVN|A01|198808181123
PID|||PATID1234^5^M11^^AN||JONES^WILLIAM^A^III||19610615|M||2106-3|677 DELAWARE
AVENUE^^EVERETT^MA^02149|GL|(919)000-1000|(000)000-3400~(000)277-
3114||S||PATID12345001^2^M10^^ACSN|123456789|9-87654^NC
PV1|1|||2000^2012^01^SRO|||004777^LEBAUER^SIDNEY^J.|||SUR||-||ADM|A0
```

Note • OTObase will ignore the unsupported segments included in the ADT message, if there are any.

3.3 ADT^A03 (Patient Discharge Message)

A "Patient Discharge" or "end visit" message (A03 event) should be sent when an in-patient's stay at the healthcare facility has ended, or an out-patient visit has ended.

OTObase deletes the patient entry from the Pending Worklist (appointment), when this message is received. There are two possible scenarios for when the system automatically deletes a patient entry from the work list:

- When the user does the sign-off, an ORU message will be sent to the connected EMR system and the patient entry will be deleted from the pending worklist.
- When OTObase receives an ADT^A03 message, the patient entry will be deleted from the Pending Worklist without sending any message to the connected EMR system.

If OTObase does not contain any pending work item (appointment) for this patient, an ADT^A03 message will be ignored.

An ADT^A03 message should have MSH, PID, and PV1 segments like the ADT^A01 message. See the segment definition details above in the ADT^A01 message section, [Message Header \(MSH\) segment ► 16](#)

```
MSH|^~\&|ADT1|MCM|LABADT|MCM|198808181126|SECURITY|ADT^A03|MSG00001-|P|2.6
EVN|A03|198808181123
PID|||PATID1234^5^M11^^AN||JONES^WILLIAM^A^III||19610615|M||2106-3|677 DELAWARE
AVENUE^^EVERETT^MA^02149|GL|(919)000-1000|(000)000-3400~(000)277-
3114||S||PATID12345001^2^M10^^ACSN|123456789|9-87654^NC
PV1|1|||2000^2012^01^SRO|||004777^LEBAUER^SIDNEY^J.|||SUR||-||ADM|A0
```

3.4 ADT^A04 (Patient Registration Message)

A "Patient Registration" message (A04 event) signals that the patient has arrived or has checked in as an out-patient, or as a recurring or emergency room patient.

This message is like ADT^A01 (Patient Admit) message and OTObase handles this message exactly like the ADT^A01 message.

An ADT^A04 message should have MSH, PID, NK1, and PV1 segments like the ADT^A01 message. See the segment definition details in the ADT^A01 message section, [Message Header \(MSH\) segment ► 16](#)

```
MSH|^~\&|ADT1|MCM|LABADT|MCM|198808181126|SECURITY|ADT^A03|MSG00001-|P|2.6
EVN|A03|198808181123
PID|||PATID1234^5^M11^^AN||JONES^WILLIAM^A^III||19610615|M||2106-3|677 DELAWARE
AVENUE^^EVERETT^MA^02149|GL|(919)000-1000|(000)000-3400~(000)277-
3114||S||PATID12345001^2^M10^^ACSN|123456789|9-87654^NC
PV1|1||2000^2012^01^SRO|||004777^LEBAUER^SIDNEY^J.||SUR||-||ADM|A0
```

3.5 ADT^A08 (Patient Information Update Message)

The "Patient Information Update Message" (A08 event) is used when any patient information has changed but no other ADT event has occurred.

OTObase updates the patient details if the patient already exists, or creates a new patient with updated details. In this case patient information will be updated but any appointments will not be scheduled (i.e. the patient entry will not be added to the OTObase Pending Worklist).

An ADT^A08 message structure is like an ADT^A01 message. See the message, and segment details above in [ADT^A01 \(Patient Admit Message\)](#) ► 16.

```
MSH|^~\&|ADT1|MCM|LABADT|MCM|198808181126|SECURITY|ADT^A08|MSG00001-|P|2.6
EVN|A08|198808181123
PID|||PATID1234^5^M11^^AN||JONES^WILLIAM^A^III||19610615|M||2106-3|677 DELAWARE
AVENUE^^EVERETT^MA^02149|GL|(919)000-1000|(000)000-3400~(000)277-
3114||S||PATID12345001^2^M10^^ACSN|123456789|9-87654^NC
PV1|1||2000^2012^01^SRO|||004777^LEBAUER^SIDNEY^J.||SUR||-||ADM|A0
```

Note • It is assumed that the EMR system sends a supported ADT message to OTObase only for relevant patients. Non-audiological patient visits are completely irrelevant for OTObase. It is recommended that the EMR system should send only audiological patient ADT messages to OTObase.

3.6 ACK (Acknowledgment) message & ADT

OTObase sends acknowledgment (ACK) messages for all incoming ORM & ADT messages. The structure of the ACK is as follows:

3.6.1 Message Header (MSH) segment

Position	Element	Use	Example
1	Field Separator	R	Pipe symbol -
2	Encoding Characters 1. Component 2. Repeat 3. Escape 4. Sub component	R	^~\& ^ ~ \ &
3	Sending Application Name	R	OTObase (User defined during configuration)
4	Sending Facility Name	R	OTObase (User defined during configuration)
5	Receiving Application	R	EMR System (User defined during configuration)
6	Receiving Facility	R	EMR System (User defined during configuration)
7	Date and Time of Message	R	YYYYMMDDhhmmss 20130125052045
8	Security	U	
9	Message Type	R	ACK
10	Message Control Identifier	R	ORM20130125052045
11	Processing ID	O	P = Production T= Training D= Debugging
12	HL7 Version	R	2.4,2.5,2.6,2.7.
13	Sequence Number	U	
14	Continuation Pointer	U	
15	Accept Acknowledgment Type	U	
16	Application Acknowledgment Type	U	
17	Country Code	U	

Position	Element	Use	Example
18	Character Set	U	
19	Principle Language of Message	U	

3.6.2 Message Acknowledgment (MSA) segment

Position	Element	Use	Example
1	Acknowledgment Code	R	AA = Success AE = Error AR = Reject
2	Message Control ID	R	ORM20130125052045
3	Text Message	O	Success, Or Failure
4	Expected Sequence Number	U	
5	Delayed Acknowledgment Type	U	
6	Error Condition	O	

3.6.3 Example of Acknowledgment (ACK) message in case of success

OTObase sends an ACK message to acknowledge receipt of an ORM & ADT message. If the received message is accepted by OTObase, then OTObase sends a Success Acknowledgment message to the EMR system.

The following is an example of a Success Acknowledgment (ACK) message:

```
MSH|^~\&|OTObase | OTObase | EMR | EMR | 20130128012045||ACK| ORM20130125110114 |P|2.7
MSA|AA|ORM20130125110114|Success|||
```

3.6.4 Example of Acknowledgment (ACK) message in case of failure

If the received message is not accepted by OTObase, then OTObase sends a Failure Acknowledgment message to the EMR system.

The following is an example of a Failure Acknowledgment (ACK) message:

```
MSH|^~\&|OTObase | OTObase | EMR | EMR | 20130128012045||ACK| ORM20130125110114 |P|2.7
MSA|AE|ORM20130125110114|Failure|||
```

3.7 QRY_A19 (Patient Query Request message)

The function of this message is to send a query for patient information to the EMR system. This message will contain the patient number for unique identification.

3.7.1 Message Header (MSH) segment

Position	Element	Use	Example
1	Field Separator	R	Pipe symbol -
2	Encoding Characters 1. Component 2. Repeat 3. Escape 4. Sub component	R	^~\& ^ ~ \ &
3	Sending Application Name	R	OTObase (User defined during configuration)
4	Sending Facility Name	R	OTObase (User defined during configuration)
5	Receiving Application	R	EMR System (User defined during configuration)
6	Receiving Facility	R	EMR System (User defined during configuration)
7	Date and Time of Message	R	YYYYMMDDhhmmss 20130125052045
8	Security	U	
9	Message Type 1. Message Type 2. Trigger Event	R	QRY^A19 QRY A19
10	Message Control Identifier	R	QRY20130125052045
11	Processing ID	O	P = Production T = Training D= Debugging
12	HL7 Version	R	2.4,2.5,2.6,2.7.
13	Sequence Number	U	

3 Supported HL7 messages types

Position	Element	Use	Example
14	Continuation Pointer	U.	
15	Accept Acknowledgment Type	U	
16	Application Acknowledgment Type	U	
17	Country Code	U	
18	Character Set	U	
19	Principal Language of Message	U	

3.7.2 Query Definition (QRD) segment

Position	Element	Use	Example
1	Query Date Time	R	YYYYMMDDhhmmss 201301251911
2	Query Format Code	R	R (record oriented response)
3	Query Priority	R	I (Immediate)
4	Query ID	U	
5	Deferred Response Type	U	
6	Deferred Response Date Time Quantity	U	
7	Quantity	U	
8	Who Subject Filter 1. Patient ID Number 2. Family Name 3. Given Name	R	10204
9	What Subject Filter	U	
10	What Department Data Code	U	
11	What Data Code Value	U	
12	Query Result Level	U	

3.7.3 Example of QRY_A19 message

The following is an example of a patient query request message (for Patient Number: 10204) :

```
MSH|^~\&|OTObase|OTObase|EMR|EMR|20130125191110||QRY^A19|QRY20130125191110|P|2.7
QRD|201301251911|R|||10204|||
```

This message queries for the demographics information for a patient based upon the Patient ID/Number (medical record number). The Patient ID Number is specified in the QRD-8 element: Who Subject Filter.

3.8 ADR_A19 (Patient Query Response message)

This message is sent by the EMR system in response to the Patient Query Request (QRY_A19) message sent by OTObase. This message contains the patient demographic information for a particular patient based upon the Patient ID Number (medical record number).

3.8.1 Message Header (MSH) segment

Position	Element	Use	Example
1	Field Separator	R	Pipe symbol -
2	Encoding Characters 1. Component 2. Repeat 3. Escape 4. Sub component	R	^~\& ^ ~ \ &
3	Sending Application Name	R	OTObase (User defined during configuration)
4	Sending Facility Name	R	OTObase (User defined during configuration)
5	Receiving Application	R	EMR System (User defined during configuration)
6	Receiving Facility	R	EMR System (User defined during configuration)
7	Date and Time of Message	R	YYYYMMDDhhmmss 20130125052045
8	Security	U	
9	Message Type 1. Message Type 2. Trigger Type	R	ADR^A19 ADR A19
10	Message Control Identifier	R	QRY20130128145136

Position	Element	Use	Example
11	Processing ID	O	P = Production T= Training D= Debugging
12	HL7 Version	R	2.4,2.5,2.6,2.7.
13	Sequence Number	U	
14	Continuation Pointer	U	
15	Accept Acknowledgment Type	U	
16	Application Acknowledgment Type	U	
17	Country Code	U	
18	Character Set	U	
19	Principal Language of Message	U	

3.8.2 Message Acknowledgment (MSA) segment

See [Message Acknowledgment \(MSA\) segment](#) ► 20.

3.8.3 Query Definition (QRD) segment

Position	Element	Use	Example
1	Query Date Time	R	YYYYMMDDhhmmss 201301251911
2	Query Format Code	R	R (record oriented response)
3	Query Priority	R	I (Immediate)
4	Query ID	U	
5	Deferred Response Type	U	
6	Deferred Response Date Time Quantity	U	
7	Quantity	U	

Position	Element	Use	Example
8	Who Subject Filter 1. Patient ID Number 2. Family Name 3. Given Name	R	10204
9	What Subject Filter	U	
10	What Department Data Code	U	
11	What Data Code Value	U	
12	Query Result Level	U	

3.8.4 Patient Identification (PID) segment

See [Patient Identification \(PID\) segment](#) ► 9.

3.8.5 Patient Visit (PV1) segment

See [Patient Visit \(PV1\) segment](#) ► 10.

3.8.6 Example of ADR_A19 message when patient found

The following is an example of a patient query response message (for Patient Number: 10204) :

```
MSH|^~\&|AWS1|ZISSERVER|OTObase|OTObase|20130128145137||ADR^A19|QRY20130128145136|P|2.7||
MSA|AA|QRY20130128145136
QRD|201301281451|R|||10204
PID|||00004||Fischer^Martin^^Mr.||19670824|M|||123 West St. ^^Denver ^CO ^80020 ^USA|||
PV1|||A5TA^5014^|||0019^Jonge^^MWC^^de^Jhr.Dr.|||O|0000519145|||20040-5201030|
```

The above message contains patient demographic and visit information.

3.8.7 Example of ADR_A19 message when patient not found

The following is an example of a patient query response message (for Patient Number: 10204) if patient information is not found:

```
MSH|^~\&|AWS1|ZISSERVER|OTObase|OTObase|20130128145137||ADR^A19|QRY20130128145136|P|2.7||
MSA|AE|QRY20130128145136|Patient Not found.
```

3.9 ORU (Observation Result Unsolicited message)

OTObase returns finished transcriptions (a PDF report containing the test data or xml data based on the configuration) to the EMR system using an Observation Result Unsolicited (ORU) message that is triggered by OTObase when the patient is Signed Off (either manually or automatically).

The HL7 message will contain the following information:

3.9.1 Message Header (MSH) segment

Position	Element	Use	Example
1	Field Separator	R	Pipe symbol -
2	Encoding Characters 1. Component 2. Repeat 3. Escape 4. Sub component	R	^~\& ^ ~ \ &
3	Sending Application Name	R	OTObase (User defined during configuration)
4	Sending Facility Name	R	OTObase (User defined during configuration)
5	Receiving Application	R	EMR System (User defined during configuration)
6	Receiving Facility	R	EMR System (User defined during configuration)
7	Date and Time of Message	R	YYYYMMDDhhmmss 20130125052045
8	Security	U	
9	Message Type 1. Message Type 2. Trigger Event	R	ORU^R01 ORU R01
10	Message Control Identifier	R	ORU20130128145120
11	Processing ID	O	P = Production T= Training D= Debugging
12	HL7 Version	R	2.4,2.5,2.6,2.7.
13	Sequence Number	U	
14	Continuation Pointer	U	

Position	Element	Use	Example
15	Accept Acknowledgment Type	U	
16	Application Acknowledgment Type	U	
17	Country Code	U	
18	Character Set	U	
19	Principal Language of Message	U	

3.9.2 Common Order (ORC) segment

Position	Element	Use	Example
1	Order Control	O	NW
2	Placer Order Number	O	3071014
3	Filler Order Number	O	105400
4	Placer Group Number	U	
5	Order Status	U	
6	Response Flag	U	
7	Quantity/Timing	U	
8	Parent	U	
9	Date and Time of Transaction	U	
10	Entered By	U	
11	Verified By	U	
12	Ordering Provider	U	
13	Enterer's Location	U	
14	Callback Phone Number	U	
15	Order Effective Date and Time	U	
16	Order Control Code Reason	U	

Position	Element	Use	Example
17	Entering Organization	U	
18	Entering Device	U	
19	Action By	U	

3.9.3 Observation Request (OBR) segment

Position	Element	Use	Example
1	Set ID	O	1
2	Placer Order Number	R	3071014
3	Filler Order Number	R	105400
4	Universal Service Identifier	U	
5	Priority	U	
6	Requested Date and Time	O	
7	Observation Date and Time	U	
8	Observation End Date and Time	U	
9	Collection Volume	U	
10	Collector Identifier	U	
11	Specimen Action Code	U	
12	Danger Code	U	
13	Relevant Clinical Information	U	
14	Specimen Received Date and Time	U	
15	Specimen Source	U	
16	Ordering Provider	U	
17	Order Callback Phone Number	U	
18	Placer Field 1	U	
19	Placer Field 2	U	

Position	Element	Use	Example
20	Filler Field 1	U	
21	Filler Field 2	U	
22	Results Report/Status Change Date and Time	U	
23	Charge to Practice	U	
24	Diagnostic Service Section ID	U	
25	Result Status	U	
26	Parent Result	U	
27	Quantity / Timing	U	
28	Result Copies to	U	
29	Parent	U	
30	Transportation Mode	U	
31	Reason for Study	U	
32	Principal Result Interpreter	U	
33	Assistant Result Interpreter	U	
34	Technician	U	
35	Transcriptionist	U	
36	Scheduled Date and Time	U	
37	Number of Sample Containers	U	
38	Transport Logistics of Collected Samples	U	
39	Collector's Comment	U	
40	Transport Arrangement Responsibility	U	
41	Transport Arranged	U	
42	Escort Required	U	
43	Planned Patient Transport Comment	U	

3.9.4 Observation Result (OBX) segment

Position	Element	Use	Example
1	Set ID	R	
2	Value Type	R	AD Address DT Date ED Encapsulated Data RP Reference Pointer FT Formatted Text (Display) ST String Data. TX Text Data (Display) 4
3	Observation Identifier	O	102012
4	Observation Sub-ID	R	<ul style="list-style-type: none"> PDF Report Raw data (eg. Acrobat^text^pdf^Base64^JV BE Ri0xLjQK Jcfsj6IKNSAwIG9 iago8PC9MZ W5ndGggNiAwlFlvRmlsdG) PDF file path XML string (OTOSuite .gnd file format)
5	Observation Value	U	
6	Units	U	
7	References Range	U	
8	Abnormal Flags	U	
9	Probability	U	
10	Nature of Abnormal Test	U	
11	Observation Result Status	U	
12	Date of Last Observation Normal Values	U	
13	User-Defined Access Checks	U	
14	Date and Time of the Observation	U	
15	Producer's ID	U	
16	Responsible Observer	U	
17	Observation Method	U	

Note • The ORC and OBR segments of ORU message have a “Placer Order number” filed. This value is supposed to be supplied by the EMR system. OTObase gets this value when it receives the ORM message (in the order processing workflow). So, when OTObase will send the ORU message in response to ORM message, it will include the Placer order number in the message. However, the Placer order number field is not available in the ADT message, which means that when OTObase will send the ORU message in response to the ADT message, then the value of this field will remain blank.

3.9.5 Example of ORU message

The following is an example of an ORU message containing embedded PDF report data:

```
MSH|^~\&|OTObase|OTObase|EMR|EMR|20130128161405||ORU^R01|ORU20130128161405|P|2.7
PID|||0000002||Cocu^Philip||19701029
OBR|1|3071014|105400|||201301251910
OBX|1|ED|Report|1|Acrobat^text^pdf^Base64^JVBERi0xLjQKcjsj6IKNSAwIG9iago8PC9MZW5ndGg
gNiAwIFivRmlsdGVyIC9GbGF0ZURlY29kZT4+CnN0cmVhbQp4nI1SyU7EMAY95ytyTA41dtbmitEkIB
ROIOQqH1mQKkGyfl/3DZ0wibRqJllv/fs52QrEchIHMSn0PUC5TH/G7EVLdjhGwt13PVyP4u9RZTMym
uBkFjyNNZIRoRWxoDgZO7FUmWNEByiCepeNwgmRSdetCNAQret+pVNwTGpBSVHBDkYkzmH4hb
bYGL6tSFbhyPij6oA03go3NGHWkPIbpv0LU20DKQ6k6Pu/Dup/r7ZICrvp6pIFdVtWa97TSfmYRgkWZ
E8JFUNwra8zBMVxWKQB YgVlrN+GaqAnv7ofqKbFpw13OZM03AXPqn4Fcxp8sar83FIPji10IOFy4Cgr
ubkTcWqAFilaYot8dprh/2wA+6cBgVX+VSY4IEo8JPJK34l0zYtmSoqxjaVfLEPZWRZlke1wywu+XwAe
MqSBGVuZHN0cmVhbQplbmRvYmoKNiAwIG9iagosMjAKZW5kb2JqCjQgMCBvYmoKPDwwVHlwZS9Q
YWdlL01lZGlhQm94IFswIDAgNTk1IDg0Ml0KL1JvdGF0ZSAwL1BhcmVudCAzIDAgUgovUmVzb3VyY2
VzPDwwUHJvY1NldFsvUERGIC9UZXBh0XQovRm9udCA4IDAgUgovPgovQ29udGVudHMgNSAwIFIKPj4
KZW5kb2JqCjMgMCBvYmoKPDwwL1R5cGUgUgU1BhZ2VzIC9LaWRzIFsKNCAwIFIKXSAvQ291bnQgMQo
+PgplbmRvYmoKMSAwIG9iagos8PC9UeXBlic9DYXRhbG9nIC9QYWdlcyAzIDAgUgovTWV0Y
```

The following is an example of an ORU message containing the path to the PDF report file:

```
MSH|^~\&|OTObase|OTObase|EMR|EMR|20140109172051||ORU^R01|ORU20140109172051|P|2.7
PID|||PATID1234^5^M11^^AN||JONES^WILLIAM^A^III||19610615|M||2106-3|677 DELAWARE
AVENUE^^EVERETT^MA^02149|GL|(919)000-1000|(000)000-3400~(000)277-
3114||S||PATID12345001^2^M10^^ACSN|123456789|9-87654^NC
PV1|1||2000^2012^01^SRO|||004777^LEBAUER^SIDNEY^J.||SUR||-||ADM|A0

OBR|1|20060307110114|18|||201401061241
OBX|1|RP|18|1|C:\E\Reports\E\0000002-20140109172043.pdf
```

3.10 ACK (Acknowledgment message for ORU)

The EMR System should send an acknowledgment for all ORU messages received from OTObase. The structure of the ACK message is as follows:

3.10.1 Message Header (MSH) segment

Position	Element	Use	Example
1	Field Separator	R	Pipe symbol -
2	Encoding Characters 1. Component 2. Repeat 3. Escape 4. Sub component	R	^~\& ^ ~ \ &
3	Sending Application Name	R	OTObase (User defined during configuration)
4	Sending Facility Name	R	OTObase (User defined during configuration)
5	Receiving Application	R	EMR System (User defined during configuration)
6	Receiving Facility	R	EMR System (User defined during configuration)
7	Date and Time of Message	R	YYYYMMDDhhmmss 20130125052045
8	Security	U	
9	Message Type	R	ACK
10	Message Control Identifier	R	ORU20130128161405
11	Processing ID	O	P = Production T = Training D= Debugging
12	HL7 Version	R	2.4,2.5,2.6,2.7.
13	Sequence Number	U	
14	Continuation Pointer	U.	
15	Accept Acknowledgment Type	U	
16	Application Acknowledgment Type	U	
17	Country Code	U	
18	Character Set	U	
19	Principal Language of Message	U	

3.10.2 Message Acknowledgment (MSA) segment

Position	Element	Use	Example
1	Acknowledgment Code	R	AA = Success AE = Error AR = Reject
2	Message Control ID	R	ORU20130128161405
3	Text Message	O	Success, Or Failure
4	Expected Sequence Number	U	
5	Delayed Acknowledgment Type	U	
6	Error Condition	O	

3.10.3 Example of ORU Acknowledgment (ACK) message in case of success

OTObase sends an ACK message to acknowledge receipt of an ORU. If the received ORU message is accepted by OTObase, then OTObase sends a Success Acknowledgment message to the EMR system.

The following is an example of a Success Acknowledgment (ACK) message:

```
MSH|^~\&|EMR | EMR| OTObase | OTObase | 20130128012045||ACK| ORU20130128161405 |P|2.7
MSA|AA|ORU20130128161405|Success|||
```

3.10.4 Example of ORU Acknowledgment (ACK) message in case of failure

If the received ORU message is not accepted by OTObase, then OTObase sends a Failure Acknowledgment message to the EMR system.

The following is an example of a Failure Acknowledgment (ACK) message:

```
MSH|^~\&|EMR | EMR| OTObase | OTObase | 20130128012045||ACK| ORU20130128161405 |P|2.7
MSA|AE|ORU20130128161405|Failure|||
```

4 Communication protocol

The OTObase EMR Connector for HL7 interface uses the TCP/IP protocol for communication and information exchange.

TCP/IP Protocol implies that the data just starts coming in a stream and there is no set size. Some messages are quite concise with a couple of segments, other HL7 standard messages are extremely long with multiple observation segments that each contain an entire patient report.

Therefore, in order to identify where one HL7 message starts and ends, the Minimal Lower Layer Protocol (MLLP) is used to wrap the HL7 message. The HL7 message is wrapped with a header and footer to ensure that you know where a message starts, where a message stops, and where the next message starts. These headers and footers are non-printable characters that would not typically be in the content of HL7 messages.

Description	Character
The header is a vertical tab character.	<VT>(Hex 0x0b)
The footer is a field separator character, immediately followed by a carriage return.	<FS> (Hex 0x1c) <CR> (Hex 0x0d)

The message being transported via TCP/IP will look like this:

<VT> HL7 message <FS> <CR>

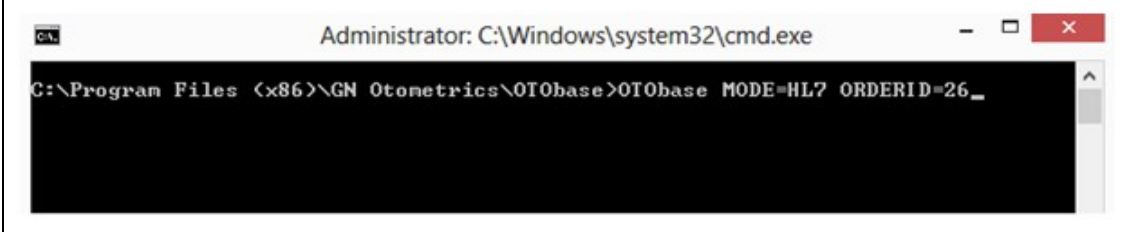
5 Opening an existing order

It is possible to open OTObase and an existing order in OTObase from the EMR system. This can be done by invoking the OTObase executable with command line parameters.

The following command can be used to invoke OTObase from the EMR system and open the measurement linked with a specific order.

Syntax:-

OTObase MODE=HL7 ORDERID=<Order_Id>



The screenshot shows a Windows command prompt window titled "Administrator: C:\Windows\system32\cmd.exe". The command prompt displays the command: `C:\Program Files (x86)\GN Otometrics\OTObase>OTObase MODE=HL7 ORDERID=26_`. The cursor is positioned at the end of the command line.

The above command will:

- Open OTObase in HL7 mode.
- Automatically select the patient linked with Order ID 26.
- Automatically open the latest measurement linked with the order ID 26 .

MODE

OTObase mode to run. The value would be HL7 as we are opening OTObase in HL7 mode to open the measurement linked with the specific order.

ORDERID

OTObase sends a unique identification number (see [Observation Request \(OBR\) segment ► 28](#)) to the EMR system in ORU messages. This identification number is referred to as "Order ID" in OTObase.