

Patient Monitor B155M/B125M/B125P/B125/ B105M/B105P/B105

HL7 Reference Manual

Software Version VSP 2.0, 3.0, 4.0



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Revision E

English

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Revision history

Revision	Date	Reason for change
A	2018-05-30	Initial release.
B	2019-04-11	ECO release.
C	2020-07-14	ECO release for samples update.
D	2021-10-28	ECO release for adding new manufacturer.
E	2022-07-27	ECO release for supported parameters update.

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1 About this manual

1.1 Intended use of this manual

The device can be connected to hospital information systems (HIS) by the Health Level Seven standard interface (HL7).

This document:

- Intended to be a technical reference to GE customers implementing the HL7 outbound interface.
- Not intended to provide instructions for implementing and using the HL7 standard. Details of the HL7 standard can be found in Health Level Seven Version 2.6.
- Contains data formats for the transmission of data and describes the requirements for interfacing to the GE system using the HL7 standard.
- Not describe how transactions are processed by the GE system or the clinical impact of using some of the features described here.

1.2 Intended audience of this manual

This manual is intended for HL7 integration engineers who configure hospital information technology systems so they interface together.

1.3 Manual conventions

This manual uses the following styles to emphasize text or indicate action.

Item	Description
Courier	Indicates hardware terms.
bold	Indicates software terms.
<i>italic</i>	Indicates terms for emphasis.
select	The word select means choosing and confirming.
supplemental information	Indicates information that appears in the Supplemental Information Manual or supplements provided.
NOTE	Note statements provide application tips or other useful information.

1.4 Illustrations and names

This manual uses illustrations as examples only. Illustrations in this manual may not necessarily reflect all system settings, features, configurations, or displayed data.

Names of persons, institutions, and places and related information are fictitious; any similarity to actual persons, entities, or places is purely coincidental.

1.5 Ordering manuals

Paper copies of the medical device IFU will be provided within 7 days of receiving the request, at no additional cost. Contact your local GE representative and request the part number on the first page of the eIFU.

1.6 Accessing manuals online

To access manuals online,

1. Go to <https://www.gehealthcare.com/documentationlibrary>.
2. Enter **Customer Documentation Portal** site.
3. Select **Modality** to **Monitoring Solutions (MS)** and **Products** to related products you want to search. Launch the search.
4. Identify and download the IFUs.

The IFUs are in PDF format, make sure the device has software to open the PDF files (e.g. Adobe® Acrobat® Reader).

1.7 Responsibility

The hospital and their third-party developer have responsibility for HL7 standard system and environment's integration development and testing.

1.8 Product availability

NOTE

Due to continual product innovation, design and specifications for these products are subject to change without notice.

Some of the products mentioned in this manual may not be available in all countries. Please consult your local representative for the availability.

2 HL7 interface

2.1 HL7 standard background

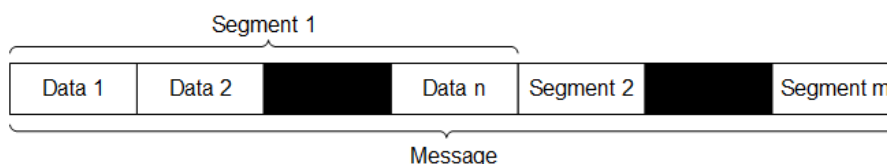
2.1.1 Overview

The Health Level Seven (HL7) standard is used to exchange data between computer systems. It does not require a specific computer operating system, programming language, or communication protocol for its implementation.

The goal of the HL7 standard is to harmonize message content and usage, while allowing user-specific variations within the standard. To accomplish this, the HL7 standard specifies encoding rules used to create the message format. Based on these rules, the messages generally consist of data fields and data segments.

2.1.2 Multiple segments

A message is comprised of multiple segments. While some of the segments are required to create a message, others are optional. Each segment within the HL7 message is separated by special segment separator characters.



2.1.3 Data elements

Each segment contains various data elements. The data elements may be of varying lengths. Like the segments, they are separated from each other by special separator characters. Certain data elements and their separators are logically grouped together to create a data segment such as the message header segment or the patient identification segment. The data contained in HL7 messages typically consists of displayable ASCII characters.

Each data segment begins with a three character value, for example “MSH” for the message header segment. These three characters uniquely identify the segment within a given message. Segments are identified as either required or optional, and some may be repeated. Similar to data fields, data segments are separated from each other by segment separator characters.

Based on the HL7 encoding rules, each message within the HL7 protocol has a known structure. The data segments and data fields that comprise a given message are always the same. As a result, an individual data field can be found within a message simply by knowing its configured position in a segment.

2.1.4 HL7 communication

HL7 messages are passed between computer systems whenever a valid transaction occurs. For example, receiving a completed test result on the monitor system would cause an HL7 message to be generated and sent. After a message is sent, the receiving system processes the message. When processing is complete, the receiving system is designed to generate an application level acknowledgment that is returned to the sending system.

Since the HL7 standard provides flexibility in message content and format, and in communication protocol options, its implementation requires mutual agreement between the sending and receiving computer systems on the following items:

- message formats
- acknowledgment protocol
- communication protocol
- data handling

Communication between HIS personnel and GE interface personnel is essential to determine the customer-specific use of the HL7 standard.

NOTE

This document is not intended to provide instructions for implementing and using the HL7 standard. Details of the HL7 standard can be found in Health Level Seven Version 2.6.

2.1.5 Observation results interfaces

The HL7 observation results reporting interface for this device is for unsolicited trended data. ORU messages are sent unsolicited to the host at a userconfigured time interval. The monitor HL7 outbound interface pauses to wait for an application level acknowledgment from the host. The HIS typically uses the trended result message content in either of the following ways:

- To make test results available for access on the hospital computer system.
- To generate charges for completed tests.

2.2 Observation results interface

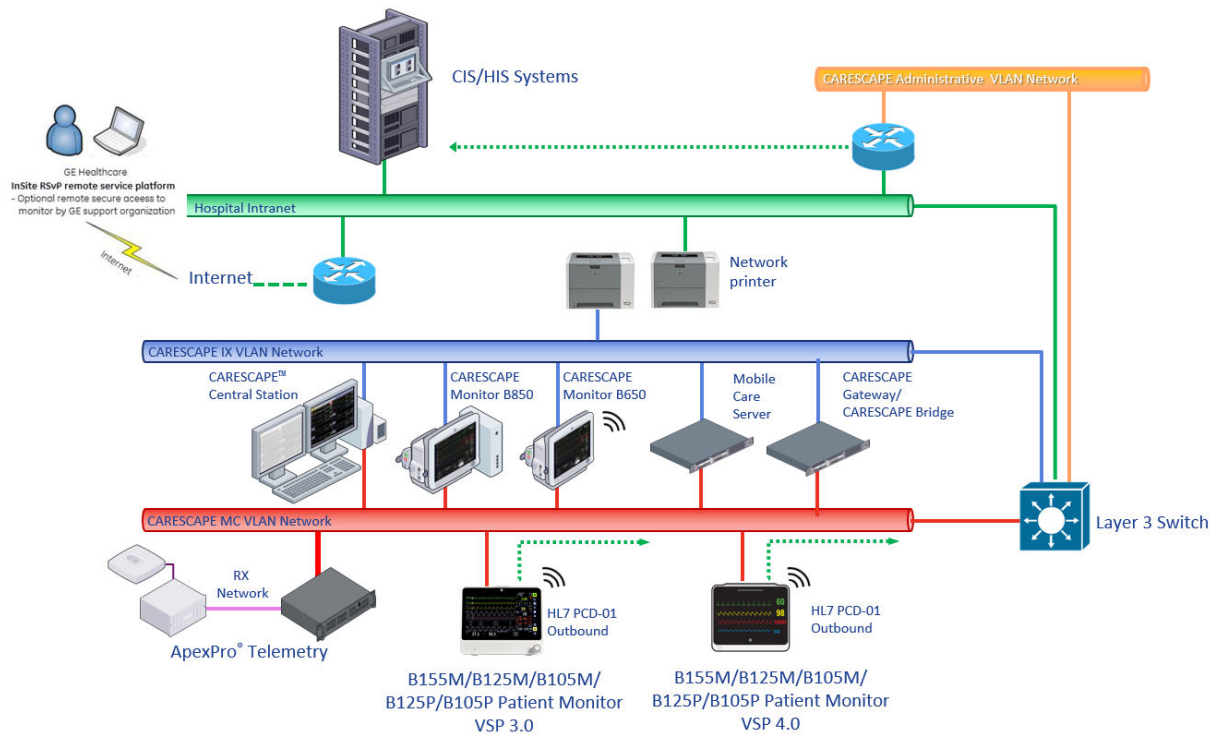
2.2.1 Introduction

The HL7 standard interface is used to connect a hospital's information system (HIS) to the monitor for the transfer of data. Using the HL7 outbound interface, the monitor can return result messages to the HIS.

The Patient Monitor Outbound implementation of the HL7 outbound interface protocol provides result messages. The HL7 result reporting interface transmits the result messages to the host system.

2.2.2 Trended data outbound overview

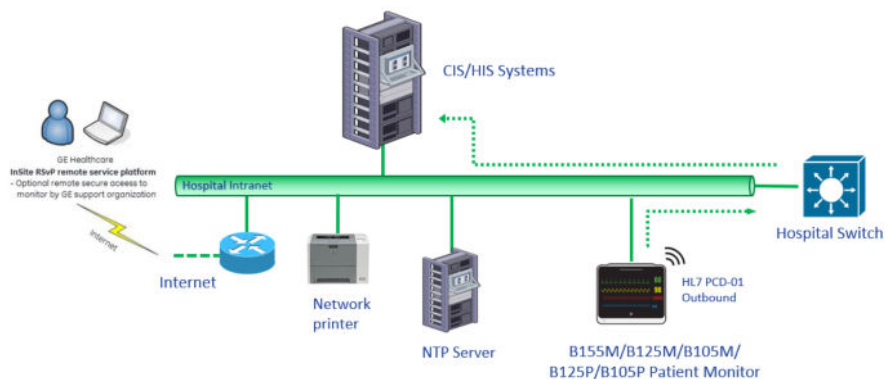
The process to create ORU message is displayed in the following diagram.

Figure 2-1 CARESCAPE network

HL7 outbound, InSite RSvP, and network printer data from monitor though CNI V2 switch.

NOTE

Need Unity network, HL7 network, and remote service license.

Figure 2-2 Hospital Network

HL7 outbound from monitor though hospital switch.

NOTE

Need HL7 network license.

NOTE

- This switch should support intervlan routing function.
- The hospital or the third party can choose GE offered switch or other types. If you need to use GE offered switch, please contact to GE ND&I Team to setup CARESCAPE Network Infrastructure version 2.

- If hospital or the third party design networks by themselves, the hospital or the third party has full responsibility for the function and the risk of their network.

2.2.3 Low level communications

The GE HL7 interface uses TCP/IP sockets for all outbound messages and conforms to the IEEE 802.3 Ethernet standard. The HL7 interface assumes that the low level communication protocol ensures that the data arrives error free. As a result, no data integrity checking is done at the application level.

2.2.4 Supported numeric options

The monitor transfers trended patient vital signs data to the hospital's information system(s). Proper transfer of this data from the monitor to the HIS systems is dependent on a custom configuration of the interface between the monitor and the hospital's information system.

The monitor will send trended data at the configured time intervals of 1, 2, 3, 4, 5, 10, 15, 30, 45, and 60 minutes, send the events data whenever have valid value.

2.2.5 Supported numeric data categories

NOTE

Different product supports the different numeric data categories. Your device may not support all of the following categories.

NOTE

NIBP trend, C.O. trend and EWS total score is identified as episodic trend, and all other parameters trends are identified as periodic trend.

Support for the following data categories includes:

- Invasive Blood Pressure (IBP)
- Gases
- ECG
- ECG/ST (ST)
- Non-invasive Blood Pressure (NIBP)
- Pulse Oximetry (SPO2)
- SPI
- Respiration (RR)
- Temperature (TP)
- C.O.
- Blood temperature
- Entropy
- BIS
- Spirometry
- Ventilation settings
- EWS

- Gas delivery

2.2.6 Client/server connections

2.2.6.1 HL7 outbound

Any HIS that communicates with the HL7 Outbound application with monitor must act as the server. The monitor tries to open a connection on a preconfigured specific IP address and port.

The monitor will connect with the server once the server port is established. The monitor continuously tries to connect to the HIS on a regular periodic interval using the auto connection feature. The monitor transfers the HL7 messages to the HIS server by TCP/IP socket connection and will retry the message up to three times.

When monitor already has admitted patient but no valid measurement data, the monitor will not send out HL7 message to the EMR system.

2.2.6.2 HIS disconnection or network outage

If the device or the HIS server connection is interrupted from the network (e.g., disconnected, in transport, etc.), the trended data for that time period will be lost.

NOTE

GE recommends that you enabling the HL7 acknowledgment option in monitor's service menu. Disabling this option may miss some data, if the HL7 receiver system has the feature of sending acknowledge message.

2.3 PCD-01

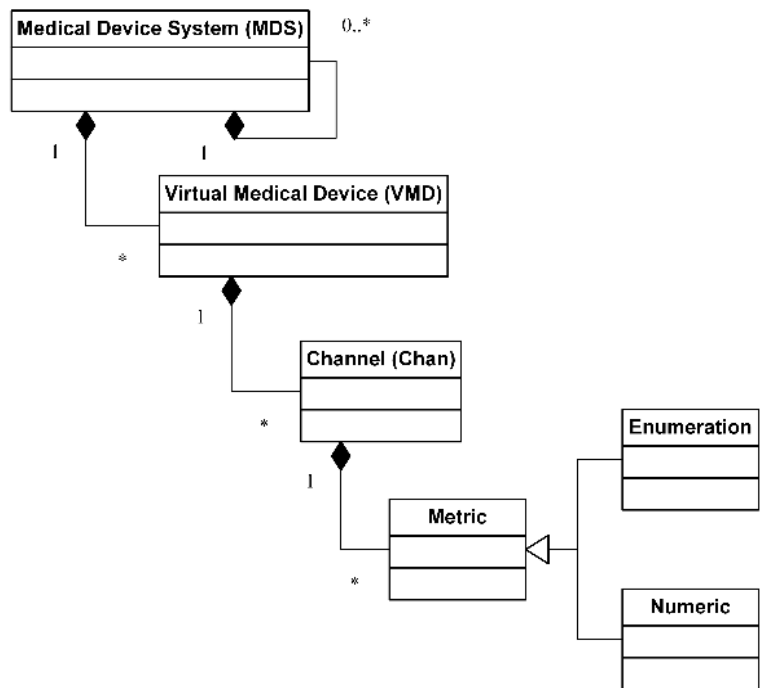
2.3.1 IHE Patient Care Device Domain > Device Enterprise Communication (DEC) Profile > PCD-01 Transaction

IHE PCD-01 is an Integration Profile that simplifies and adds semantic meaning to HL7 V2.6 messaging. The device conforms to PCD-01 as a Device Observation Report (DOR) actor using:

- ISO/IEEE 11073-10101 nomenclature in OBX-3 (Observation Identifier).
- Virtual medical device containment tree in OBX-4 (Observation Sub-ID).
- The originating medical device in OBX-18 (equipment instance identifier). The value of this identifier is composed of two components. Component #1 is an EUI-64 identifier that starts with the GE Healthcare company code, plus the EUI-64 separator, followed by the last 3 octets of the system's MAC address in hex upper-case with no separators., plus a string that identifies the monitoring equipment. For example, "080019FFFEAABCCxxxxxxx". Component #2 is "B1X5_GE".

NOTE

The OBX-4 Observation Sub-ID follows PCD observation results guidelines for relationships and elements in a hierarchical tree shown in the following diagram.



2.3.2 OBX-4

Condition predicate:

This field is used to distinguish between multiple OBX segments by providing an unambiguous mapping from observation contained in the OBX segment to the IEEE 11073 containment tree for the Medical Device System sourcing of the observation. For device related data, this field groups devices hierarchically.

For metric related data, this field associates metrics to devices hierarchically and is used as a sequence number within the hierarchical representation. The dotted notation provided for in the object diagram is: <MDS>.<VMD>.<Channel>.<Metric> for the PCD-01 transaction, where the Metric is a sequence number.

NOTE

Numeric and Enumeration are not used for PCD-01 transactions as shown in the object diagram.

2.3.3 Physiological monitor

2.3.3.1 Containment tree

Physiological monitors are comprised of a number of different Virtual Medical Devices (VMDs) as indicated in the following example containment tree:

Physiological Monitor Containment tree		Reference IDs
MDS: Physiological Monitor		MDC_DEV_METER_PHYSIO_MULTI_PARAM_MDS (1::4301)
VMD: Invasive Blood Pressure		MDC_DEV_METER_PRESS_BLD_VMD (1::4318)
	Channel: Invasive BP	MDC_DEV_METER_PRESS_BLD_CHAN (1::4319)
VMD: Non-Invasive Blood Pressure		MDC_DEV_PRESS_BLD_NONINV_VMD

Physiological Monitor Containment tree		Reference IDs
	Channel: Non-Invasive BP	MDC_DEV_PRESS_BLD_NONINV_CHAN (1::5151)
VMD: Temperature		MDC_DEV_METER_TEMP_VMD (1::4366)
	Channel: Temperature	MDC_DEV_METER_TEMP_CHAN
VMD: SpO2		MDC_DEV_ANALY_SAT_O2_VMD (1::4106)
VMD: SPI		MDC_DEV_CALC_SURGICAL_PLETH_INDEX
VMD: ECG Monitor		MDC_DEV_ECG_VMD (1::4262)
VMD: ECG Resp		MDC_DEV_ECG_RESP_VMD
VMD: Spirometry		MDC_DEV_ANALY_AWAY_MULTI_PARAM_VMD
VMD: Vent		MDC_DEV_SYS_PT_VENT_VMD
VMD: Gas Mon		MDC_DEV_GEN_CONC_AWAY_VMD
VMD: Gas Delivery		MDC_DEV_SYS_ANESTH_VMD
VMD: Entropy		MDC_DEV_EEG_ENTROPY_VMD
VMD: BIS		MDC_DEV_EEG_BIS_VMD
VMD: Cardiac output		MDC_DEV_ANALY_CARD_OUTPUT_VMD
	Channel: C.O.	MDC_DEV_ANALY_CARD_OUTPUT_CTS_CHAN
	CMD: CCO	MDC_DEV_ANALY_CARD_OUTPUT_CTS_CMD
EWS		MDCX_SCORE_VMD

The first OBX following the OBR segment is always set to:

```
OBX|1||69965^MDC_DEV_MON_PHYSIO_MULTI_PARAM_MDS^MDC|1
.0.0.0|||||X
```

This is the standard device reference used for a monitor or monitor system.

The second OBX following OBX(1) is a Virtual Medical Device (VMD) Header, e.g.,

```
OBX|10||69798^MDC_DEV_ECG_VMD^MDC|1.5.0.0|||||X
```

This is a logical grouping of semantically related observations and numeric categories. The OBXs that follow are the actual results for the VMD.

```
OBX|11|NM|147842^MDC_ECG_HEART_RATE^MDC|1.5.1.1|80|264864^MDC_DIM_BEAT_PER_MIN^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|12|NM|148066^MDC_ECG_V_P_C_RATE^MDC|1.5.1.2|0|264864^MDC_DIM_BEAT_PER_MIN^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
```

Invasive/Non Invasive Blood Pressure also have an explicit channel OBX as shown in the example below.

NOTE

Regarding the third dot in the OBX-4 notation, which indicates the channel that corresponds to the Channel Header, all observations below contain the same channel number.

The message contains first the VMD OBX headers, followed by the Channel OBX header, and then the discrete observations.

```
OBX|2||69854^MDC_DEV_METER_PRESS_BLD_VMD^MDC|1.13.0.0|||||X
OBX|3||69855^MDC_DEV_METER_PRESS_BLD_CHAN^MDC|1.13.1.0|||||X
OBX|4|NM|150033^MDC_PRESS_BLD_ART_SYS^MDC|1.13.1.1|112|266016^MDC_DIM_MMHG^MDC||||R|
```

```
|||||080019FFFE0B4020^B1X5_GE
OBX|5|NM|150034^MDC_PRESS_BLD_ART_DIA^MDC|1.13.1.2|76|266016^MDC_DIM_MMHG^MDC||||R|
|||||080019FFFE0B4020^B1X5_GE
OBX|6|NM|150035^MDC_PRESS_BLD_ART_MEAN^MDC|1.13.1.3|95|266016^MDC_DIM_MMHG^MDC||||R|
|||||080019FFFE0B4020^B1X5_GE
OBX|7|NM|149522^MDC_BLD_PULS_RATE_INV^MDC|1.13.1.4|80|264864^MDC_DIM_BEAT_PER_MIN^MDC
||||R|||||080019FFFE0B4020^B1X5_GE
```

NOTE

If a second Invasion Channel were to be used, the following channel OBX header would be included in the message with the channel in OBX-4 equal to 2. This would then be followed by the observations related to channel 2 (e.g., PA pressure).

```
OBX|8||69855^MDC_DEV_METER_PRESS_BLD_CHAN^MDC|1.13.2.0|||||X
```

All observations have the OBX-4 channel set to the channel number coming from monitor.

2.3.3.2 VMD Reference IDs, MDC Codes, and Containment Trees

The following table lists all of the defined VMD and Channel related to each numeric category.

Parameter	VMD Reference ID	VMD MDC Code	Containment
ECG	MDC_DEV_ECG_VMD	69798	1.5.0.0
ECG RESP	MDC_DEV_ECG_RESP_VMD	70666	1.6.0.0
IBP	MDC_DEV_METER_PRESS_BLD_VMD	69854	1.13.0.0
IBP	MDC_DEV_METER_PRESS_BLD_CHAN	69855	1.13.x.0 where "x" is the slot number
NIBP	MDC_DEV_PRESS_BLD_NONINV_VMD	70686	1.16.0.0
NIBP	MDC_DEV_PRESS_BLD_NONINV_CHAN	70687	1.16.x.0 where "x" is the slot number
SpO2	MDC_DEV_ANALY_SAT_O2_VMD	69642	1.22.0.0
SPI	MDC_DEV_CALC_SURGICAL_PLETH_INDEX	69642	1.30.0.0
Temperature	MDC_DEV_METER_TEMP_VMD	69902	1.26.0.0
Temperature	MDC_DEV_METER_TEMP_CHAN	69903	1.26.x.0 where "x" is the slot number
CO	MDC_DEV_ANALY_CARD_OUTPUT_CMD	66970	1.3.0.0
CO	MDC_DEV_ANALY_CARD_OUTPUT_CTS_CHAN	66971	1.3.1.0
CCO	MDC_DEV_ANALY_CARD_OUTPUT_CTS_CMD	70718	1.4.0.0
Gas Mon	MDC_DEV_GEN_CONC_AWAY_VMD	69766	1.11.0.0
Gas Delivery	MDC_DEV_SYS_ANESTH_VMD	70042	1.10.0.0
Spirometry	MDC_DEV_ANALY_AWAY_MULTI_PARAM_VMD	69682	1.20.0.0
Vent	MDC_DEV_SYS_PT_VENT_VMD	70001	1.29.0.0
Entropy	MDC_DEV_EEG_ENTROPY_VMD	0	1.8.0.0
BIS	MDC_DEV_EEG_BIS_VMD	0	1.1.0.0
EWS	MDCX_SCORE_VMD	0	1.34.0.0

3 Sample messages

3.1 HL7 minimal lower layer protocol

HL7 Outbound messages are framed using the HL7 Minimal Lower Layer Protocol. This protocol is documented in the HL7 2.6 specification. All HL7 messages begin with one start block character. The framing is completed by an end character and a carriage return character at the end of the message. The general format is as follows:

<SB> <HL7 message> <EB> <CR>

Where:

<SB> = Start Block character (0x0B)

<EB> = End Block character (0x1C)

<CR> = Carriage Return Character (0x0D)

<HL7 messages> use UTF-8 character encoding.

3.2 Interface data content

For HL7 Outbound messages, the trended data of monitor is mapped to data field positions in the HL7 segment structures to create result messages.

The following pages provide the general format of the various HL7 data messages recognized by the monitor for outbound interface. This document describes only the data fields and segments that are provided by monitor. Fields and segments not listed here are not sent by monitor.

3.3 Transactions from the monitor HL7 interface

3.3.1 Result reporting messages (ORU)

The HL7 results message type supported by the monitor HL7 outbound interface for result reporting is described below.

- Result Message (ORU) — This message indicates that data has been acquired.

3.3.2 Result message composition

All ORU messages have the same basic composition using the following HL7 segment types:

- MSH — Message header segment
- PID — Patient identification segment
- PV1 — Patient visit segment
- OBR — Observation request segment
- OBX — Observation result segment(s)

The structure of an ORU message looks like this:

```
MSH
PID
PV1
{
OBR
{OBX}
}
```

All message segments are terminated using a segment separator character, which defaults to a carriage return.

The open and closed braces { } represent segments and segment groups.

Segments enclosed in square brackets [] are optional.

Trailing data fields for a segment are truncated if empty.

3.3.3 Result message examples

Following are several examples of the many possible HL7-formatted result messages.

The monitor HL7 outbound interface can generate countless variations of these examples.

Example 1

This example has one OBR segment followed by the corresponding OBX segments collected at a user-configured time interval. The OBX segments contain periodic vital sign data for heart rate, PVC, temperature, and invasive blood pressures.

```
MSH|^~\&|VSP^080019FFFE134535^EUI-64|GE Healthcare|||20211129084800+0100||ORU^R01^ORU
_R01|004097134535|P|2.6|||NE|AL||UNICODE UTF-8|||PCD_DEC_001^THE PCD^1.3.6.1.4.1.1937
6.1.6.1.1.1^ISO
PID|||HED12^^^PID^MR||LAZY^KITTY^^^^^L|||
PV1||E|ICU^^79874
OBR|1|080019FFFE13453520130122134100^VSP^080019FFFE134535^EUI-64|080019FFFE1345352013
0122134100^VSP^080019FFFE134535^EUI-64|182777000^monitoring of patient^SCT|||201301221
34100
OBX|1||69965^MDC_DEV_MON_PHYSIO_MULTI_PARAM_MDS^MDC|1.0.0.0|||||X
OBX|2||69854^MDC_DEV_METER_PRESS_BLD_VMD^MDC|1.13.0.0|||||X
OBX|3||69855^MDC_DEV_METER_PRESS_BLD_CHAN^MDC|1.13.1.0|||||X
OBX|4|NM|150033^MDC_PRESS_BLD_ART_SYS^MDC|1.13.1.1|38|266016^MDC_DIM_MMHG^MDC||||R|
||||080019FFFE134535^B1X5_GE
OBX|5|NM|150034^MDC_PRESS_BLD_ART_DIA^MDC|1.13.1.2|19|266016^MDC_DIM_MMHG^MDC||||R|
||||080019FFFE134535^B1X5_GE
OBX|6|NM|150035^MDC_PRESS_BLD_ART_MEAN^MDC|1.13.1.3|27|266016^MDC_DIM_MMHG^MDC||||R|
||||080019FFFE134535^B1X5_GE
OBX|7|NM|149522^MDC_BLD_PULS_RATE_INV^MDC|1.13.1.4|17|264864^MDC_DIM_BEAT_PER_MIN^MDC
||||R|||||080019FFFE134535^B1X5_GE
OBX|8||69855^MDC_DEV_METER_PRESS_BLD_CHAN^MDC|1.13.2.0|||||X
OBX|9|NM|150087^MDC_PRESS_BLD_VEN_CENT_MEAN^MDC|1.13.2.1|1|266016^MDC_DIM_MMHG^MDC||
|R|||||080019FFFE134535^B1X5_GE
OBX|10||69798^MDC_DEV_ECG_VMD^MDC|1.5.0.0|||||X
OBX|11|NM|147842^MDC_ECG_HEART_RATE^MDC|1.5.1.1|21|264864^MDC_DIM_BEAT_PER_MIN^MDC||
|R|||||080019FFFE134535^B1X5_GE
OBX|12|NM|148066^MDC_ECG_V_P_C_RATE^MDC|1.5.1.2|0|264864^MDC_DIM_BEAT_PER_MIN^MDC||
|R|||||080019FFFE134535^B1X5_GE
OBX|13||69902^MDC_DEV_METER_TEMP_VMD^MDC|1.26.0.0|||||X
OBX|14||69903^MDC_DEV_METER_TEMP_CHAN^MDC|1.26.1.0|||||X
OBX|15|NM|150344^MDC_TEMP^MDC|1.26.1.1|28.4|268192^MDC_DIM_DEGC^MDC||||R|||||08001
9FFFE3829D9^B1X5_GE
```



```
OBX|16||69903^MDC_DEV_METER_TEMP_CHAN^MDC|1.26.2.0|||||X
OBX|17|NM|150344^MDC_TEMP^MDC|1.26.2.1|28.3|268192^MDC_DIM_DEGC^MDC||||R|||||08001
9FFFE3829D9^B1X5_GE
```

Example 2

This example shows an OBR segment followed by the corresponding OBX segments containing various periodic vital sign data collected at a user configured time interval.

```
MSH|^~\&|VSP^080019FFFE0B4020^EUI-64|GE Healthcare|||20211129084800+0100||ORU^R01^ORU
_R01|000C290B4020|P|2.6|||NE|AL|||UNICODE|||PCD_DEC_001^IHE PCD^1.3.6.1.4.1.19376.1.6.
1.1.1^ISO
PID|||999999999^^^PID^MR||^L|||
PV1||E|ICU^^79874
OBR|1|080019FFFE0B402020121109160900^VSP^080019FFFE0B4020^EUI-64|080019FFFE0B40202012
1109160900^VSP^080019FFFE0B4020^EUI-64|182777000^monitoring of patient^SCT|||20121109
160900
OBX|1||69965^MDC_DEV_MON_PHYSIO_MULTI_PARAM_MDS^MDC|1.0.0.0|||||X
OBX|2||69854^MDC_DEV_METER_PRESS_BLD_VMD^MDC|1.13.0.0|||||X
OBX|3||69855^MDC_DEV_METER_PRESS_BLD_CHAN^MDC|1.13.1.0|||||X
OBX|4|NM|150033^MDC_PRESS_BLD_ART_SYS^MDC|1.13.1.1|112|266016^MDC_DIM_MMHG^MDC||||R|
||||080019FFFE0B4020^B1X5_GE
OBX|5|NM|150034^MDC_PRESS_BLD_ART_DIA^MDC|1.13.1.2|76|266016^MDC_DIM_MMHG^MDC||||R|
||||080019FFFE0B4020^B1X5_GE
OBX|6|NM|150035^MDC_PRESS_BLD_ART_MEAN^MDC|1.13.1.3|95|266016^MDC_DIM_MMHG^MDC||||R|
||||080019FFFE0B4020^B1X5_GE
OBX|7|NM|149522^MDC_BLD_PULS_RATE_INV^MDC|1.13.1.4|80|264864^MDC_DIM_BEAT_PER_MIN^MDC
||||R|||||080019FFFE0B4020^B1X5_GE
OBX|8||69855^MDC_DEV_METER_PRESS_BLD_CHAN^MDC|1.13.2.0|||||X
OBX|9|NM|150087^MDC_PRESS_BLD_VEN_CENT_MEAN^MDC|1.13.2.1|9|266016^MDC_DIM_MMHG^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|10||69798^MDC_DEV_ECG_VMD^MDC|1.5.0.0|||||X
OBX|11|NM|147842^MDC_ECG_HEART_RATE^MDC|1.5.1.1|80|264864^MDC_DIM_BEAT_PER_MIN^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|12|NM|148066^MDC_ECG_V_P_C_RATE^MDC|1.5.1.2|0|264864^MDC_DIM_BEAT_PER_MIN^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|13|NM|131841^MDC_ECG_AMPL_ST_I^MDC|1.5.1.3|0.04|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|14|NM|131842^MDC_ECG_AMPL_ST_II^MDC|1.5.1.4|0.04|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|15|NM|131901^MDC_ECG_AMPL_ST_III^MDC|1.5.1.5|0.04|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|16|NM|131843^MDC_ECG_AMPL_ST_V1^MDC|1.5.1.6|0.04|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|17|NM|131844^MDC_ECG_AMPL_ST_V2^MDC|1.5.1.7|0.00|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|18|NM|131845^MDC_ECG_AMPL_ST_V3^MDC|1.5.1.8|0.00|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|19|NM|131846^MDC_ECG_AMPL_ST_V4^MDC|1.5.1.9|0.00|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|20|NM|131847^MDC_ECG_AMPL_ST_V5^MDC|1.5.1.10|0.00|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|21|NM|131848^MDC_ECG_AMPL_ST_V6^MDC|1.5.1.11|0.00|266419^MDC_DIM_MICRO_VOLT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|22|NM|131902^MDC_ECG_AMPL_ST_AVR^MDC|1.5.1.12|-0.04|266419^MDC_DIM_MICRO_VOLT^MDC
||||R|||||080019FFFE0B4020^B1X5_GE
OBX|23|NM|131903^MDC_ECG_AMPL_ST_AVL^MDC|1.5.1.13|0.00|266419^MDC_DIM_MICRO_VOLT^MDC|
||||R|||||080019FFFE0B4020^B1X5_GE
OBX|24|NM|131904^MDC_ECG_AMPL_ST_AVF^MDC|1.5.1.14|0.04|266419^MDC_DIM_MICRO_VOLT^MDC|
||||R|||||080019FFFE0B4020^B1X5_GE
OBX|25||69766^MDC_DEV_GEN_CONC_AWAY_VMD^MDC|1.11.0.0|||||X
OBX|26|NM|151712^MDC_CONC_AWAY_CO2_EXP^MDC|1.11.1.1|38|266016^MDC_DIM_MMHG^MDC||||R|
```

```

|||||080019FFFE0B4020^B1X5_GE
OBX|27|NM|151716^MDC_CONC_AWAY_CO2_INSP^MDC|1.11.1.2|8|266016^MDC_DIM_MMHG^MDC||||R|
|||||080019FFFE0B4020^B1X5_GE
OBX|28|NM|151594^MDC_CO2_RESP_RATE^MDC|1.11.1.3|18|264928^MDC_DIM_RESP_PER_MIN^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|29|NM|153132^MDC_CONC_AWAY_O2_EXP^MDC|1.11.1.4|16|262688^MDC_DIM_PERCENT^MDC||||
R|||||080019FFFE0B4020^B1X5_GE
OBX|30|NM|152196^MDC_CONC_AWAY_O2_INSP^MDC|1.11.1.5|21|262688^MDC_DIM_PERCENT^MDC||||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|31|NM|152136^MDC_CONC_AWAY_N2O_EXP^MDC|1.11.1.6|5|262688^MDC_DIM_PERCENT^MDC||||
R|||||080019FFFE0B4020^B1X5_GE
OBX|32|NM|152192^MDC_CONC_AWAY_N2O_INSP^MDC|1.11.1.7|8|262688^MDC_DIM_PERCENT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|33|NM|0^MDC_CONC_MAC_SUM^MDC|1.11.1.8|0|262656^MDC_DIM_DIMLESS^MDC||||R|||||08
0019FFFE0B4020^B1X5_GE
OBX|34|NM|0^MDC_CONC_MAC_SUM_AGE_CORR^MDC|1.11.1.9|0|262656^MDC_DIM_DIMLESS^MDC||||R
|||||080019FFFE0B4020^B1X5_GE
OBX|35|NM|152128^MDC_CONC_AWAY_ISOFL_EXP^MDC|1.11.1.10|0|262688^MDC_DIM_PERCENT^MDC|
||R|||||080019FFFE0B4020^B1X5_GE
OBX|36|NM|152184^MDC_CONC_AWAY_ISOFL_INSP^MDC|1.11.1.11|1|262688^MDC_DIM_PERCENT^MDC|
||||R|||||080019FFFE0B4020^B1X5_GE
OBX|37|0^MDC_DEV_EEG_ENTROPY_VMD^MDC|1.8.0.0|||||X
OBX|38|NM|155024^MDC_EEG_PAROX_CRTX_BURST_SUPPRN^MDC|1.8.1.1|0|262688^MDC_DIM_PERCENT
^MDC||||R|||||080019FFFE0B4020^B1X5_GE
OBX|39|NM|0^MDC_EEG_ENTROPY_RESPONSE^MDC|1.8.1.2|81|262656^MDC_DIM_DIMLESS^MDC||||R|
|||||080019FFFE0B4020^B1X5_GE
OBX|40|NM|0^MDC_EEG_ENTROPY_STATE^MDC|1.8.1.3|75|262656^MDC_DIM_DIMLESS^MDC||||R|||
|||080019FFFE0B4020^B1X5_GE
OBX|41|69642^MDC_DEV_ANALY_SAT_O2_VMD^MDC|1.22.0.0|||||X
OBX|42|NM|149530^MDC_PULS_OXIM_PULS_RATE^MDC|1.22.1.1|80|264864^MDC_DIM_BEAT_PER_MIN^
MDC||||R|||||080019FFFE0B4020^B1X5_GE
OBX|43|NM|150456^MDC_PULS_OXIM_SAT_O2^MDC|1.22.1.2|100|262688^MDC_DIM_PERCENT^MDC|||
|R|||||080019FFFE0B4020^B1X5_GE
OBX|44|69682^MDC_DEV_ANALY_AWAY_MULT_I_PARAM_VMD^MDC|1.20.0.0|||||X
OBX|45|NM|151562^MDC_RESP_RATE^MDC|1.20.1.1|18|264928^MDC_DIM_RESP_PER_MIN^MDC||||R|
|||||080019FFFE0B4020^B1X5_GE
OBX|46|70666^MDC_DEV_ECG_RESP_VMD^MDC|1.6.0.0|||||X
OBX|47|NM|151562^MDC_RESP_RATE^MDC|1.6.1.1|30|264928^MDC_DIM_RESP_PER_MIN^MDC||||R||
|||080019FFFE0B4020^B1X5_GE
OBX|48|69902^MDC_DEV_METER_TEMP_VMD^MDC|1.26.0.0|||||X
OBX|49|69903^MDC_DEV_METER_TEMP_CHAN^MDC|1.26.1.0|||||X
OBX|50|NM|150344^MDC_TEMP^MDC|1.26.1.1|28.4|268192^MDC_DIM_DEGC^MDC||||R|||||08001
9FFFE3829D9^B1X5_GE
OBX|51|69903^MDC_DEV_METER_TEMP_CHAN^MDC|1.26.2.0|||||X
OBX|52|NM|150344^MDC_TEMP^MDC|1.26.2.1|28.3|268192^MDC_DIM_DEGC^MDC||||R|||||08001
9FFFE3829D9^B1X5_GE

```

3.3.4 Application high level acknowledgement messages

The monitor Outbound HL7 interface supports application level message acknowledgments formatted as HL7 original mode acknowledgments. This function allows the HIS receiving application to acknowledge receipt and successful processing. The acknowledgment message returned to the sending application is used to determine whether to log the message to the monitor service error system.

The HL7 acknowledgment configuration is optional in monitor's HL7 service menu, which will require acknowledgment message to be sent back to monitor or not from HL7 receiver system. The default acknowledgment configuration is **Enable** in monitor HL7 service menu.

NOTE

GE recommends enabling the HL7 acknowledgement option in the monitor's service menu. Disabling this option may miss some data, if the HL7 receiver system has the feature of sending acknowledge message.

3.3.5 Acknowledgement message composition

Acknowledgment messages contain the following HL7 interface segments:

- MSH — Message segment header
- MSA — Message segment acknowledgment

HL7 acknowledgment messages may contain one of statuses from the receiving system:

- Application Accept (AA)
- Commit Accept (CA)
- Application Error (AE)
- Application Reject (AR)

If a positive accept acknowledgment (AA or CA) is returned from the HIS, it is assumed the HIS has committed the data it received to safe storage. The monitor HL7 application is then released from the necessity of re-sending the message on time outs. If the acknowledgment configuration is enable, the monitor HL7 application expects an accept acknowledgment message which indicates successful reception and secure storage of the HL7 message data in the HIS.

If the acknowledgment configuration is enabled, according to the HL7 specification, AE messages are those that contain an error. The outbound interface attempts to send the ORU message again, with there being no more than three total attempts; AR messages are also not retransmitted, the system will disconnect the connection with the HL7 receiving system.

If the acknowledgment configuration is enabled, and no HL7 Acknowledgement message is received after three total attempts. The outbound interface disconnects the connection with the HL7 receiving system.

Regardless if the acknowledgement configuration is enable or disable, if monitor receives an HL7 acknowledgement message with an Acknowledgment Code (MSA field 1) that is not "AA" or "CA". The outbound interface creates a log entry with at least the description from the message (MSA field 3) and error condition (MSA field 6) if present.

3.3.6 Acknowledgement message examples

HL7 messages may be acknowledged as accepted, rejected, or returned with an acknowledgment error. The following are examples of possible acknowledgment messages that may be received as a result of sending messages to an HIS server.

Acknowledgment Accept

```
MSH|^~\&|NUR^^|.^^|MMS
HL7|.^^|202012021001||ACK^R01|17f1be29-aa2a-11d2-a655-00105a1e9b67|P^|2.3
MSA|AA|17f1be29-aa2a-11d2-a655-00105a1e9b67
```

Acknowledgment Reject

```
MSH|^~\&|NUR^^|.^^|MMS  
HL7|.^^|202012021003||ACK^R01|17f1be29-aa2a-11d2-a655-00105a1e9b67|P^|2.3  
MSA|AR|17f1be29-aa2a-11d2-a655-00105a1e9b67|Unsupported message type
```

Acknowledgment Error

```
MSH|^~\&|NUR^^|.^^|MMS  
HL7|.^^|202012021002||ACK^R01|17f1be29-aa2a-11d2-a655-00105a1e9b67|P^|2.3  
MSA|AE|17f1be29-aa2a-11d2-a655-00105a1e9b67|Unable to find patient
```

4 HL7 data segment definitions

4.1 Introduction

The following tables define the various data segments and are shown with the standard HL7 message layout.

The lengths given for fields are the maximum lengths supported by the GE system, not the HL7 definitions for field lengths. When the GE HL7 interface support column indicates N, the data may be optimally sent in the message but it will be ignored by the GE HL7 interface.

A data field may also be conditionally required, which is indicated with a CR instead of an R. The Set ID field (seq. 1) in an OBR segment is an example of a conditionally required field.

Only fields listed Y/R are available in the current HL7 output stream. Many of the fields listed Y have no means of being entered into the monitoring devices. The Y simply indicates that the field is supported and would not be ignored, as the fields marked N, should it be received. However, the HL7 application is strictly outbound at this point. The reason some fields are marked Y is that there is the potential to add in-bound ADT capability to the HL7 application coming from an HIS system at some point in the future. The fields could be included for outbound data as well.

4.1.1 HL7 table abbreviations

Table 4-1 Data Definition

Abbreviations	Description
SEQ	The sequence of the elements as they are numbered in the segment.
LEN	The length of the element.
DT	The data type of the element. The data types are described below.
TBL#	Specific table reference.
RP/#	Indicates if element repeats and number of times.
ITEM#	HL7 unique item number for each element.
REQ/OPT	Whether the field is required, optional, or conditional in a segment.

Table 4-2 OPT Type

Abbreviations	Description
R	Required
RE	Required, but may be empty.
O	Optional
C	Conditional
CE	Conditional, but may be empty
X	Not used with this trigger event.

Table 4-3 Data Type

Abbreviations	Description
CE	Coded element
SN	Structured numeric
CK	Composite ID w/check digit
ST	String
CQ	Composite quantity w/units
TQ	Timing quantity
CX	Extended composite ID w/check digit
TS	Time stamp
DLN	Driver's license number
TX	Text data
DT	Date
XAD	Extended composite ID number
EI	Entity identifier
XCN	Extended composite ID number
HD	Hierarchic designator name for persons
ID	Coded value
XON	Extended composite name and ID
IS	Sequence ID number for organizations
NM	Numeric
XPN	Extended person name
PT	Processing type
XTN	Extended telecommunications number
SI	Sequence ID
*	Indication that the data type for the value of an HL7 field can be of any type

4.2 Data segments

4.2.1 MSH – Message header segment

SEQ	LEN	DT	REQ/OPT	TABLE#	ELEMENT NAME
1	1	ST	R		Field Separator
2	4	ST	R		Encoding Characters
3	227	HD	R	0361	Sending Application
4	227	HD	RE	0362	Sending Facility
5	227	HD	RE	0361	Receiving Application

SEQ	LEN	DT	REQ/OPT	TABLE#	ELEMENT NAME
6	227	HD	RE	0362	Receiving Facility
7	26	DTM	R		Date/Time of Message
8	40	ST	RE		Security
9	15	MSG	R		Message Type
10	20	ST	R		Message Control ID
11	3	PT	R		Processing ID
12	60	VID	R		Version ID
13	15	NM	RE		Sequence Number
14	180	ST	RE		Continuation Pointer
15	2	ID	R	0155	Accept Acknowledgment Type
16	2	ID	R	0155	Application Acknowledgment Type
17	3	ID	RE	0399	Country Code
18	16	ID	RE	0211	Character Set
19	250	CE	RE		Principal Language of Message
20	20	ID	RE	0356	Alternate Character Set Handling Scheme
21	427	EI	R		Message Profile Identifier

4.2.2 MSA – Message acknowledgment

SEQ	LEN	DT	REQ/OPT	TABLE#	ELEMENT NAME
1	2	ID	R	0008	Acknowledgement code
2	20	ST	R		Message Control Id
3	80	ST	X		Text Message
4	1	ID	X		Delayed Acknowledgment Type
5	250	CWE	X	0357	Error Condition

4.2.3 PID – Patient Identification

SEQ	LEN	DT	REQ/OPT	TBL#	ITEM#	ELEMENT NAME
1	4	SI	R		00104	Set ID - PID
2	20	CX	RE		00105	Patient ID
3	250	CX	R		00106	Patient Identifier List
4	20	CX	RE		00107	Alternate Patient ID - PID
5	250	XPN	RE		00108	Patient Name
6	250	XPN	RE		00109	Mother's Maiden Name
7	26	TS	X		00110	Date/Time Birth
8	1	IS	RE	0001	00111	Administrative Sex
9	250	XPN	X		00112	Patient Alias
10	250	CE	RE	0005	00113	Race

SEQ	LEN	DT	REQ/OPT	TBL#	ITEM#	ELEMENT NAME
11	250	XAD	RE		00114	Patient Address
12	4	IS	RE	0289	00115	Country Code
13	250	XTN	RE		00116	Phone Number - Home
14	250	XTN	X		00117	Phone Number - Business
15	250	CE	RE	0296	00118	Primary Language
16	250	CE	RE	0002	00119	Marital Status
17	250	CE	RE	0006	00120	Religion
18	250	CX	RE		00121	Patient Account Number
19	16	ST	X		00122	SSN Number - Patient
20	25	DLN	RE		00123	Driver's License Number - Patient
21	250	CX	RE		00124	Mother's Identifier
22	250	CE	RE	0189	00125	Ethnic Group
23	250	ST	RE		00126	Birth Place
24	1	ID	RE	0136	00127	Multiple Birth Indicator
25	2	NM	RE		00128	Birth Order
26	250	CE	RE	0171	00129	Citizenship
27	250	CE	RE	0172	00130	Veterans Military Status
28	250	CE	RE	0212	00739	Nationality
29	26	TS	RE		00740	Patient Death Data and Time
30	1	ID	RE	0136	00741	Patient Death Indicator
31	1	ID	RE	0136	01535	Identity Unknown Indicator
32	20	IS	RE	0445	01536	Identity Reliability Code
33	26	TS	RE		01537	Last Update Date/Time
34	241	HD	RE		01538	Last Update Facility
35	250	CE	RE	0446	01539	Species Doe
36	250	CE	C	0447	01540	Breed Code
37	80	ST	C		01541	Strain
38	250	CE	RE	0429	01542	Production Class Code
39	250	CWE	RE	0171	01840	Tribal Citizenship

4.2.4 PV1 – Patient Visit

SEQ	LEN	DT	REQ/OPT	TABLE#	ELEMENT NAME
1	4	SI	O		Set ID - PV1
2	1	IS	R	0004	Patient Class
3	80	PL	RE		Patient Location
4	2	IS	X	0007	Admission Type
5	250	CX	X		Preadmit Number

SEQ	LEN	DT	REQ/OPT	TABLE#	ELEMENT NAME
6	80	PL	X		Prior Patient Location
7	250	XCN	X	0010	Attending Doctor
8	250	XCN	X	0010	Referring Doctor
9	250	XCN	X	0010	Consulting Doctor
10	3	IS	X	0069	Hospital Service
11	80	PL	X		Temporary Location
12	2	IS	X	0087	Preadmit Test Indicator
13	2	IS	X	0092	Re-admission Indicator
14	6	IS	X	0023	Admit Source
15	2	IS	X	0009	Ambulatory Status
16	2	IS	X	0099	VIP Indicator
17	250	XCN	X	0010	Admitting Doctor
18	2	IS	X	0018	Patient Type
19	250	CX	RE		Visit Number
20	2	FC	X	0064	Financial Class
21	2	IS	X	0032	Charge Price Indicator
22	2	IS	X	0045	Courtesy Code
23	2	IS	X	0046	Credit Rating
24	2	IS	X	0044	Contract Code
25	8	DT	X		Contract Effective Date
26	12	NM	X		Contract Amount
27	3	NM	X		Contract Period
28	2	IS	X	0073	Interest Code
29	4	IS	X	0110	Transfer to Bad Debt Code
30	8	DT	X		Transfer to Bad Debt Date
31	10	IS	X	0021	Bad Debt Agency Code
32	12	NM	X		Bad Debt Transfer Amount
33	12	NM	X		Bad Debt Recovery Amount
34	1	IS	X	0111	Delete Account Indicator
35	8	DT	X		Delete Account Date
36	3	IS	X	0112	Discharge Disposition
37	47	DLD	X	0113	Discharged to Location
38	250	CE	X	0114	Diet Type
39	2	IS	X	0115	Servicing Facility
40	1	IS	X	0116	Bed Status
41	2	IS	X	0117	Account Status
42	80	PL	X		Pending Location

SEQ	LEN	DT	REQ/OPT	TABLE#	ELEMENT NAME
43	80	PL	X		Prior Temporary Location
44	26	TS	X		Admit Date/Time
45	26	TS	X		Discharge Date/Time
46	12	NM	X		Current Patient Balance
47	12	NMN	X		Total Charges
48	12	NM	X		Total Adjustments
49	12	NM	X		Total Payments
50	250	CX	X	0203	Alternate Visit ID
51	1	IS	RE	0326	Visit Indicator

4.2.5 OBR – Observation Request (To Host)

SEQ	LEN	DT	USAGE	ELEMENT NAME
1	4	SI	R	Set ID
2	427	EI	R	Placer Order Number
3	427	EI	R	Filler Order Number
4	250	CE	R	Universal Service Identifier
5	2	ID	X	Priority
6	26	DTM	X	Requested Date/Time
7	26	DTM	RE	Observation Date/Time

4.2.6 OBX – Result

SEQ	LEN	DT	USAGE	TABLE#	ELEMENT NAME
1	4	SI	R		Set Id
2	2	ID	RE	0125	Value Type
3	250	CE	R		Observation Identifier
4	20	ST	R		Observation Sub-ID
5	99999	Varies	RE		Observation Value
6	250	CE	RE		Units
7	60	ST	RE		Reference Range
8	5	IS	RE	0078	Abnormal Flags
9	5	NM	RE		Probability
10	2	ID	RE	0080	Nature of Abnormal Test
11	1	ID	R	0085	Observation Result Status
12	26	DTM	RE		Effective Date of Reference Range
13	20	ST	RE		User Defined Access Checks
14	26	DTM	R		Date/Time of the Observation
15	250	CE	RE		Producer's ID

SEQ	LEN	DT	USAGE	TABLE#	ELEMENT NAME
16	250	XCN	RE		Responsible Observer
17	250	CE	RE		Observation Method
18	22	EI	RE		Equipment Instance Identifier

A Supported parameters

A.1 HL7 supported parameters

NOTE

Some parameters in this table are only available from certain versions of the acquisition source.

NOTE

This list is subject to change without notice.

Sub- parameter Name	Abbrevia- tion	UCUM	REFID	CF_CODE1 0	UOM_MDC	CF_UCODE 10
Invasive Blood Pressure (IBP)						
Pulmonary Artery Pressure Systolic	PA-S	mm[Hg]	MDC_PRESS_BLD_ART_P ULM_SYS	150045	MDC_DIM_MMHG	266016
Pulmonary Artery Pressure Diastolic	PA-D	mm[Hg]	MDC_PRESS_BLD_ART_P ULM_DIA	150046	MDC_DIM_MMHG	266016
Pulmonary Artery Pressure Mean	PA-M	mm[Hg]	MDC_PRESS_BLD_ART_P ULM_MEAN	150047	MDC_DIM_MMHG	266016
Pulmonary Capil- lary Wedge Pres- sure	PAW	mm[Hg]	MDC_PRESS_BLD_ART_P ULM_WEDGE	150052	MDC_DIM_MMHG	266016
Central Venous Pressure Mean	CVP-M	mm[Hg]	MDC_PRESS_BLD_VEN_C ENT_MEAN	150087	MDC_DIM_MMHG	266016
Intracranial Pres- sure Mean	ICP-M	mm[Hg]	MDC_PRESS_IN- TRA_CRAN_MEAN	153611	MDC_DIM_MMHG	266016
Cerebral Perfu- sion Pressure Mean	CPP	mm[Hg]	MDC_PRESS_CER- EB_PERF	153604	MDC_DIM_MMHG	266016
Arterial Pressure Systolic	ART-S	mm[Hg]	MDC_PRESS_BLD_ART_S YS	150033	MDC_DIM_MMHG	266016
Arterial Pressure Diastolic	ART-D	mm[Hg]	MDC_PRESS_BLD_ART_D IA	150034	MDC_DIM_MMHG	266016
Arterial Pressure Mean	ART-M	mm[Hg]	MDC_PRESS_BLD_ART_M EAN	150035	MDC_DIM_MMHG	266016
Arterial blood pressure Systolic	ABP-S	mm[Hg]	MDC_PRESS_BLD_ART_A BP_SYS	150037	MDC_DIM_MMHG	266016
Arterial blood pressure Diastolic	ABP-D	mm[Hg]	MDC_PRESS_BLD_ART_A BP_DIA	150038	MDC_DIM_MMHG	266016
Arterial blood pressure Mean	ABP-M	mm[Hg]	MDC_PRESS_BLD_ART_A BP_MEAN	150039	MDC_DIM_MMHG	266016
ABP (Pulse Rate)	ABP (Pulse Rate)	{beat}/min	MDC_BLD_PULS_RATE_I NV	149522	MDC_DIM_BEAT_P ER_MIN	264864

Sub- parameter Name	Abbrevia- tion	UCUM	REFID	CF_CODE1 0	UOM_MDC	CF_UCODE 10
ART (Pulse Rate)	ART (Pulse Rate)	{beat}/min	MDC_BLD_PULS_RATE_I NV	149522	MDC_DIM_BEAT_P ER_MIN	264864
UAC (Pulse Rate)	UAC (Pulse Rate)	{beat}/min	MDC_BLD_PULS_RATE_I NV	149522	MDC_DIM_BEAT_P ER_MIN	264864
Right Ventricle Pressure - Diastolic	RVP-D	mm[Hg]	MDC_PRESS_BLD_VENT_ RIGHT_DIA	150106	MDC_DIM_MMHG	266016
Right Ventricle Pressure - Mean	RVP-M	mm[Hg]	MDC_PRESS_BLD_VENT_ RIGHT_MEAN	150107	MDC_DIM_MMHG	266016
Right Ventricle Pressure - Systolic	RVP-S	mm[Hg]	MDC_PRESS_BLD_VENT_ RIGHT_SYS	150105	MDC_DIM_MMHG	266016
IBP1 -Systolic	P1 -Systolic	mm[Hg]	MDC_PRESS_BLD_SYS	150017	MDC_DIM_MMHG	266016
IBP1 -Diastolic	P1 -Diastolic	mm[Hg]	MDC_PRESS_BLD_DIA	150018	MDC_DIM_MMHG	266016
IBP1 - Mean	P1 -Mean	mm[Hg]	MDC_PRESS_BLD_MEAN	150019	MDC_DIM_MMHG	266016
IBP2 -Systolic	P2 -Systolic	mm[Hg]	MDC_PRESS_BLD_SYS	150017	MDC_DIM_MMHG	266016
IBP2 -Diastolic	P2 -Diastolic	mm[Hg]	MDC_PRESS_BLD_DIA	150018	MDC_DIM_MMHG	266016
IBP2 - Mean	P2 -Mean	mm[Hg]	MDC_PRESS_BLD_MEAN	150019	MDC_DIM_MMHG	266016
IBP8 -Systolic	P8 -Systolic	mm[Hg]	MDC_PRESS_BLD_SYS	150017	MDC_DIM_MMHG	266016
IBP8 -Diastolic	P8 -Diastolic	mm[Hg]	MDC_PRESS_BLD_DIA	150018	MDC_DIM_MMHG	266016
IBP8 - Mean	P8 -Mean	mm[Hg]	MDC_PRESS_BLD_MEAN	150019	MDC_DIM_MMHG	266016
Right Atrial Cath- eter Pressure Mean	RAP-M	mm[Hg]	MDC_PRESS_BLD_ATR_RI GHT_MEAN	150071	MDC_DIM_MMHG	266016
Left Atrial Pres- sure Mean	LAP-M	mm[Hg]	MDC_PRESS_BLD_ATR_L EFT_MEAN	150067	MDC_DIM_MMHG	266016
Umbilical Arterial Catheter Pressure Systolic	UAC-S	mm[Hg]	MDC_PRESS_BLD_ART_U MB_SYS	150057	MDC_DIM_MMHG	266016
Umbilical Arterial Catheter Pressure Diastolic	UAC-D	mm[Hg]	MDC_PRESS_BLD_ART_U MB_DIA	150058	MDC_DIM_MMHG	266016
Umbilical Arterial Catheter Pressure Mean	UAC-M	mm[Hg]	MDC_PRESS_BLD_ART_U MB_MEAN	150059	MDC_DIM_MMHG	266016
Umbilical Venous Catheter Pressure Mean	UVC-M	mm[Hg]	MDC_PRESS_BLD_VEN_U MB_MEAN	150091	MDC_DIM_MMHG	266016
ECG						
Heart Rate	HR	{beat}/min	MDC_ECG_HEART_RATE	147842	MDC_DIM_BEAT_P ER_MIN	264864

Sub- parameter Name	Abbrevia- tion	UCUM	REFID	CF_CODE1 0	UOM_MDC	CF_UCODE 10
Premature Ven- tricular Count	PVC	{beat}/min	MDC_ECG_V_P_C_RATE	148066	MDC_DIM_BEAT_P ER_MIN	264864
Respiration Rate - ECG	IMPR-RR	{breath}/mi n	MDC_RESP_RATE	151562	MDC_DIM_RESP_P ER_MIN	264928
Gases						
Expired CO2	CO2-EX	mm[Hg]	MDC_CONC_AWAY_CO2_ EXP	151712	MDC_DIM_MMHG	266016
Inspired CO2	CO2-IN	mm[Hg]	MDC_CONC_AWAY_CO2_ INSP	151716	MDC_DIM_MMHG	266016
Respiration Rate - CO2	CO2-RR	{breath}/mi n	MDC_CO2_RESP_RATE	151594	MDC_DIM_RESP_P ER_MIN	264928
Expired O2	O2-EX	%	MDC_CONC_AWAY_O2_E XP	153132	MDC_DIM_PER- CENT	262688
Inspired O2	O2-IN	%	MDC_CONC_AWAY_O2_I NSP	152196	MDC_DIM_PER- CENT	262688
Expired N2O	N2O-EX	%	MDC_CONC_AWAY_N2O _EXP	152136	MDC_DIM_PER- CENT	262688
Inspired N2O	N2O-IN	%	MDC_CONC_AWAY_N2O _INSP	152192	MDC_DIM_PER- CENT	262688
MAC Sum	MAC_SUM	{unitless}1	MDC_CONC_MAC_SUM	0	MDC_DIM_DIM- LESS	262656
MAC Sum Age- Corrected	MAC_AGE_ SUM	{unitless}1	MDC_CONC_MAC_SUM_ AGE_CORR	0	MDC_DIM_DIM- LESS	262656
Expired Halothane	HAL-EX	%	MDC_CONC_AWAY_HAL- OTH_EXP	152120	MDC_DIM_PER- CENT	262688
Inspired Halo- thane	HAL-IN	%	MDC_CONC_AWAY_HAL- OTH_INSP	152176	MDC_DIM_PER- CENT	262688
Expired Isoflurane	ISO-EX	%	MDC_CONC_AWAY_ISOF L_EXP	152128	MDC_DIM_PER- CENT	262688
Inspired Isoflurane	ISO-IN	%	MDC_CONC_AWAY_ISOF L_INSP	152184	MDC_DIM_PER- CENT	262688
Expired Enflurane	ENF-EX	%	MDC_CONC_AWAY_ENFL _EXP	152116	MDC_DIM_PER- CENT	262688
Inspired Enflurane	ENF-IN	%	MDC_CONC_AWAY_ENFL _INSP	152172	MDC_DIM_PER- CENT	262688
Expired Desflur- ane	DES-EX	%	MDC_CONC_AWAY_DE SFL_EXP	152112	MDC_DIM_PER- CENT	262688
Inspired Desflur- ane	DES-IN	%	MDC_CONC_AWAY_DESF L_INSP	152168	MDC_DIM_PER- CENT	262688
Expired Sevoflur- ane	SEV-EX	%	MDC_CONC_AWAY_SEV- OFL_EXP	152124	MDC_DIM_PER- CENT	262688
Inspired Sevoflur- ane	SEV-IN	%	MDC_CONC_AWAY_SEV- OFL_INSP	152180	MDC_DIM_PER- CENT	262688

Sub- parameter Name	Abbrevia- tion	UCUM	REFID	CF_CODE1 0	UOM_MDC	CF_UCODE 10
Fractional In- spired Oxygen (circuit)	FiO2 (cir- cuit)	%	MDC_CONC_GASDLV_O2 _INSP	153144	MDC_DIM_PER- CENT	262688
ECG/ST(ST)						
ST Segment I	ST-I	uV	MDC_ECG_AMPL_ST_I	131841	MDC_DIM_MI- CRO_VOLT	266419
ST Segment II	ST-II	uV	MDC_ECG_AMPL_ST_II	131842	MDC_DIM_MI- CRO_VOLT	266419
ST Segment III	ST-III	uV	MDC_ECG_AMPL_ST_III	131901	MDC_DIM_MI- CRO_VOLT	266419
ST Segment V1	ST-V1	uV	MDC_ECG_AMPL_ST_V1	131843	MDC_DIM_MI- CRO_VOLT	266419
ST Segment V2	ST-V2	uV	MDC_ECG_AMPL_ST_V2	131844	MDC_DIM_MI- CRO_VOLT	266419
ST Segment V3	ST-V3	uV	MDC_ECG_AMPL_ST_V3	131845	MDC_DIM_MI- CRO_VOLT	266419
ST Segment V4	ST-V4	uV	MDC_ECG_AMPL_ST_V4	131846	MDC_DIM_MI- CRO_VOLT	266419
ST Segment V5	ST-V5	uV	MDC_ECG_AMPL_ST_V5	131847	MDC_DIM_MI- CRO_VOLT	266419
ST Segment V6	ST-V6	uV	MDC_ECG_AMPL_ST_V6	131848	MDC_DIM_MI- CRO_VOLT	266419
ST Segment AVR	ST-AVR	uV	MDC_ECG_AMPL_ST_AV R	131902	MDC_DIM_MI- CRO_VOLT	266419
ST Segment AVL	ST-AVL	uV	MDC_ECG_AMPL_ST_AVL	131903	MDC_DIM_MI- CRO_VOLT	266419
ST Segment AVF	ST-AVF	uV	MDC_ECG_AMPL_ST_AVF	131904	MDC_DIM_MI- CRO_VOLT	266419
Non-Invasive Blood Pressure (NIBP)						
Noninvasive BP Systolic	NBP-S	mm[Hg]	MDC_PRESS_BLD_NON- INV_SYS	150021	MDC_DIM_MMHG	266016
Noninvasive BP Diastolic	NBP-D	mm[Hg]	MDC_PRESS_BLD_NON- INV_DIA	150022	MDC_DIM_MMHG	266016
Noninvasive BP Mean	NBP-M	mm[Hg]	MDC_PRESS_BLD_NON- INV_MEAN	150023	MDC_DIM_MMHG	266016
Pulse Oximetry (SpO2)						
Pulse Oximetry Peripheral Heart Rate	SPO2-R	{beat}/min	MDC_PULS_OX- IM_PULS_RATE	149530	MDC_DIM_BEAT_P ER_MIN	264864
Pulse Oximetry	SPO2-%	%	MDC_PULS_OXIM_SAT_ O2	150456	MDC_DIM_PER- CENT	262688
Respiration Rate (RR)						
Respiration Rate	RR	{breath}/mi n	MDC_RESP_RATE	151562	MDC_DIM_RESP_P ER_MIN	264928

Sub- parameter Name	Abbrevia- tion	UCUM	REFID	CF_CODE1 0	UOM_MDC	CF_UCODE 10
Temperature (TP)						
Temperature 1	TP-1	Cel	MDC_TEMP	150344	MDC_DIM_DEGC	268192
Temperature 2	TP-2	Cel	MDC_TEMP	150344	MDC_DIM_DEGC	268192
Axillary Tempera- ture	TP-Axil	Cel	MDC_TEMP_AXIL	0	MDC_DIM_DEGC	268192
Esophageal Tem- perature	TP-Eso	Cel	MDC_TEMP_ESO	150372	MDC_DIM_DEGC	268192
Nasopharynx Temperature	TP-Naso	Cel	MDC_TEMP_NASOPH	150380	MDC_DIM_DEGC	268192
Tympanic Tem- perature	TP-Tymp	Cel	MDC_TEMP_TYMP	150392	MDC_DIM_DEGC	268192
Rectal Tempera- ture	TP-Rect	Cel	MDC_TEMP_RECT	188420	MDC_DIM_DEGC	268192
Bladder Tempera- ture	TP-Blad	Cel	MDC_TEMP_FOLEY	150348	MDC_DIM_DEGC	268192
Skin Temperature	TP-Skin	Cel	MDC_TEMP_SKIN	150388	MDC_DIM_DEGC	268192
Airway Tempera- ture	TP-AirW	Cel	MDC_TEMP_AWAY	150356	MDC_DIM_DEGC	268192
Room Tempera- ture	TP-Room	Cel	MDC_TEMP_ROOM	0	MDC_DIM_DEGC	268192
Myocardial Tem- perature	TP-Myo	Cel	MDC_TEMP_MYO	0	MDC_DIM_DEGC	268192
Core Temperature	TP-Core	Cel	MDC_TEMP_CORE	150368	MDC_DIM_DEGC	268192
Surface Tempera- ture	TP-Surf	Cel	MDC_TEMP_BODY	150364	MDC_DIM_DEGC	268192
Entropy						
Suppression Ratio	BURST SUPPRES- SION RATIO	%	MDC_EEG_PA- ROX_CRTX_BURST_SUPP RN	155024	MDC_DIM_PER- CENT	262688
Response Entropy	RE	{unitless} 1	MDC_EEG_ENTROPY_RE- SPONSE	0	MDC_DIM_DIM- LESS	262656
State Entropy	SE	{unitless} 1	MDC_EEG_ENTRO- PY_STATE	0	MDC_DIM_DIM- LESS	262656
BIS						
Bispectral Index	BIS	{unitless} 1	MDC_EEG_BISPEC- TRAL_INDEX	153644	MDC_DIM_DIM- LESS	262656
Electromyography	EMG	dB	MDC_EMG_ELEC_POTL_ MUSCL	153640	MDC_DIM_DECI- BEL	268576
Suppression Ratio	SR	%	MDC_EEG_PA- ROX_CRTX_BURST_SUPP RN	155024	MDC_DIM_PER- CENT	262688
Cardiac Output (C.O.)						

Sub- parameter Name	Abbrevia- tion	UCUM	REFID	CF_CODE1 0	UOM_MDC	CF_UCODE 10
Cardiac Output	CO	L/min	MDC_OUTPUT_CARD	150276	MDC_DIM_L_PER_MIN	265216
Cardiac Index	CI	L/min/m2	MDC_OUTPUT_CARD_IN- DEX	149772	MDC_DIM_L_PER_MIN_PER_M_SQ	264992
Right Ventricular Ejection Fraction	REF	%	MDC_VOL_BLD_VENT_RI GHT_STROKE_EJCT_FRA C	0	MDC_DIM_PER- CENT	262688
Temperature Blood	TBlood	Cel	MDC_TEMP_BLD	188436	MDC_DIM_DEGC	268192
Surgical Pleth Index (SPI)						
Surgical Pleth In- dex	SPI	{unitless} 1	MDC_SURGI- CAL_PLETH_INDEX	149784	MDC_DIM_DIM- LESS	262656
Spirometry						
Airway Resistance	Raw	cm[H2O]/L/ s	MDC_RES_AWAY_EXP	151844	MDC_DIM_CM_H2 O_PER_L_PER_SE C	268064
Plateau Pressure	Pplat	cm[H2O]	MDC_PRESS_RESP_PLAT	151784	MDC_DIM_CM_H2 O	266048
Positive End Ex- piratory Pressure	PEEP	cm[H2O]	MDC_PRESS_AWAY_END _EXP_POS_TOTAL	152788	MDC_DIM_CM_H2 O	266048
Maximum Airway Pressure	Ppeak	cm[H2O]	MDC_PRESS_AWAY_INSP _MAX	151817	MDC_DIM_CM_H2 O	266048
Average Airway Pressure	Pmean	cm[H2O]	MDC_PRESS_AWAY	151792	MDC_DIM_CM_H2 O	266048
Compliance	Compl	mL/ cm[H2O]	MDC_COMPL_LUNG_DY N	151692	MDC_DIM_MIL- LI_L_PER_CM_H2 O	268050
Expired Tidal Vol- ume	TVexp	mL	MDC_VOL_AWAY_TI- DAL_EXP_MEAN	152667	MDC_DIM_MILLI_L	263762
Expired Minute Volume	MVexp	L/min	MDC_VOL_MI- NUTE_AWAY_EXP	151884	MDC_DIM_L_PER_MIN	265216
Inspiratory Minute Volume	MVinsp	L/min	MDC_VOL_MI- NUTE_AWAY_INSP	151888	MDC_DIM_L_PER_MIN	265216
Inspired Tidal Vol- ume	TVinsp	mL	MDC_VOL_AWAY_TI- DAL_INSP	152660	MDC_DIM_MILLI_L	263762
Ventilation Setting						
Ventilation mode	Vent Mode	{unitless} 1	MDC_VENT_MODE	184352	MDC_DIM_DIM- LESS	262656
Tidal Volume	Tv	mL	MDC_VENT_VOL_TI- DAL_SETTING	16929196	MDC_DIM_MILLI_L	263762
Pressure Control Pressure	Pinsp	cm[H2O]	MDC_VENT_PRESS_AWA Y_SETTING	16929188	MDC_DIM_CM_H2 O	266048
Ventilation Respi- ration Rate	RR	{breath}/mi n	MDC_VENT_RESP_RATE_ SETTING	16928802	MDC_DIM_RESP_P ER_MIN	264928

Sub- parameter Name	Abbrevia- tion	UCUM	REFID	CF_CODE1 0	UOM_MDC U	CF_UCODE 10
Inspiratory Time Expiratory Time Ratio	I:E	{unitless} 1	MDC_RATIO_IE_SETTING	16929048	MDC_DIM_DIM- LESS	262656
Inspiratory Time	Tinsp	s	MDC_VENT_TIME_PD_INS P_SETTING	16929632	MDC_DIM_SEC	264320
Positive End-Ex- piratory Pressure	PEEP	cm[H2O]	MDC_VENT_PRESS_AWA Y_END_EXP_POS_SET- TING	16929192	MDC_DIM_CM_H2 O	266048
EWS						
National Early Warning score	NEWS2	{unitless} 1	MDCX_SCORE_EWS	0	MDC_DIM_DIM- LESS	262656
Modified Early Warning score	MEWS	{unitless} 1	MDCX_SCORE_MEWS	0	MDC_DIM_DIM- LESS	262656
Gas Delivery						
Gas Consumption Desflurane	DES-DLV	mL	MDC_VOL_DE- LIV_DESFL_LIQUID_CASE	152900	MDC_DIM_MILLI_L	263762
Gas Consumption Isoflurane	ISO-DLV	mL	MDC_VOL_DE- LIV_ISOFL_LIQUID_CASE	152948	MDC_DIM_MILLI_L	263762
Gas Consumption Sevoflurane	SEV-DLV	mL	MDC_VOL_DE- LIV_SEVFL_LIQUID_CASE	152980	MDC_DIM_MILLI_L	263762
Gas Consumption N2O	N2O-DLV	L	MDC_VOL_DE- LIV_N2O_CASE	152960	MDC_DIM_L	263744
Fresh Air Flow	AirFlow	L/min	MDC_FLOW_AIR_FG	152876	MDC_DIM_L_PER_ MIN	265216
Fresh N2O Flow	N2OFlow	L/min	MDC_FLOW_N2O_FG	153092	MDC_DIM_L_PER_ MIN	265216
Fresh O2 Flow	O2Flow	L/min	MDC_FLOW_O2_FG	153156	MDC_DIM_L_PER_ MIN	265216

B Abbreviations

B.1 Abbreviations

Abbreviations and symbols which you may encounter while reading this manual or using the monitor HL7 application are listed below with their meanings.

Abbreviation	Definition
ACK	acknowledgment code
Addr, AD	address
ADT	Admit, discharge, transfer
ASCII	American Standard Code for Information Interchange
ADD	Addendum
CCG	Centricity Clinical Gateway
CE	coded entry
CHAR	character
Channel	Slot number on the sending device
Chg	change
CIS	Clinical Information System
CK	Composite ID with check digit
CM	composite
CN	composite name
CQ	composite quantity with units
CV	cardiovascular
DICOM	Digital Imaging and Communications in Medicine
DT	date
ECG, EKG	electrocardiogram
FTP	File Transfer Protocol
FAQs	Frequently Asked Questions
HL7	Health Level Seven standard interface
HIS	Hospital Information System
ID	identification
IS	Information Systems
ITPS	Information Technologies Professional Services
1K	1024 bytes
Lic	license
MDS	Medical Device

Abbreviation	Definition
Metric	Sequence number
MRG	Merge Segment
MSH	Message Segment Header
MSA	Message Segment Acknowledgment
NACK	negative acknowledgment code
NM	numeric
Num	number
OBR	observation request
Obs	observation
OBX	observation result
ORU	Observation Report Unsolicited
ORF	Observation Report Filtered
O	optional
PCD TF	IHE Patient Care Device Technical Framework
PDM	Patient Data Model
PN	part number, person name
PID	Patient Identification
PV1	Patient Visit
QRD	Query Definition
QRF	Query Filter
Req	request
Req. Field	required field
Rev	revision
Seq	sequence
ST	string data
TCP/IP	Transmission Control Protocol/Internet Protocol
TN	telephone number
TS	time stamp
U	unknown
VMD	Virtual Medical Device
Y/O	yes/optional
Y/R	yes/required
Y	yes

