Contents

1. LAB01457 - EMR HL7 Interface Specification

Global ID: GID-1610693

Project ID: PRJ01248-DES-2027

1.1 Approvals and Revision History

Approvals

Name	Title	Signature	Date
Elizabeth Zechman	Service	See Agile	See Agile
Chris Keegan	Architect	See Agile	See Agile
Melanie Tinney	Marketing	See Agile	See Agile
Steve Amrhein	QA	See Agile	See Agile

Revision History

Revision Level	Description	Author	Date Revised
1	Initial Release	Chris Haigney	See Agile
2	New section created covering new HL7 inbound messages	Chris Haigney	See Agile
3	New section created covering Alarm Communication	Chris Haigney	See Agile
4	Minor edit to correct typographical error in copyright statement only	Kyle Lombardo	See Agile
5	Moved sections to separate Inbound and Outbound interfaces Added section for outbound bed interface	Chris Haigney	See Agile
6	Added VIP section to Patient section	Chris Haigney	See Agile
7	Updated per integration comments	Chris Haigney	See Agile

1.2 Introduction

Global ID: GID-1610695

Project ID: PRJ01248-DES-2028

The Gateway Software provides a simple interface that allows information hosts (third-party software applications) to communicate with Hillrom Welch Allyn Vital Signs Monitors and connected Hillrom beds. It

achieves this by having the ability to translate data to a format that is understood by the third-party application which the Gateway Software can subsequently send to the third-party application via a TCP connection.

Similarly, Gateway Software has the ability to receive & translate third-party data formats.

The integration consists of several transaction types:

- Inbound to Gateway Software
  - ADT
  - Patient demographics Query / Response
  - HL7 Orders
  - HL7 Observations
  - HL7 Lab Results
  - HL7 Procedures
  - HL7 Medications & Medication Administrations
- Outbound to the third-party application
  - Send Vitals ORU readings
    - Confirmed/validated data
    - Unconfirmed/unvalidated data
  - IHE Alarm Manager

Communication between the Gateway Software and the HL7 host system is via TCP/IP sockets, via dedicated ports.

Date/time is expected to be received in UTC (20211201150552). Time zone offsets are accepted (20211201150552+0100).

HL7 version 2.6 shall be the messaging standard between the Gateway Software and the HL7 host system.

1.2.1 Definitions

Global ID: GID-1610696

Project ID: PRJ01248-DES-2029

The following table lists acronyms and terms that are used throughout this document. The names and acronyms for software items within the system are introduced in the sections which describe them.

Term	Definition
Gateway Software	A software application that is capable of receiving data from a device and converting the data to HL7 messages and then transmitting that data via a TCP/IP socket. Examples include: CDIS-NCE, Connex CSK, Connex VM and/or Connex CS. This specification specifies the Digital Health Gateway.
HL7	Health Level 7 - A framework for the exchange, integration, sharing, and retrieval of electronic health information
Host HL7 System	Software System that is connected to the host side of the gateway software.
IHE	Integrating the Healthcare Enterprise. IHE is an initiative by groups of healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical needs in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement and enable care providers to use information more effectively.
Vitals Device	A generic name for CVSM, CIWS, and future vitals devices. The following Welch Allyn devices are compatible with Zenith: CIWS, CSM, CVSM 1.7 or greater.
Digital Health Gateway (DGH)	A software system that provides the functionality described in this document.
ADT	Admit, Discharge, Transfer
EG	Enterprise Gateway

1.2.2 Purpose

Global ID: GID-1645462

Project ID: PRJ01248-DES-2030

This document contains specifications intended as a guide for software and HL7 Interface developers who understand HL7 Interface requirements. It explains the Digital Health Gateway's (DHG) Enterprise Gateway Interface requirements. This document shall be used to assist software and HL7 Interface developers and allow these technical personnel to develop the HL7 interface between a facility-controlled Hospital Information System (HIS) and the DHG's Enterprise Gateway.

1.2.3 Scope

Global ID: GID-1645463

Project ID: PRJ01248-DES-2031

The scope of this interface specification is to define the messaging between the Digital Health Gateway's Enterprise Gateway and a HL7 host system to achieve the following bidirectional communication:

1. Send vitals data from the vitals device to the HL7 host system
    - ORU_O01
2. Send alerts via an IHE interface to a HL7 host system
    - ORU_R40
3. Listen for incoming HL7 messages from the HL7 host system
    - ADT
    - ORU
    - ORM
    - OMG
    - OMP
    - PPR
    - RAS

1.3 HL7 Message Formats

Global ID: GID-1646846

Project ID: PRJ01248-DES-2032

All HL7 messages (including patient ID and patient list) are based on IHE HL7 standards.

The specifications are available by clicking the following link: IHE specification and then select Patient Care Device (PCD).

The specification for Alarm Reporting is available by clicking the following link: IHE Alarm Communication Management

Optionality (Usage) column – defines if this is a Hillrom Required, Optional or Conditional component of the HL7 Segment/Field.

“R” = Required. This must be present in the HL7 Message.

“O” = Optional. This can be present in the HL7 Message.

“C” = Conditional. This may be present in the HL7 Message.

1.3.1 Message Segments Detailed Descriptions

Global ID: GID-1646847

Project ID: PRJ01248-DES-2033

This section describes the different HL7 message segments.

1.3.1.1 MSH Segment

Global ID: GID-1646848

Project ID: PRJ01248-DES-2034

Example:

MSH|^~\&|Clarity|Hillrom|EMR|HIS|20140308152017+0500||ORU^R01^ORU_R01|20140308202025103001270212|P|2.6|||AL|NE||||| IHE_PCD_ORU_R01^IHE_PCD^1.3.6.1.4.1.19376.1.6.1.1.1^ISO

Field	Description	Usage	Comment OR Example
MSH-1	Field Separator	R	|
MSH-2	Encoding Characters	R	^~\&
MSH-3	Sending Application	R	Clarity
MSH-4	Sending Facility	R	Hillrom
MSH-5	Receiving Application	R	Generic Name for Receiving Application EMR (Clarity to EMR) Clarity (EMR to Clarity)
MSH-6	Receiving Facility	R	Generic Name for Receiving Facility HIS (Clarity to EMR) Clarity (EMR to Clarity)
MSH-7	Date/Time of Message	R	Format: YYYYMMDDHHMMSS+/-HHMM Local Date/Time +/- Timezone offset of the server date/time in HH (hours) and MM (minutes) from UTC time
MSH-9.1 MSH-9.2 MSH-9.3	Message Type	R	<Message Code (ID)> ^ <Trigger Event (ID)> ^ <Message Structure (ID)> Example: ORU^R01^ORU_R01
MSH-10	Message Control ID	R	An identifier that uniquely identifies the message Usage: Reading Date/Time & Unique Number
MSH-11	Processing ID	R	P for Production. D for Debugging

Field	Description	Usage	Comment OR Example
MSH-12	Version ID	R	HL7 Version; Usage: 2.6
MSH-15	Accept Acknowledgement Type	R	AL
MSH-16	Application Acknowledgement Type	R	NE
MSH-21	Message Profile Identifier	O	<Entity Identifier> ^ <Namespace ID> ^ <Universal ID> ^ <Universal ID Type> Usage: IHE_PCD_ORU_R01^ IHE_PCD^1.3.6.1.4.1.19376.1.6.1.1.1^ISO

1.3.1.2 PID Segment

Global ID: GID-1646849

Project ID: PRJ01248-DES-2035

Example: PID|||147852369||Callaghan^Harold^P||19451225|M

Field	Description	Required	Comments
PID-3	Patient Identifier	R	Can be displayed on the device. This interface does not currently support repeaters for MRN.
PID-5.1	Last Name or Surname	R	Can be displayed on the device and can be sent in the ORU result if a patient query or patient list or manually entered.
PID-5.2	First Name	R	Can be displayed on the device and can be sent in the ORU result if a patient query or patient list or manually entered.
PID-5.3	Middle Initial	O	Can be displayed on the device
PID-7	Date of Birth	R	Format: YYYYMMDD Not displayed on the device, but can be sent as part of the ORU result if a patient query or patient list has been done before ORU sent.
PID-8	Gender	R	M=male; F=female Not displayed on the device, but can be sent as part of the ORU result if a patient query or patient list has been done before ORU sent.
PID-18	Account #	O	Patient's account number

1.3.1.3 PV1 Patient Visit Segment

Global ID: GID-1646850

Project ID: PRJ01248-DES-2036

Example: PV1||I|MedSurg-3^Room^Bed

Field	Description	Required	Comments
PV1-2	Patient Class	R	I = Inpatient
PV1-3.1	Assigned Location (Unit)	R	Can be displayed on the device Data comes from device's fields for: LocationID (PV1-3.1) Room (PV1-3.2) Bed fields (PV1-3.3) Example: LocationID^Room^Bed
PV1-3.2	Assigned Location (Room)	R	Can be displayed on the device Data comes from device's fields for: LocationID (PV1-3.1) Room (PV1-3.2) Bed fields (PV1-3.3) Example: LocationID^Room^Bed
PV1-3.3	Assigned Location (Bed)	R	Can be displayed on the device Data comes from device's fields for: LocationID (PV1-3.1) Room (PV1-3.2) Bed fields (PV1-3.3) Example: LocationID^Room^Bed
PV1-3.4	Assigned Location (Facility)	R	Won't be displayed on vitals device
PV1-3.7	Assigned Location (Building)	O	Won't be displayed on vitals device
PV1-3.8	Assigned Location (Floor)	O	Won't be displayed on vitals device

Field	Description	Required	Comments
PV1-7	Attending Doctor	O	Looking for Assigning Facility of NPI by default in PV1-7.13
PV1-8	Referring Doctor	O	Looking for Assigning Facility of NPI by default in PV1-8.13
PV1-9	Consulting Doctor	O	Looking for Assigning Facility of NPI by default in PV1-9.13
PV1-16	VIP Indicator	C	Patient's VIP status 1, true, vip, yes, y
PV1-17	Admitting Doctor	O	Looking for Assigning Facility of NPI by default in PV1-17.13
PV1-19	Visit ID	C	Patient's Visit ID Required for ADT

1.3.1.4 OBR Observation Segment

Global ID: GID-1646851

Project ID: PRJ01248-DES-2037

Example: OBR|||20140308152017213|S^S|||20140308202025
|||12398756|||||||||||||||F|||||||||12398756||||||||||

Field	Description	Required	Comments
OBR-3.1	Filler Order Number	R	ORU: Filled with local time of when the message was processed. ACM: 3.1 = The source description of where the value in alarm comes from; 3.2 = not used; 3.3 = Date/Time of when the alarm tripped.
OBR-3.2	Filler Order Number (display)	C	ORU: Required if terminology mapping is to be used
OBR-3.3	Filler Order Number	C	ORU: Required if terminology mapping is used

Field	Description	Required	Comments
	(system)		
OBR-4	Universal Service ID	C	Type of data in the ORU message where: S = Episodic data; C = Continuous
OBR-7	Observation Date/Time	R	Format: YYYYMMDDHHMMSS+HHMM UTC Date/Time +/- Timezone offset in HH (hours) and MM (minutes) from UTC time. NOTE: always +0000 since parameter date/time is reported in UTC
OBR-10	Collector Identifier	O	Usage: Clinician ID
OBR-25	Result Status	R	Confirmed/Validated (F) or Unconfirmed/Unvalidated (R)
OBR-29	Parent Number	R	ACM only: The source description of where the value in alarm comes from. This field defines the internal object and field that tripped the alarm.
OBR-34	Technician	O	Usage: Clinician ID

1.3.1.5 OBX Observation Segment

Global ID: GID-1646852

Project ID: PRJ01248-DES-2038

Example: OBX|1|NM|150021^MDC_PRESS_BLD_NONINV_SYS^MDC|1.0.1.1|100|
266016^MDC_DIM_MMHG^MDC|||||F|||20140308202025||12398756|| 103001270212^PMP^CVSM 6000 Series||0|0|0

Field	Description	Required	Comments
OBX-1	Set ID	R	Sequence Number of the OBX in the message
OBX-2	Value Type	R	Examples usage: NM (Numeric); ST (String); CWE (code)
OBX-3.1 OBX-3.2 OBX-3.3	Observation Identifier	R	A triplet describes the value that is being sent. <Identifier (ST)> ^ <Text (ST)> ^ <Name of Coding System (ID)> See OBX-3 table below

Field	Description	Required	Comments
OBX-4.1	Observation Sub-ID	R	See OBX-4 table below
OBX-5	Observation Value	C	The value associated with OBX-3, if one is provided. If the Value Type (OBX.2.1) is set to CWE, this can be a triplet.
OBX-6	Units	C	Describes units for value in OBX-5 See OBX-6 table below
OBX-8	Interpretation Codes	O	Measurement alarm value See OBX-8 table below
OBX-11	Observation Result Status	R	F = Confirmed/validated; R = Unconfirmed/unvalidated See table below for the OBX-11 value usage
OBX-14	Date/Time of the Observation	R	Format: YYYYMMDDHHMMSS+HHMM UTC Date/Time +/- Timezone offset in HH (hours) and MM (minutes) from UTC time. NOTE: always +0000 since parameter date/time is reported in UTC
OBX-16	Responsible Observer	O	Usage: Clinician ID
OBX-17	Observation Method	O	Method and Source of the parameter. Format = Method^Source Method = one of (Blank; Manual; Device) See source values in OBX-17 table below
OBX-18	Equipment Instance Identifier	O	Description of the system sending the data. Contains: 18.1 - Entity Identifier – length 199 18.2 - Namespace ID – length 20 (Optional) 18.3 - Universal ID – length 199 (Optional) Example: SerialNumber^ModelName^ModelNumber
OBX-20	Observation Site (Modifier Field 1)	O	NIBP: Cuff Site TEMPERATURE: Mode SpO2: O2 Method
OBX-21	Modifier Field 2	O	NIBP: Cuff Size – See OBX-21 table below

Field	Description	Required	Comments
			SpO2: O2 Flow Rate (1 - 20 liters, increments of 1)
OBX-22	Modifier Field 3	O	NIBP: Patient Position – See OBX-22 table below SpO2: O2 Concentration (21 - 100%, increments of 1%)
OBX-23	Modifier Field 4	O	SpO2: Measurement Site – See OBX-23 table below
OBX-24+	Custom Data Modifiers	O	When custom data modifiers are specified for an existing parameter, a variable number of modifiers will be appended to the end of the OBX segment, following the static modifiers for the parameter. These custom modifiers will always begin at OBX-24, regardless of how many standard modifiers are associated with the parameter.

Value	OBX-3 - Observation Identifier
NIBP SYS	150021^MDC_PRESS_BLD_NONINV_SYS^MDC
NIBP DIA	150022^MDC_PRESS_BLD_NONINV_DIA^MDC
NIBP MAP	150023^MDC_PRESS_BLD_NONINV_MEAN^MDC
Temperature	150344^MDC_TEMP^MDC
SpO2 SAT	150456^MDC_PULS_OXIM_SAT_O2^MDC
Heart Rate	149546^MDC_PULS_RATE_NON_INV^MDC
Weight	68063^MDC_ATTR_PT_WEIGHT^MDC
Height	68060^MDC_ATTR_PT_HEIGHT^MDC
Respiration Rate	151562^MDC_RESP_RATE^MDC
Pain	PAIN^PAIN_LEVEL^L
BMI	BMI^BMI^L
SpHb	64156^SPHB_VALUE^L
etCO2	151728^MDC_AWAY_CO2_ET^MDC
FiCO2	151729^MDC_AWAY_CO2_FI^MDC
IPI	64158^MDC_INTEGRATED_PULM_INDEX^MDC

Value	OBX-3 - Observation Identifier
Custom Data Parameter/Score/Calculation	<Custom Data Name>

*The <Custom Alarm Name> for tech alarms are generated based on the WACP data and naming scheme. Each alarm is guaranteed to be unique. See Appendix A for a full list of explicit alarm codes.

Value	OBX-4 - Observation Sub-ID
NIBP SYS	1.0.1.1
NIBP DIA	1.0.1.2
NIBP MAP	1.0.1.3
Temperature	1.10.1.1
SpO2 SAT	1.1.1.12
Heart Rate	1.0.0.1
Weight	1.1.2.209
Height	1.1.2.25
Respiration Rate	1.1.1.25
Pain	0.0.0.0
BMI	0.0.0.0
SpHb	0.0.0.0
etCO2	0.0.0.0
FiCO2	0.0.0.0
IPI	0.0.0.0
Custom Data Parameter/Score/Calculation	0.0.0.0

Value	OBX-6 – Units
NIBP	266016^MDC_DIM_MMHG^MDC
Temperature	268192^MDC_DIM_DEGC^MDC OR 266560^MDC_DIM_FAHR^MDC

Value	OBX-6 – Units
SpO2 SAT	262688^MDC_DIM_PERCENT^MDC
Heart Rate	264864^MDC_DIM_BEAT_PER_MIN^MDC
Weight	263875^MDC_DIM_KILO_G^MDC OR 263904^MDC_DIM_LB^MDC
Height	263441^MDC_DIM_CENTI_M^MDC OR 263520^MDC_DIM_INCH^MDC
Respiration Rate	264928^MDC_DIM_RESP_PER_MIN^MDC
Pain	N/A
BMI	N/A
SpHb	266866^MDC_DIM_MILLI_MOLE_PER_L^MDC
EtCO2	266016^MDC_DIM_MMHG^MDC
FiCO2	266016^MDC_DIM_MMHG^MDC
IPI	N/A
Custom Data Parameter/Score/Calculation	<Custom Data Units>

The following table specifies the relation between Observation Result status values in ORU messages, based on different profiles (modes) of the device.

Device Profile	Measurement Type	Outbound Interface	OBR-4	OBR-25	OBX-11
Intervals	Episodic	Confirmed/Validated	S	F	F
Intervals	Intervals	Unconfirmed/Unvalidated	C	R	R
Spot check	Episodic	Confirmed/Validated	S	F	F

Value	OBX-17 – Sources Values
NIBP	Blank; CVSM; MODG

Value	OBX-17 – Sources Values
Temperature	Blank; SureTemp; SureTemp_Plus; Braun_Pro4000; Braun_Pro6000
SpO2	Blank; Nonin; Nellcor_MP205; Nellcor_MP506; Nellcor_NELL3; Nellcor_NELL1; Masimo_MS11; Masimo_MS2011; Masimo_MX
Heart Rate	Blank; NIBP; SPO2; ECG; Bed_Sensor; Chair_Sensor
Weight	Blank
Height	Blank
Respiration Rate	Blank; Respiration; CO2; ECG; Bed_Sensor; Chair_Sensor
Pain	Blank
BMI	Blank
SpHb	Blank; Masimo_MX
EtCO2; FiCO2; IPI	Blank
Custom Data Parameter/Score/Calculation	Blank

Device Selection	OBX-20 – Cuff Site Values
None	Blank
Unknown	Unknown
L Arm	LA
R Arm	RA
L Leg	LL
R Leg	RL

Device Selection	OBX-20 – Temperature Mode
None	Blank
Unknown	Unknown

Oral	Oral
Rectal	Rectal
Pediatric Axillary	Ped_Axillary
Adult Axillary	Adult_Axillary
Tympanic	Tympanic

Device Selection	**OBX-20 – SpO2 O2 Method**
None	Blank
Aerosol / humidified mask	Aerosol/humidified mask
Face tent	Face Tent
Mask	Mask
Nasal cannula	Nasal Cannula
Nonrebreather	Nonrebreather
Partial rebreather	Partial Rebreather
T-piece	T Piece
Tracheostomy collar	Tracheostomy Collar
Ventilator	Ventilator
Venturi mask	Venturi Mask
Room air	Room Air
Oxymizer	Oxymizer

Device Selection	**OBX-21 – NIBP Cuff Size**
None	Blank
Unknown	Unknown
Neo 1	Neo 1
Neo 2	Neo 2
Neo 3	Neo 3

Device Selection	OBX-21 – NIBP Cuff Size
Neo 4	Neo 4
Neo 5	Neo 5
Small infant	Small Infant
Infant	Infant
Small child	Small Child
Child	Child
Small adult	Small Adult
Adult	Adult
Adult long	Adult Long
Large adult	Large Adult
Large adult long	Large Adult Long
Thigh	Thigh

Device Selection	OBX-22 – NIBP Patient Position
None	Blank
Unknown	Unknown
Lying	Lying
Sitting	Sitting
Standing	Standing

Device Selection	OBX-23 – SpO2 Measurement Site
None	Blank
Ear	Ear
Finger	Finger
Toe	Toe
Forehead	Forehead

1.3.1.6 ORC Common Order Segment

Global ID: GID-2027742

Project ID: PRJ01248-DES-2039

Field	Description	Required	Comments
ORC-2	Order Number	C	Required for Medication orders
ORC-5	Order Status	O	Order status
ORC-7	Priority	O	Consumed for medication orders
ORC-9	Date/Time of Transaction	C	Required for Medication orders

1.3.1.7 RXO Pharmacy/Treatment Order Segment

Global ID: GID-2027743

Project ID: PRJ01248-DES-2040

Field	Description	Required	Comments
RXO-1.1	Requested Give Code Identifier	C	Required for Medication orders
RXO-1.2	Requested Give Code Text	C	Required for medication orders
RXO-1.3	Requested Give Code System	C	Required for medication orders

1.3.1.8 RXA Pharmacy/Treatment Administration Segment

Global ID: GID-2027744

Project ID: PRJ01248-DES-2041

Field	Description	Required	Comments
RXA-3	Date/Time Start of Administration	C	Required if RXA-4.1 is empty
RXA-4	Date/Time End of Administration	C	Required if RXA-3.1 is empty
RXA-6	Administered Amount	O	
RXA-7.1	Administered Units Identifier	O	
RXA-7.2	Administered Units Text	O	
RXA-7.3	Administered Units System	O	
RXA-9.1	Administration Notes Identifier	O	Used only if RXA-18 is empty
RXA-9.2	Administration Notes Text	O	Used only if RXA-18 is empty
RXA-9.3	Administration Notes System	O	Used only if RXA-18 is empty
RXA-10.1	Administering Provider Identifier	O	
RXA-10.2	Administering Provider Family Name	O	
RXA-10.3	Administering Provider Given Name	O	
RXA-12	Administered Per (Time Unit)	O	
RXA-18.1	Substance/Treatment Refusal Reason Code	O	
RXA-18.2	Substance/Treatment Refusal Reason Text	O	
RXA-18.3	Substance/Treatment Refusal Reason System	O	
RXA-20	Completion Status	O	

1.3.1.9 DG1 Diagnosis Segment

Global ID: GID-2027745

Project ID: PRJ01248-DES-2042

Field	Description	Required	Comments
DG1-3.1	Diagnosis Code Identifier	R	Diagnosis code
DG1-3.2	Diagnosis Code Text	R	
DG1-3.3	Diagnosis Code System	R	
DG1-5	Diagnosis Date/Time	O	Date/time the diagnosis was determined

1.3.2 Vitals Data Send

Global ID: GID-1646856

Project ID: PRJ01248-DES-2043

The message will use the following message segments: MSH, PID, PV1, OBR and OBX.

1.4 Inbound HL7 Interfaces

Global ID: GID-1731295

Project ID: PRJ01248-DES-2044

This section describes all the HL7 interfaces supported by the Digital Health Gateway.

1.4.1 HL7 Host System

Global ID: GID-1797684

Project ID: PRJ01248-DES-2045

This section describes the different interfaces that the Digital Health Gateway supports over HL7. This includes support for ADT messages. The full list of supported messages and segments is defined below.

Supported HL7 Messages

ADT

ORU

ORM

OMG

OMP

PPR

RAS

Supported HL7 Segments

MSH

PID

PV1

ORC

OBR

OBX

NTE

RXE

RXO

RXC

PR1

ROL

PRB

Supported Coding Systems

The Digital Health Gateway supports the following coding systems out of the box. Local coding systems can be supported with help from our integration team.

SNOMED

LOINC

ICD-9

ICD-10

RxNORM

MDC

In order to translate incoming data codes, the DHG is expecting values to be in the format code^display^system.

OBX|1|NM|**28539-5^RBC^LN**||900|%|400-800|H|||F|||20191005|||62110|XE|

Data values in code format are also supported as long as they are tagged as CWE and sent in the same code^display^system format.

OBX|1|CWE|67775-7^Level of responsiveness^LN||**LA9340-6^Alert^LN**||||||F|||20191005|||62110|XE|

1.4.1.1 Admit, Discharge, Transfer

Global ID: GID-1646744

Project ID: PRJ01248-DES-2046

This section describes the messages and formats of Admit, Discharge and Transfer messages.

1.4.1.1.1 Supported ADT Trigger Events

This section contains a list of supported HL7 messages, and which components can receive each message.

NOTE: Digital Health Gateway (DGH) does not support A60.

HL7 ADT Message Support

ADT Message	DHG / Dashboard	Voalte Mobile	Voalte Nurse Call
A01 Admit/visit notification	Yes	Yes	Yes
A02 Transfer a patient	Yes	Yes	Yes
A03 Discharge/end visit	Yes	Yes	Yes
A04 Register a patient	Yes	Yes	Yes
A05 Pre-admit a patient	Yes	Yes	No
A06 Change an outpatient to an inpatient	Yes	Yes	Yes
A07 Change an inpatient to an outpatient	Yes	Yes	Yes
A08 Update patient information	Yes	Yes	Yes
A09 Patient departing – tracking	Yes	No	No
A10 Patient arriving – tracking	Yes	No	No
A11 Cancel admit/visit notification	Yes	Yes	Yes
A12 Cancel transfer	Yes	Yes	Yes
A13 Cancel discharge/end visit	Yes	Yes	Yes
A17 Swap patients	Yes	No	Yes
A18 Merge patient information	Yes	Yes	Yes
A23 Delete a patient record	Yes	No	No
A28 Add person information	Yes	No	No
A29 Delete person information	Yes	No	No
A30 Merge person information	Yes	No	Yes

A31 Update person information	Yes	No	No
A34 Merge patient information - patient I	Yes	No	Yes
A35 Merge patient information - account only	Yes	No	Yes
A36 Merge patient information - patient ID and account number	Yes	No	Yes
A38 Cancel pre-admit	Yes	No	No
A40 Merge patient - patient identifier list	Yes	No	No
A41 Merge account - patient account num	Yes	No	Yes
A42 Merge visit - visit number	Yes	No	Yes
A43 Move patient information - patient identifier list	Yes	No	Yes
A44 Move account information - patient account number	Yes	No	Yes
A45 Move visit information - visit number	Yes	No	Yes
A47 Change patient identifier list	Yes	No	Yes
A49 Change patient account number	Yes	No	Yes
A50 Change visit number	Yes	No	Yes
A60 Update Adverse Reaction information	No	No	Yes

1.4.1.1.2 ADT Patient Identifiers, Patient Locations

Global ID: GID-1646738

Project ID: PRJ01248-DES-2048

ADT messages will work as per HL7 specifications only when standard HL7 patient identifiers are set.

Standard HL7 identifiers are:

- PID-3 (Patient Identifier)

- PID-18 (Patient Account Number)
- PV1-19 (Visit Number)

Standard HL7 source and target identifiers used for merge and change messages:

Target Identifier	Source Identifier
PID-3 (Patient Identifier)	MRG-1 (Prior Patient Identifier)
PID-18 (Patient Account Number)	MRG-3 (Prior Account Number)
PV1-19 (Visit Number)	MRG-5 (Prior Visit Number)

Patient Identifiers

Enterprise Gateway requires a visit number and one unique identifier to identify a patient and track a patient, typically Patient Identifier (PID-3) and/or an Account identifier (PV1-19).

Here is an example of an ADT message that meets the minimum HL7 specifications. This is an HL7 version 2.5, ADT A01 Message.

EXAMPLE 1

```
MSH|^~\&|||||20120629092011||ADT^A01|MESSAGEIDA01-
1|P|2.5||||||EVN||20120521|||||
PID|||1888881||Male^One|||||||||||||||||||||||||||||||
PV1||I|||||||||||||||||||||||||||||||||||||||||||||||
```

In Example 1, the HL7 message is missing additional fields required by PID1-3.1, PID1-7, PID1-8, and PV1-19 to be populated. Example 2 includes a visit identifier (PV1-19) and location information (PV1-3-1).

EXAMPLE 2

```
MSH|^~\&|||||20120629092011||ADT^A01|MESSAGEIDA01-1|P|2.5||||||
EVN||20120521|||||
PID|||1888881||Male^One|||||||||||||||||||||||||||||||
PV1||I|Unit1^Room1^Bed1^Facility|||||||||||||||44444|||||||||||||||||||
||||||||||||
```

Example 2 contains the minimum amount of data required to process an ADT message.

1.4.1.1.2.1 VIP Patient

Global ID: GID-1937279

Project ID: PRJ01248-DES-2049

PV1.16.1 can be used to notifiy the system that a patient is a "VIP" patient. Any of the listed data values can be used in PV1.16.1 to indicate a patient is of "VIP" status.

- 1
- true
- yes
- y
- vip

NOTE: Capitalization is not manditory. 'true' 'True' and 'TRUE' would all be accepted similarly.

1.4.1.1.3 ADT Patient Location

Global ID: GID-1646748

Project ID: PRJ01248-DES-2050

The key field for identifying patient locations is the PV1-3 field. The elements critical for establishing location include:

Field	Location Name	Required	Rules
PV1.3.1	Point of Care	R	This is required to determine which Workstation/Unit will be monitoring each patient.
PV1.3.2	Room	R	If the Room is present, this data will be stored by the CDR.
PV1.3.3	Bed	R	If the Bed is present, this data will be stored by the CDR.
PV1.3.4	Facility	C	If the PV1-3-4 (Facility) is populated in the ADT message with data, this data will be stored by the CDR.
PV1.3.7	Building	C	If the PV1-3-7 (Building) is populated in the ADT message with data, this data will be stored by the CDR.
PV1.3.8	Floor	C	If the PV1-3-8 (Floor) is populated in the ADT message with data, this data will be stored by the CDR.

1.4.1.2 Results

Global ID: GID-1713549

Project ID: PRJ01248-DES-2051

The Digital Health Gateway can support receiving results from an HL7 EMR.

Messages/Segments: ORC, OBX, and NTE segments can be found within ORU messages with Event R01.

In order to properly receive, there are a few fields of the HL7 message that are required. The Patient that is referenced by the results must have previously been admitted and the following pieces of the HL7 message must be included:

PV1		
Segment-Field	**Description**	**Required**
PV1-3	Location	R

PID		
Segment-Field	**Description**	**Required**
PID-3	Patient identifier	R
OBX		
Segment-Field	**Description**	**Required**
OBX-3	Observation code	R
OBX-5	Observation value	R
OBX-7	Reference range	O
OBX-8	Interpretation	O

The category field will be mapped as 'Laboratory' if a corresponding ORC segment is found. The category field will be mapped as a 'Vital Signs' if no ORC segment is found. See the examples for specific usage.

The interpretation field will be mapped using the OBX-8.1 segment. See the table below for mapping. The system used will be http://hl7.org/fhir/v2/0078.

Value	Description
L	Below low normal

Value	Description
H	Above high normal
LL	Below lower panic limits
HH	Above upper panic limits
<	Below absolute low-off instrument scale
>	Above absolute high-off instrument scale
N	Normal
A	Abnormal
AA	Very abnormal
null	No range defined, or normal ranges don't apply
U	Significant change up
D	Significant change down
B	Better
W	Worse
S	Susceptible
R	Resistant
I	Intermediate
MS	Moderately susceptible
VS	Very susceptible

The referenceRange field will be mapped using the OBX-7.1 segment.

If '-' exists in OBX-7.1, define both low and high limits.

If '>' exists in OBX-7.1, define the low limit.

If '<' exists in OBX-7.1, define the high limit.

1.4.1.3 Observations

Global ID: GID-1797945

Project ID: PRJ01248-DES-2052

The Digital Health Gateway can support incoming observations for a known patient.

Messages/Segments: OBR, OBX, and NTE segments can be found within ORU messages with Event R01. Multiple OBX segments are allowed.

Mappings: In order to properly store the lab results in the CDR, there are a few fields of the HL7 message that are required. The Patient FHIR resource that is referenced by the lab results must exist and the following pieces of the HL7 message must be included:

- Point of care (PV1-3.1)
- Observation Identifier (OBX-3.1)
- Observation value (OBX-5.1)

The observation identifier (OBX-3), observation value (OBX-5), and units (OBX-6) field will attempt to be mapped using the Terminology service.

See OBX Observation Segment for more information about how the OBX segment should be constructed.

Example

```
MSH|^~\&||26589||69853|20191005091349|HJONES|ORU^R01|162|P|2.4||
PID|||90662||Test90662^P1atient1^N|Test90662^PatMom1|19370906000000|M|Test
90662^Pat1|2028-9|1st street^^NY^NY^11101|USA||(315)123-
4567^^^test90662pat1@yahoo.com||||801090662||||||||||||
PV1|1|I|GTWY1303^14741^A^1^^^State
Street^Floor1||||||||||||||||VISIT1090662|||||||||||||||||||||||||20191005
091349||
ORC|NW|06-CH0190662|||||^^^^^ROUTINE|||||12^GRANT^JILL^^^^||||
OBR|1|06-
CH0190662||10216|100||20191005091349|||HJONES|O|||||12^GRANT^JILL^^^^||312
||||||||||^^^^^ROUTINE
OBX|1|NM|1497-7^WBC^LN||6.61|10*3/uL|3.40-11.80||||F
```

1.4.1.3.1 Risks

Global ID: GID-1797967

Project ID: PRJ01248-DES-2053

If an HL7 system would like to send an observation of a risk for a given patient, they can do so by sending an ORU_O01 observation to the Digital Health Gateway using the following codes as guidelines:

NOTE: OBX value type (OBX-2.1) should be set as ST, for string data.

Risk Type	OBX-3.1	OBX-3.2	OBX-3.3	OBX-5.1 (ST)
Falls	HR1169	Falls Risk	HR	"true", "false", "t", "f", "yes", "no", "y", "n", "high", "low"
Skin	HR1170	Skin Risk	HR	"true", "false", "t", "f", "yes", "no", "y", "n", "high", "low"
Pulmonary	HR1171	Pulmonary Risk	HR	"true", "false", "t", "f", "yes", "no", "y", "n", "high", "low"

Example

```
MSH|^~\&||26589||69853|20191005091349|HJONES|ORU^R01|162|P|2.4||
PID|||10190548||Test10190548^Patient1^N|Test10190548^PatMom1|19420705|M|Te
st10190548^Pat1|2028-9|1st street^^NY^NY^11101|USA||(315)123-
4587^^^test10190548pat1@yahoo.com|||||||||||||||
PV1|1|I|EXT02U201^Rm14741^BedF^Fac1^^^Bld State
Street^Flr1||||0017^Test14741^ADoc1^A^I^Dr^PHD||||||||||||VISIT2020092401|
|||||||||||||||||||||||||20200921042049||
OBR|1|06-
FR0002703||10216|100||20191005091349|||HJONES|O|||||12^GRANT^JILL^^^^||312
|||||||||^^^^^ROUTINE
OBX|1|ST|HR1169^Falls Risk Score^HR||true||||||F|||20201005091349|||||
NTE|1|L|Result: This is a Falls Risk Message
```

1.4.1.4 Lab Orders

Global ID: GID-1713548

Project ID: PRJ01248-DES-2054

The Digital Health Gateway can support incoming orders for a known patient.

Messages/Segments: OBR segments can be found in OMG messages. Multiple OBR segments are allowed.

OBR segments can be found in ORM messages. Multiple OBR segments are allowed within a single ORM message. When using the generic (and deprecated) ORM message, all orders will be processed as laboratory orders that **do not** contain RXE and/or RXO segments.

When assigning the priority of the Order, the Enterprise Gateway makes use of TQ1-9, OBR-27.6, or OBR-5.

When assigning the authoredOn date, the EG makes use of TQ1-7 or OBR-6.

The Patient that is referenced by the lab order must exist and the following pieces of the HL7 message must be included:

PID		
Segment-Field	**Description**	**Required**
PID-3	Patient Identifier	R
OBR		
Segment-Field	**Description**	**Required**
OBR-2	Place Order Number Entity Identifier	R
OBR-4	Universal Service Identifier	R
OBR-6	Start Date/Time Not required if TQ1-7 is used	C
OBR-25	Result Status	R
TQ1		
Segment-Field	**Description**	**Required**
TQ1-7	Start Date/Time Not required if OBR-6 is used	C

Example

```
MSH|^~\&||26589||69853|20191005091349|HJONES|ORU^R01|162|P|2.4||
```

```
PID|||90662||Test90662^P1atient1^N|Test90662^PatMom1|19370906|M|Test90662^
Pat1|2028-9||USA||||||801090662||||||||||||
PV1|1|I|GTWY1303^14741^A^1^^^State
Street^Floor1||||0022^Test14741^ADoc1^A^I^Dr^PHD|0027^Test90662^RDoc1^R^II
I^Dr^PHD|0037^Test90662^CDoc1^C^II^Dr^PHD|||||||0047^Test14741^AdmDoc^Ad^
III^Dr^PHD||VISIT1090662|||||||||||||||||||||||||20191005091349||
ORC|NW|06-CH0002703|||||^^^^^ROUTINE|||||12^GRANT^JILL^^^^||||
OBR|1|06-
CH0002703||10216|100||20191005091349|||HJONES|O|||||12^GRANT^JILL^^^^||312
||||||||||^^^^^ROUTINE
OBX|1||28539-5^RBC^LN||900|%|400-800|H|||F|||20191005|||62110|XE|
NTE|1|L|Result: This is a High Lab result value
```

1.4.1.5 Medication Orders

Global ID: GID-1731296

Project ID: PRJ01248-DES-2055

The Digital Health Gateway can support incoming medication orders for a known patient.

Messages/Segments: RXO and ORC segments can be found with OMP messages.

RXO and ORC segments can be found with ORM messages. When using the generic (and deprecated as of HL7 v2.4) ORM message, all orders will be processed as MedicationRequests that **contain** an RXO segment.

PID			
Segment-Field	**Description**	**Required**	**Notes**
PID-3	Patient Identifier	R	
PV1			
Segment-Field	**Description**	**Required**	**Notes**
PV1-19	Visit Identifier	R	

ORC			
Segment-Field	**Description**	**Required**	**Notes**
ORC-2	External Medication Order	R	
ORC-5	Status	O	
ORC-7.6	Priority	O	Used if TQ1-9 is empty
ORC-9	Date/Time Authored	R	

ORC			
Segment-Field	**Description**	**Required**	**Notes**
ORC-16	Reason Code	O	
RXO			
Segment-Field	**Description**	**Required**	**Notes**
RXO-1	Medication Identifier	R	
TQ1			
Segment-Field	**Description**	**Required**	**Notes**
TQ1-9	Priority	O	

Example

```
MSH|^~\&||26589||69853|20191015091349|HJONES|OMP^O01|162|P|2.4||
PID|||90662||Test90662^P1atient1^N|Test90662^PatMom1|19370906000000|M|Test
90662^Pat1|2028-9|1st street^^NY^NY^11101|USA||(315)123-
4567^^^test90662pat1@yahoo.com||||801090662||||||||||||
PV1|1|I|GTWY1303^14741^A^1^^^State
Street^Floor1||||0022^Test14741^ADoc1^A^I^Dr^PHD|0027^Test90662^RDoc1^R^II
I^Dr^PHD|0037^Test90662^CDoc1^C^II^Dr^PHD|||||||0047^Test14741^AdmDoc^Ad^
III^Dr^PHD||VISIT1090662|||||||||||||||||||||||20191005091349||
ORC|NW|06-CH0002703|||O||||20191015112218|||12^GRANT^JILL^^^^||||
TQ1|1|||||||||ROUTINE
RXO|372823004^Prednisone^http://snomed.info/sct
NTE|1|L|Patient needs an Immunosuppressant
```

1.4.1.6 MedicationAdministration

Global ID: GID-2036261

Project ID: PRJ01248-DES-2056

Messages/Segments: RXA segments can be found in RAS messages. There may be multiple RXA segments corresponding to multiple MedicationAdministration resources within a single RAS message.

Mapping: Each MedicationAdministration will have a unique 'id'.

Segment-Field	Description	Required	Notes
RXA-2	Administration Sub-ID Counter	R	Must be unique across RXA segments
RXA-3	Start Date	C	Required if RXA-4 is empty
RXA-4	End Date	C	Required if RXA-3 is empty
RXA-6	Administered Amount	O	
RXA-7	Administered Units	O	
RXA-9	Notes	O	
RXA-10	Performer	O	RXA-10.2 First name RXA-10.3 Last name
RXA-12	Administered per (time unit)	O	
RXA-18	Substance/Treatment Refusal Reason	O	
RXA-20	Status	O	
RXR-2	Dosage site	O	
RXR-4	Dosage method	O	

Example

```
MSH|^~\&||26589||69853|20191015091349|HJONES|RAS^O17|162|P|2.4||
PID|||10190547||Test10190547^Patient1^N|Test10190547^PatMom1|1942070500000
0|M|Test10190547^Pat1|2028-9|1st street^^NY^NY^11101|USA||(315)123-
4587^^^test10190547pat1@yahoo.com||||||||||||||||
PV1|1|I|EXT02U201^Rm14741^BedA^Fac1^^^Bld State
Street^Flr1||||0017^Test14741^ADoc1^A^I^Dr^PHD||||||||||||VISIT2020092101|
||||||||||||||||||||||||20200921042049||
ORC|NW|06-
MJR0002703|||O||^^^^^ROUTINE||20291015112218|||12^GRANT^JILL^^^^||||
RXO|372823004^Prednisone^http://snomed.info/sct
RXA|1|1|20191015091349|372823004^Prednisone^http://snomed.info/sct|0.5|123
^Ml^uom.net|||0017^Test14741^ADoc1^A^I^Dr^PHD|||||||||PA|
RXA|2|2|20191015091349|20191015091449|372823004^Prednisone^http://snomed.i
nfo/sct|0.5|123^Ml^uom.net|||0017^Test14741^ADoc1^A^I^Dr^PHD|||||||||CP|
```

```
RXR|47625008^Intravenous route^http://snomed.info/sct|108003^Condylar
emissary
vein^http://snomed.info/sct||420341009^Constant^http://snomed.info/sct|
NTE|1|L|Patient needs an Immunosuppressant
```

1.4.1.7 Practitioners and Roles

Global ID: GID-1731297

Project ID: PRJ01248-DES-2057

Messages/Segments: ROL segments can be found in ADT messages or PPR messages. PV1-7/8/9/17 segments can be found in ADT or PPR messages.

ROL			
Field	**Description**	**Required**	**Notes**
ROL-2	Action Code	O	
ROL-3	External Role Identifier	R	
ROL-4.1	External Practitioner Identifier	R	
ROL-4.2	Last Name	O	
ROL-4.3	First Name	O	
ROL-4.12	Telecom	O	Phone number of the practitioner
ROL-5	Period Start	O	
ROL-6	Period End	O	

PV1			
Field	**Description**	**Required**	**Notes**
PV1-7.1	External Practitioner Identifier	R	
PV1-7.2	Last Name	O	
PV1-7.3	First Name	O	
PV1-7.13	Identifier Type Code	R	Default NPI

Practitioners and their roles can be added using the PV1-7, PV1-8, PV1-9, and PV1-17 fields, as well as ROL segments. Multiple doctors may exist within the allowed PV1 segments.

The external role identifier will be assumed in PV1-7/8/9/17.

The action code should be defined in ROL-2. If the ROL-2 segment is empty, the practitioner will be considered to be active.

PV1-7/8/9/17 doctors will always be considered active.

Example

```
MSH|^~\&|ADT1|MCM|LABADT|MCM|20191011042049+0400|SECURITY|ADT^A01|MSG00001
|P|2.3|
EVN|A01|20191011042049||
PID|||90662||Test90662^Patient1^N|Test90662^PatMom1|19420705000000|M|Test9
0662^Pat1|2028-9|1st street^^NY^NY^11101|USA||(315)123-
4587^^^test90662pat1@yahoo.com||||||||||||||||
PV1|1|I|GTWY1303^14742^B^1^^^State
Street^Floor1||||0024^Test0024^Doc0024^A^I^Dr^PHD^^^^^^NPI~0025^Test0025^D
oc0025^A^I^Dr^PHD^^^^^^NPI|0024^Test0024^Doc0024^A^I^Dr^PHD^^^^^^NPI||||||
|||0024^Test0024^Doc0024^A^I^Dr^PHD^^^^^^NPI||VISIT1090662|||||||||||||||
||||||||20191011042049||
IN1|1|790662||Insurance790662||||||||||||
```

1.4.1.8 Problems/Conditions

Global ID: GID-1731301

Project ID: PRJ01248-DES-2058

The Digital Health Gateway can accept diagnoses and problems with a known patient.

DG1 segments can be found in ADT messages. There may be multiple DG1 segments in a single ADT message. PRB segments can be found in PPR messages. There will only be one PRB segment with a PPR message.

Segment-Field	Description	Required	Notes
PRB-3	Problem Identifier	R	Looking for data in CWE format (code^display^system)
PRB-4	Problem Instance ID	R	
PRB-7	Problem Established Date/Time	O	Used if PRB-16 is blank

Segment-Field	Description	Required	Notes
PRB-9	Abatement Date/Time	O	
PRB-16	Onset Date/Time	O	Preferred
PRB-26	Problem Code	O	
NTE	Notes/Annotations	O	
DG1-3	Diagnosis Identifier	R	Looking for data in CWE format (code^display^system)

Example

```
MSH|^~\&||26589||69853|20191011042049|HJONES|PPR^PC1|162|P|2.4||
PID|||90662||Test90662^Patient1^N|Test90662^PatMom1|19420705000000|M|Test9
0662^Pat1|2028-9|1st street^^NY^NY^11101|USA||(315)123-
4587^^^test90662pat1@yahoo.com|||||||||||||||
PV1|1|I|GTWY1303^14741^A^1^^^State
Street^Floor1||||0022^Test14741^ADoc1^A^I^Dr^PHD|0027^Test90662^RDoc1^R^II
I^Dr^PHD|0037^Test90662^CDoc1^C^II^Dr^PHD|||||||0047^Test14741^AdmDoc^Ad^
III^Dr^PHD||VISIT1090662|||||||||||||||||||||||20191011042049||
PRB|AD|199505011200|04411^Restricted Circulation^Nursing Problem
List|04411|154848||199505011200|||IP^Inpatient^Problem Classification
List| NU^Nursing^Management Discipline List|Acute^Acute^Persistence List|
C^Confirmed^Confirmation Status List|A1^Active^Life Cycle Status List|
199505011200|199504250000||2^Secondary^Ranking List|HI^High^Certainty
Coding List||1^Fully^Awareness Coding List|2^Good^Prognosis Coding
List||||
ROL|1^Diagnosing Provider^Role Master List|AD|^Admit^Alan^A^^MD|
199505011200||||
ROL|45^Recorder^Role Master List|AD|^Admit^Alan^^^^|199505011201||||
OBX|1|ST|^Peripheral Dependent Edema|1|Increasing Edema in lower limbs|
GOL|AD|199505011200|00312^Improve Peripheral Circulation^Goal Master
List||||199505011200|199505101200|Due^Review Due^Next Review List||
199505021200||QAM|||ACT^Active^ Level Seven Healthcare, Inc.
Internal|199505011200| P^Patient^Level Seven Healthcare, Inc.||
ROL|12^Primary Nurse^Role Master List|AD|^Admit^Alan^A^^RN|
199505011200||||
```

1.4.1.9 Procedure

Global ID: GID-1731302

Project ID: PRJ01248-DES-2059

The Digital Health Gateway can receive procedures for a known patient.

Messages/Segments: PR1 segments can be found in ADT messages.

PID		
Segment-Field	**Description**	**Required**
PID-3	Patient Identifier	R

PV1		
Segment-Field	**Description**	**Required**
PV1-19	Visit Identifier	R

PPR		
Segment-Field	**Description**	**Required**
PR1-3	Original Code	R
PR1-12	Performed Date/Time	O
PR1-15	Previous Conditions	O
PR1-19	Order Number	R

Example

```
MSH|^~\&|ADT1|MCM|LABADT|MCM|20191011042049+0400|SECURITY|ADT^A01|MSG00001
|P|2.3|
EVN|A01|20191011042049||
PID|||90662||Test90662^Patient1^N|Test90662^PatMom1|19420705000000|M|Test9
0662^Pat1|2028-9|1st street^^NY^NY^11101|USA||(315)123-
4587^^^test90662pat1@yahoo.com||||||||||||||||
PV1|1|I|GTWY1303^14742^B^1^^^State
Street^Floor1||||0024^Test0024^Doc0024^A^I^Dr^PHD^^^^^^NPI~0025^Test0025^D
oc0025^A^I^Dr^PHD^^^^^^NPI|0026^Test0026^Doc0026^A^I^Dr^PHD^^^^^^NPI~0027^
Test0027^Doc0027^A^I^Dr^PHD^^^^^^NPI|0028^Test0028^Doc0028^A^I^Dr^PHD^^^^^
^NPI~0029^Test0023^Doc0029^A^I^Dr^PHD^^^^^^NPI||||||||0030^Test0030^Doc003
0^A^I^Dr^PHD^^^^^^NPI~0031^Test0031^Doc0031^A^I^Dr^PHD^^^^^^NPI||VISIT1090
662||||||||||||||||||||||||20191011042049||
IN1|1|790662||Insurance790662||||||||||||
```

```
PR1|1||174514005^Drainage of gallbladder
area^http://snomed.info/sct||201112171858||||||||||1550||||8890662
ROL|1|AD|CP|1276535^SMITH^ELLEN|20191011042049
```

1.4.2 Welch Allyn Vital Sign Monitors

Global ID: GID-1797685

Project ID: PRJ01248-DES-2060

The following section describes the inbound HL7 interface used by Welch Allyn Vital Sign Monitors to query for patient information.

1.4.2.1 Queries

Global ID: GID-1646844

Project ID: PRJ01248-DES-2061

This section defines the queries that are handled by the Digital Health Gateway.

1.4.2.1.1 Patient Query

Global ID: GID-1646845

Project ID: PRJ01248-DES-2062

When a user enters a patient ID/number either manually or by a bar code scanner, the vitals device shall send a patient query message to the Digital Health Gateway using the patient ID/number as the patient identifier.

When the result (patient details) is returned back from the Digital Health Gateway, the vitals device shall be able to store the following patient information

Patient Information	Displayed on Welch Allyn Vital Signs Monitor
Patient Identifier	Yes
Last Name	Yes
First Name	Yes
Middle Initial	Yes
Gender	No (Stored)
Date Of Birth	No (Stored)

1.4.2.1.1.1 Query Request

Global ID: GID-1646854

Project ID: PRJ01248-DES-2063

The patient query that is sent from the Hillrom Welch Allyn Vitals Device to the Digital Health Gateway uses the IHE compliant QRY^A19 query message type. This message corresponds to Transaction ITI-21 of the IHE Technical Framework.

The following is a sample of the message:

MSH|^~\&|CDIS-NCE|WelchAllyn|EMR|HIS|20200325160449+0000||QBP^Q22^QBP_Q21|20200325160449614-|P|2.6|||AL|NE|||||IHE_PCD_ORU_R01^IHE_PCD^1.3.6.1.4.1.19376.1.6.1.1.1^ISO

QPD|IHE PDQ Query|20200325160449|@PID.3.1^VISIT1090648~@PID3.4^EMR~@PV1.3^00BV:GTWY1301~@PV1.3.9^IP:74.79.214.6:42284

RCP|I|1^RD

The value in the QPD segment (135798642) is the Patient ID that is either scanned or manually entered into the device. This value will be used by the Digital Health Gateway to search for the patient/return the demographics of a single patient.

Note that RCP-2.1 is set to 1 to indicate that at most only one patient should be returned in the result.

1.4.2.1.2 Response

Global ID: GID-1646855

Project ID: PRJ01248-DES-2064

The patient query response that is sent from the Digital Health Gateway uses the IHE compliant RSP^K22 message type. This message corresponds to Transaction ITI-21 of the IHE Technical Framework.

The following is a sample of the message:

```
MSH|^~\&|CDIS-NCE|WelchAllyn|EMR|HIS|20140123094559-
0500||RSP^K22|20140123094559728|P|2.6|||AL|NE
MSA|AA|20140122123838853
QAK|20140122123838853|OK
QPD|PatientQuery|20140123094459728|@PID.3.1^135798642
PID|||135798642||Eastwood^Clint||19780423|M
```

If no patient can be found, the RSP^K22 message should be returned but have no PID segment, or have a code in MSA-1 that is not AA, e.g. AE:

```
MSH|^~\&|CDIS-NCE|WelchAllyn|EMR|HIS|20140123094559-
0500||RSP^K22|20140123094559728|P|2.6|||AL|NE
MSA|AE|20140122123838853
QAK|20140122123838853|OK
QPD|PatientQuery|20140123094459728|@PID.3.1^135798642
```

1.5 Outbound HL7 Interfaces

Global ID: GID-1797687

Project ID: PRJ01248-DES-2065

This section describes the different outbound HL7 interfaces supported by the Digital Health Gateway

1.5.1 Alarm Communication Management Interface

Global ID: GID-1768891

Project ID: PRJ01248-DES-2066

This section describes the IHE ACM interface supported by the Digital Health Gateway.

1.5.1.1 Alarm Reporting

Global ID: GID-1768895

Project ID: PRJ01248-DES-2067

The alarm reporting interface is compliant to and supports the IHE ACM PCD-04 Alarm Report messages. These messages are formatted per the ACM standard without any customization.

The message will use the following message segments: MSH, PID, OBR, and OBX. See Message Segments Detailed Descriptions for details around MSH and PID segments.

For the OBR segment, OBR-3 is used as a unique identifier for the specific alarm that is occurring, which is used by the (AM) to associate future messages to the originating alarm. All alarm messages associated with the same alarm occurrence must repeat the same OBR-3 field in each message. Each alarm message will only contain information associated with a single alarm. This information will be represented by 4 OBX segments.

The first OBX segment identifies the type of alarm occurrence, along with the associated source. OBX-3 contains the MDC event code for the alarm, usually being either a HI or LO event for a physiological parameter. OBX-5 identifies the source/type of alarm occurring (ex: Heart Rate). OBX-6 is the typical unit associated with the alarm source. OBX-14 is the date/time that the alarm was detected.

Event Descriptors

Common Term	Reference ID	Value
Value greater high limit	MDC_EVT_HI	196648
Value smaller low limit	MDC_EVT_LO	196670
Intermediate	MDC_EVT_ALARM	196616

```
OBX|1|NM|196648^MDC_EVT_HI^MDC|1.0.0.1.1|||||||R|||20160425082916+0000
```

The second OBX segment identifies the physiological value of the parameter that is currently alarming. OBX-3 contains the MDC code for the parameter, which should match the normal MDC code found in PCD-04 messages. OBX-5 identifies the literal value of the parameter (HR of 35). OBX-6 is the typical unit associated with the alarm source.

```
OBX|2|NM|HR1420^MEWS^HR|1.0.0.1.2|H|||||R|||20200702133235+0000
```

The third OBX segment identifies the type of alarm event for this specific message. During the lifetime of an alarm, it will be reported multiple times to the (AM), where this OBX segment will describe the different event states for those messages. OBX-3 contains the MDC code defining this segment as the Event segment. OBX-5 contains the specific event occurring, which will be one of the following values:

- start
- start_only
- continue
- end
- escalate
- de_escalate

The “start” event is sent once when the alarm first begins, while the “end” event is sent once when the alarm finishes. The “continue” event is sent multiple times, once every 30 seconds while the alarm continues to be active. If a user silences alarms on the device, a single “de-escalate” event will be sent at the time of the silence. If alarms become audible at the device again, a single “escalate” event will be sent at that time.

```
OBX|3|NM|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.1.3|start_only|||||R|||2020
0702133235+0000
```

The fourth OBX segment identifies the current active state of the alarm. OBX-3 contains the MDC code defining this segment as the Alarm State segment. OBX-5 contains the specific state of the alarm, which will be one of the following values:

- active
- inactive

When an alarm first occurs, and for the duration of the alarm, all alarm messages will have a value of "active". Even when an alarm is silenced, it will still be active. The only time the alarm state will be marked as inactive is when the final "end" event is sent.

```
OBX|4|NM|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.1.4|active||||||R|||20200702
133235+0000
```

Example

```
MSH|^~\&|DHG|Hillrom|HIS||20200702133235+0000||ORU^R40^ORU_R40|20200702133
235+0000b129e546-00ad-47dd-99b6-5b84176c305c|P|2.6|||AL|NE
PID|1||90556^MR^http://hl7.org/fhir/v2/0203||Test90556^Patient1||19420705|
M
PV1|1|I|EXT02U201^14741^A^1^^^State Street^Floor1
OBR|1||b9f8c326-0bd2-4a50-a3c4-
7e07b2e7ed8d^^20200702133235+0000|C|||20200702133235+0000||||||||||||||||
|R
OBX|1|NM|196616^MDC_EVT_ALARM^MDC|1.0.0.1.1|QE MEWS Rule With
Timeout||||||R|||20200702133235+0000
OBX|2|NM|HR1420^MEWS^HR|1.0.0.1.2|H||||||R|||20200702133235+0000
OBX|3|NM|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.1.3|start_only||||||R|||2020
0702133235+0000
OBX|4|NM|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.1.4|active||||||R|||20200702
133235+0000
```

1.5.1.2 Alarm Reporting Response

Global ID: GID-1768898

Project ID: PRJ01248-DES-2068

In response to an Alarm Report message, the HL7 ACK/NACK returned from the Alarm Manager (AM) back to the Alarm Reporter (AR) is used to communicate that the Alarm Manager (AM) has received the Report Alarm [PCD-04] transaction from the Alarm Reporter (AR). The Report Alarm [PCD-04] is asynchronous to Report Dissemination Alarm Status [PCD-07] transactions by an indeterminate amount of time. HL7 ACK is therefore not used to report the dissemination status of the alarm as it would leave the Alarm Reporter (AR) actor awaiting HL7 ACK receipt for an indeterminate amount of time. The ACK/NACK response therefore represents:

- An ACK to signify successful receipt of the alarm
- A NACK to signify the alarm was ill-formed and not processed.

An ACK message has the following structure:

```
MSH|^~\&|EMR|HIS|CDIS-NCE|WelchAllyn|20140308152017-
0500||ACK^A01^ACK|20131016055248|P|2.6|||AL|NE
MSA|AA|20131004110527014
```

A NACK message has a similar structure as an ACK message; the only difference being the MSA-1.1 field is set to AE.

```
MSH|^~\&|EMR|HIS|CDIS-NCE|WelchAllyn|20140308152017-
0500||ACK^A01^ACK|20131016055248|P|2.6|||AL|NE
MSA|AE|20131004110527014
```

1.5.1.3 Hillrom Bed Alerts

Global ID: GID-1800701

Project ID: PRJ01248-DES-2069

This section contains more detail about the outbound HL7 interface for Hillrom bed alerts.

For the OBR segment, OBR-3 is used as a unique identifier for the specific alarm that is occurring, which is used by the (AM) to associate future messages to the originating alarm. All alarm messages associated with the same alarm occurrence must repeat the same OBR-3 field in each message. ORB-3 will be in the format of **Unique Identifier^HILLROM_ENTERPRISE_GATEWAY**. Each alarm message will only contain information associated with a single alarm. This information will be represented by 4 OBX segments.

Technical Alarms

OBX|1|-5 will contain the technical alarm type. OBX|2|-5 will contain the technical alarm value.

Supported technical alarms are:

- Head of Bed - Off
- Head of Bed - Basic Armed
- Head of Bed - Below 30 Armed
- Head of Bed - Below 45 Armed
- Patient Position Alarm

Vitals Alarms

Supported vitals alarms are:

- Heart Rate High

- Heart Rate Low
- Respiratory Rate High
- Respiratory Rate Low

Event ID Code	Event ID Display	Event Value	Source ID Code	Source ID Display	Source Value
196616	MDC_EVT_ALARM	22937600^HobAlarmInfo.Mode.Unknown^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	22937601^HobAlarmInfo.Mode.Off^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	22937602^HobAlarmInfo.Mode.BasicHobArmed^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	22937603^HobAlarmInfo.Mode.Below30Armed^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	22937604^HobAlarmInfo.Mode.Below45Armed^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	16384000^PpmInfo.AlarmStatus.Unknown^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	MDC_MOC_VMS_MDS_COMPOS_SINGLE_BED
196616	MDC_EVT_ALARM	16384001^PpmInfo.AlarmStatus.NotAlarming^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	MDC_MOC_VMS_MDS_COMPOS_SINGLE_BED
196616	MDC_EVT_ALARM	16384002^PpmInfo.AlarmStatus.Alarming^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	MDC_MOC_VMS_MDS_COMPOS_SINGLE_BED
196616	MDC_EVT_ALARM	15728646^PpmInfo.AlarmStatus.OffWithAutoReEnable^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	MDC_MOC_VMS_MDS_COMPOS_SINGLE_BED
196616	MDC_EVT_ALARM	15728647^PpmInfo.AlarmStatus.Suspended^99HRCBD	68480	MDC_ATTR_ALERT_SOURCE	MDC_MOC_VMS_MDS_COMPOS_SINGLE_BED
196648	MDC_EVT_HI	VitalsAlertTypeHeartRateHigh	149546	MDC_PULS_RATE_NON_INV	Observation.valueQuantity.value
196670	MDC_EVT_LO	VitalsAlertTypeHeartRateLow	149546	MDC_PULS_RATE_NON_INV	Observation.valueQuantity.value
196648	MDC_EVT_HI	VitalsAlertTypeRespiratoryRateHigh	151554	MDC_RESP_RATE	Observation.valueQuantity.value

196670	MDC_EVT_LO	VitalsAlertTypeRespiratoryRateLow	151554	MDC_RESP_RATE	Observation.valueQuantity.value
196992	MDC_EVT_SIG_UNANALYZEABLE	VitalsAlertTypeUnstableSignal	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196676	MDC_EVT_LOST	VitalsAlertTypeVitalsNoMotion	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196678	MDC_EVT_MALF	VitalsAlertTypeUnitMalfunction	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
197348	MDC_EVT_UNKNOWN	VitalsAlertTypeUnknown	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	VitalsAlertTypeBedSensor	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	VitalsAlertTypeBedBeforeSensorExpiration	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value
196616	MDC_EVT_ALARM	VitalsAlertTypeBedSensorExpired	68480	MDC_ATTR_ALERT_SOURCE	Observation.valueQuantity.value

1.5.1.3.1 Vitals Alert Examples

Global ID: GID-1800746

Project ID: PRJ01248-DES-2070

Heart Rate High - Alerting

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||147852369||Keegan^Robert^B^^^^L||19850930+0000|M
PV1||I|TestHimss^202^A^^^^^^^General Hospital
OBR|1||b025a90c-53f6-4b42-b25d-
ed57818f03c3^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020092
1152105+0000|||||||||||||||||||||^6122c858-7106-4d1a-82df-
d19a53cbbe33&Centrella&105645123
OBX|1|ST|196648^MDC_EVT_HI^MDC|1.0.0.0.1|VitalsAlertTypeHeartRateHigh|||H~
SP|||F
OBX|2|NM|149546^MDC_PULS_RATE_NON_INV^MDC|1.0.0.0.2|130|264864^MDC_DIM_BEA
T_PER_MIN^MDC|||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

Heart Rate High - Not Alerting

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||b025a90c-53f6-4b42-b25d-
ed57818f03c3^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020092
1152105+0000|||||||||||||||||||||^addaec49-a4ed-4348-b083-
eaacff73bb80&Centrella&105645123
OBX|1|ST|196648^MDC_EVT_HI^MDC|1.0.0.0.1|VitalsAlertTypeHeartRateHigh|||H~
SP|||F
OBX|2|NM|196648^MDC_EVT_HI^MDC|1.0.0.0.2|130||||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|stop||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|inactive||||||F
```

Heart Rate Low - Alerting

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||b025a90c-53f6-4b42-b25d-
ed57818f03c3^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020092
1152105+0000|||||||||||||||||||||^dec4ff99-53fe-4dc2-8dca-
85473b185248&Centrella&105645123
OBX|1|ST|149546^MDC_PULS_RATE_NON_INV^MDC|1.0.0.0.1|VitalsAlertTypeHeartRa
teLow|||L~PM~SP|||F
OBX|2|NM|196648^MDC_EVT_HI^MDC|1.0.0.0.2|30||||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

Respiratory Rate High - Alerting

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||b025a90c-53f6-4b42-b25d-
ed57818f03c3^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020092
1152105+0000|||||||||||||||||||||^f43d2293-3277-4c71-8593-
5d778a298198&Centrella&105645123
OBX|1|ST|151562^MDC_RESP_RATE^MDC|1.0.0.0.1|VitalsAlertTypeHeartRateHigh||
|H~PM~SP|||F
OBX|2|NM|196648^MDC_EVT_HI^MDC|1.0.0.0.2|44||||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

Respiratory Rate Low - Alerting

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||b025a90c-53f6-4b42-b25d-
ed57818f03c3^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020092
1152105+0000|||||||||||||||||||||^92c04f85-5c08-42ee-872f-
65cb5009f911&Centrella&105645123
OBX|1|ST|151562^MDC_RESP_RATE^MDC|1.0.0.0.1|VitalsAlertTypeRespiratoryRate
Low|||L~PM~SP|||F
OBX|2|NM|196648^MDC_EVT_HI^MDC|1.0.0.0.2|4||||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

1.5.1.3.2 Technical Alert Examples

Global ID: GID-1800773

Project ID: PRJ01248-DES-2071

Head of Bed Angle - Basic Armed - Alarming

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||30c07c2b-9ae6-4cef-bddd-
0a0cc70dc9a4^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020100
7164152+0000|||||||||||||||||||||^6122c858-7106-4d1a-82df-
d19a53cbbe33&Centrella&105645123
OBX|1|CWE|196616^MDC_EVT_ALARM^MDC|1.0.0.0.1|22937602^HobAlarmInfo.Mode.Ba
sicHobArmed^99HRCBD||||||F
OBX|2|NM|68480^MDC_ATTR_ALERT_SOURCE^MDC|1.0.0.0.2|35.1|262880^MDC_DIM_ANG
_DEG^MDC|||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

Head of Bed Angle - Below 30 Degrees - Alarming

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||30c07c2b-9ae6-4cef-bddd-
0a0cc70dc9a4^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020100
7164152+0000|||||||||||||||||||||^dbe762b3-db0b-4c5a-9b3b-
983740c225d0&Centrella&105645123
```

```
OBX|1|CWE|196616^MDC_EVT_ALARM^MDC|1.0.0.0.1|22937603^HobAlarmInfo.Mode.Be
low30Armed^99HRCBD||||||F
OBX|2|NM|68480^MDC_ATTR_ALERT_SOURCE^MDC|1.0.0.0.2|28.1|262880^MDC_DIM_ANG
_DEG^MDC|||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

Head of Bed Angle - Below 45 Degrees - Alarming

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||30c07c2b-9ae6-4cef-bddd-
0a0cc70dc9a4^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020100
7164152+0000||||||||||||||||||||||^7549d097-8c3b-447e-9b21-
a03ddcdbc2fa&Centrella&105645123
OBX|1|CWE|196616^MDC_EVT_ALARM^MDC|1.0.0.0.1|22937604^HobAlarmInfo.Mode.Be
low45Armed^99HRCBD||||||F
OBX|2|NM|68480^MDC_ATTR_ALERT_SOURCE^MDC|1.0.0.0.2|32.1|262880^MDC_DIM_ANG
_DEG^MDC|||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

Patient Position State - Alarming

```
MSH|^~\&|DHG|Hillrom|EMR|HIS|20201016072034+0000||ORU^R40^ORU_R40|12345|P|
2.6|||AL|NE|USA||||IHE_PCD_ACM_001^IHE PCD^1.3.6.1.4.1.19376.1.6.1.4.1^ISO
PID|1||90646||Test90638^Patient1^N^^^^L||19420705+0000|M
PV1||I|GTWY1301^11190639222^B^^^^^Floor1^State Street^1
OBR|1||65d8f0b0-07e5-497f-8952-
c068595f0b54^HILLROM_ENTERPRISE_GATEWAY|196616^MDC_EVT_ALARM^MDC|||2020092
2052606+0000||||||||||||||||||||||^cb76fca7-954b-4abc-942e-
1859d808b1c3&Centrella&105645123
OBX|1|CWE|196616^MDC_EVT_ALARM^MDC|1.0.0.0.1|16384002^PpmInfo.AlarmStatus.
Alarming^99HRCBD||||||F
OBX|2|CWE|68480^MDC_ATTR_ALERT_SOURCE^MDC|1.0.0.0.2|65571^MDC_MOC_VMS_MDS_
COMPOS_SINGLE_BED^MDC||||||F
OBX|3|ST|68481^MDC_ATTR_EVENT_PHASE^MDC|1.0.0.0.3|start_only||||||F
OBX|4|ST|68482^MDC_ATTR_ALARM_STATE^MDC|1.0.0.0.4|active||||||F
```

1.5.2 Vitals HL7 Send to the EMR

Global ID: GID-1731294

Project ID: PRJ01248-DES-2072

This section describes the HL7 interface used to send vital signs data from a Hillrom device to a third party HIS.

Outbound vitals data can be formatted using the following coding systems:

- MDC
- LOINC
- SNOMED

Outbound bed data that does not conform to a standard will be sent using the Hillrom's system OID: 'http://oid-info.com/get/1.3.6.1.4.1.50624'.

Units will be normalized using the Units of Measure (UoM) standard whenever possible.

1.5.2.1 Welch Allyn Vital Sign Monitor Data

Global ID: GID-1646765

Project ID: PRJ01248-DES-2073

The following fields shall be sent as part of a vitals data sent from a vitals device to the host HL7 system:

- Date/Time of when the reading was saved in the vitals device
- Patient ID
- Patient Last Name
- Patient First Name
- Patient Middle Initial
- Clinician ID
- Device Serial number
- Device Model Name
- Device Location ID
- Blood Pressure – Systolic
- Blood pressure – Diastolic
- Blood pressure – Mean Arterial Pressure
- Heart Rate
- Temperature
- SpO2 Saturation
- Weight
- Height
- Respiration

- Pain
- BMI
- Hemoglobin
- Custom Data Modifiers/Parameters/Scores/Calculations

Where applicable, for each field specified above a unit of measure shall be sent.

The device shall act accordingly when the following response messages are received from the host HL7 system in response to a Vitals send:

- ACK
- NACK

1.5.2.1.1 Outbound Example

Global ID: GID-1646857

Project ID: PRJ01248-DES-2074

The format of the Vitals data send shall be an HL7 ORU message. The following tables describe the mapping between incoming Welch Allyn Vital Sign Monitor data and the outbound HL7 message.

Value	**OBX-3 - Observation Identifier**
NIBP SYS	150021^MDC_PRESS_BLD_NONINV_SYS^MDC
NIBP DIA	150022^MDC_PRESS_BLD_NONINV_DIA^MDC
NIBP MAP	150023^MDC_PRESS_BLD_NONINV_MEAN^MDC
Temperature	150344^MDC_TEMP^MDC
SpO2 SAT	150456^MDC_PULS_OXIM_SAT_O2^MDC
Heart Rate	149546^MDC_PULS_RATE_NON_INV^MDC
Weight	68063^MDC_ATTR_PT_WEIGHT^MDC
Height	68060^MDC_ATTR_PT_HEIGHT^MDC
Respiration Rate	151562^MDC_RESP_RATE^MDC
Pain	PAIN^PAIN_LEVEL^L
BMI	BMI^BMI^L
SpHb	64156^SPHB_VALUE^L

Value	OBX-3 - Observation Identifier
etCO2	151728^MDC_AWAY_CO2_ET^MDC
FiCO2	151729^MDC_AWAY_CO2_FI^MDC
IPI	64158^MDC_INTEGRATED_PULM_INDEX^MDC
Custom Data Parameter/Score/Calculation	<Custom Data Name>

*The <Custom Alarm Name> for tech alarms are generated based on the WACP data and naming scheme. Each alarm is guaranteed to be unique. See Appendix A for a full list of explicit alarm codes.

Value	OBX-4 - Observation Sub-ID
NIBP SYS	1.0.1.1
NIBP DIA	1.0.1.2
NIBP MAP	1.0.1.3
Temperature	1.10.1.1
SpO2 SAT	1.1.1.12
Heart Rate	1.0.0.1
Weight	1.1.2.209
Height	1.1.2.25
Respiration Rate	1.1.1.25
Pain	0.0.0.0
BMI	0.0.0.0
SpHb	0.0.0.0
etCO2	0.0.0.0
FiCO2	0.0.0.0
IPI	0.0.0.0
Custom Data Parameter/Score/Calculation	0.0.0.0

Value	OBX-6 – Units
NIBP	266016^MDC_DIM_MMHG^MDC
Temperature	268192^MDC_DIM_DEGC^MDC OR 266560^MDC_DIM_FAHR^MDC
SpO2 SAT	262688^MDC_DIM_PERCENT^MDC
Heart Rate	264864^MDC_DIM_BEAT_PER_MIN^MDC
Weight	263875^MDC_DIM_KILO_G^MDC OR 263904^MDC_DIM_LB^MDC
Height	263441^MDC_DIM_CENTI_M^MDC OR 263520^MDC_DIM_INCH^MDC
Respiration Rate	264928^MDC_DIM_RESP_PER_MIN^MDC
Pain	N/A
BMI	N/A
SpHb	266866^MDC_DIM_MILLI_MOLE_PER_L^MDC
EtCO2	266016^MDC_DIM_MMHG^MDC
FiCO2	266016^MDC_DIM_MMHG^MDC
IPI	N/A
Custom Data Parameter/Score/Calculation	<Custom Data Units>

The following table specifies the relation between Observation Result status values in ORU messages, based on different profiles (modes) of the device.

Device Profile	Measurement Type	Outbound Interface	OBR-4	OBR-25	OBX-11
Intervals	Episodic	Confirmed/Validated	S	F	F
Intervals	Intervals	Unconfirmed/Unconfirmed	C	R	R

Spot check	Episodic	Confirmed/Validated	S	F	F

Value	**OBX-17 – Sources Values**
NIBP	Blank; CVSM; MODG
Temperature	Blank; SureTemp; SureTemp_Plus; Braun_Pro4000; Braun_Pro6000
SpO2	Blank; Nonin; Nellcor_MP205; Nellcor_MP506; Nellcor_NELL3; Nellcor_NELL1; Masimo_MS11; Masimo_MS2011; Masimo_MX
Heart Rate	Blank; NIBP; SPO2; ECG; Bed_Sensor; Chair_Sensor
Weight	Blank
Height	Blank
Respiration Rate	Blank; Respiration; CO2; ECG; Bed_Sensor; Chair_Sensor
Pain	Blank
BMI	Blank
SpHb	Blank; Masimo_MX
EtCO2; FiCO2; IPI	Blank
Custom Data Parameter/Score/Calculation	Blank

Device Selection	**OBX-20 – Cuff Site Values**
None	Blank
Unknown	Unknown
L Arm	LA
R Arm	RA
L Leg	LL
R Leg	RL

Device Selection	OBX-20 – Temperature Mode

None	Blank
Unknown	Unknown
Oral	Oral
Rectal	Rectal
Pediatric Axillary	Ped_Axillary
Adult Axillary	Adult_Axillary
Tympanic	Tympanic

Device Selection	**OBX-20 – SpO2 O2 Method**
None	Blank
Aerosol / humidified mask	Aerosol/humidified mask
Face tent	Face Tent
Mask	Mask
Nasal cannula	Nasal Cannula
Nonrebreather	Nonrebreather
Partial rebreather	Partial Rebreather
T-piece	T Piece
Tracheostomy collar	Tracheostomy Collar
Ventilator	Ventilator
Venturi mask	Venturi Mask
Room air	Room Air
Oxymizer	Oxymizer

Device Selection	**OBX-21 – NIBP Cuff Size**
None	Blank
Unknown	Unknown
Neo 1	Neo 1

Device Selection	OBX-21 – NIBP Cuff Size
Neo 2	Neo 2
Neo 3	Neo 3
Neo 4	Neo 4
Neo 5	Neo 5
Small infant	Small Infant
Infant	Infant
Small child	Small Child
Child	Child
Small adult	Small Adult
Adult	Adult
Adult long	Adult Long
Large adult	Large Adult
Large adult long	Large Adult Long
Thigh	Thigh

Device Selection	OBX-22 – NIBP Patient Position
None	Blank
Unknown	Unknown
Lying	Lying
Sitting	Sitting
Standing	Standing

Device Selection	OBX-23 – SpO2 Measurement Site
None	Blank
Ear	Ear
Finger	Finger

Toe	Toe
Forehead	Forehead

```
MSH|^~\&|CDIS-NCE|WelchAllyn|EMR|HIS|20140308152017-
0500||ORU^R01^ORU_R01|20140308202025103001270212|P|2.6|||AL|NE|||||IHE_PCD
_ORU_R01^IHE_PCD^1.3.6.1.4.1.19376.1.6.1.1.1^ISO
PID|||147852369||Keegan^Chris^M^^^^L|||M
PV1||I|Wing-a^101^2
OBR|||20140308152017213|S^S|||20140308202025+0000|||||||||||||||||F||||||
||||||||||||
OBX|1|NM|150021^MDC_PRESS_BLD_NONINV_SYS^MDC|1.0.1.1|100|266016^MDC_DIM_MM
HG^MDC|||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000
Series||0|0|0
OBX|2|NM|150022^MDC_PRESS_BLD_NONINV_DIA^MDC|1.0.1.2|50|266016^MDC_DIM_MMH
G^MDC|||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000
Series||0|0|0
OBX|3|NM|150023^MDC_PRESS_BLD_NONINV_MEAN^MDC|1.0.1.3|0|266016^MDC_DIM_MMH
G^MDC|||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000
Series||0|0|0
OBX|4|NM|150344^MDC_TEMP^MDC|1.10.1.1|36.9683|268192^MDC_DIM_DEGC^MDC|||||
F|||20140308202025+0000||||103001270212^PMP^VSM 6000 Series||0
OBX|5|NM|150456^MDC_PULS_OXIM_SAT_O2^MDC|1.1.1.12|99|262688^MDC_DIM_PERCEN
T^MDC|||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000
Series||0|0|0
OBX|6|NM|149546^MDC_PULS_RATE_NON_INV^MDC|1.0.0.1|60|264864^MDC_DIM_BEAT_P
ER_MIN^MDC|||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000
Series||0
OBX|7|NM|68063^MDC_ATTR_PT_WEIGHT^MDC|1.1.2.209|68|263875^MDC_DIM_KILO_G^M
DC|||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000 Series||
OBX|8|NM|68060^MDC_ATTR_PT_HEIGHT^MDC|1.1.2.25|177.8|263441^MDC_DIM_CENTI_
M^MDC|||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000 Series||
OBX|9|NM|151562^MDC_RESP_RATE^MDC|1.1.1.25|15|264928^MDC_DIM_RESP_PER_MIN^
MDC |||||F|||20140308202025+0000||||103001270212^PMP^VSM 6000 Series||
OBX|10|NM|PAIN^PAIN_LEVEL^L|1|6||||||F|||20140308202025+0000||||1030012702
12^PMP^VSM 6000 Series||
OBX|11|NM|BMI^BMI^L|1|39||||||F|||20140308202025+0000||||103001270212^PMP^
VSM 6000 Series||
```

1.5.2.1.1.1 Custom Modifiers

Global ID: GID-1646859

Project ID: PRJ01248-DES-2075

When the modifier is associated with vitals data that is already represented by an OBX segment, the modifiers will be appended to the end of the OBX segment for that parameter. The standard modifier fields will start in OBX-20 for that data element, while custom modifier fields will always start at OBX-24, regardless of the

number of standard modifiers that exist.. The modifiers will then extend into subsequent OBX fields, with a new field for each individual modifier. Custom modifiers are variable in number, and there is no guaranteed order to the modifiers. Custom modifiers are therefore represented as key^value pairs, and the consuming application must examine the key^value pairs to determine how they are handled. When generating the OBX field for a custom modifier, the following rules apply:

1. The parameter that is associated with the modifier is defined by the “Modifies” attribute.
2. The modifier key name is in the “HISId” attribute
3. When the modifier type is defined as “Alphanumeric” or “List”, the selected value is in the “ItemHISId” attribute.
4. When the modifier type is defined as “Integer” or “Decimal”, the value is located in the direct numeric value entered by the user.

The OBX segments containing the custom modifier would appear as:

OBX|1|NM|150021^MDC_PRESS_BLD_NONINV_SYS^MDC|1.0.1.1|120|266016^MDC_DIM_MMHG^MDC|||||F|||20150304205705+0000|||Manual^|100000584014^Connex Spot Monitor^1000||NIBPDevice^MANUAL|NIBPPosition^SITTING|NIBPLocation^LEFT_ARM|NIBPActivity^MODERATE

OBX|2|NM|150022^MDC_PRESS_BLD_NONINV_DIA^MDC|1.0.1.2|80|266016^MDC_DIM_MMHG^MDC|||||F|||20150304205705+0000|||Manual^|100000584014^Connex Spot Monitor^1000||NIBPDevice^MANUAL|NIBPPosition^SITTING|NIBPLocation^LEFT_ARM|NIBPActivity^MODERATE

OBX|3|NM|150023^MDC_PRESS_BLD_NONINV_MEAN^MDC|1.0.1.3|0|266016^MDC_DIM_MMHG^MDC|||||F|||20150304205705+0000|||Manual^|100000584014^Connex Spot Monitor^1000||NIBPDevice^MANUAL|NIBPPosition^SITTING|NIBPLocation^LEFT_ARM|NIBPActivity^MODERATE

1.5.2.1.1.2 Custom Parameters

Global ID: GID-1646860

Project ID: PRJ01248-DES-2076

Any custom parameters defined for a device will be represented by a new OBX segment. These OBX segments will appear in the output HL7 data in the same order as they appear within the source data from the device. This means the order of parameters is dynamic, and no specific order should be expected or relied upon. When generating an OBX segment for a custom parameter, the OBX fields are generated by the following mapping:

Field	Description	Comments
OBX-2	Value Type	NM (“Type” attribute = “Integer” or “Decimal”); ST (“Type” attribute = “Alphanumeric” or “List”)

Field	Description	Comments
OBX-3	Observation Identifier	"HISId" attribute
OBX-4	Observation Sub-ID	0.0.0.0
OBX-5	Observation Value	When OBX-2 is NM, the value is located in the direct numeric value entered by the user When OBX-2 is ST, the selected value is in the "ItemHISId" attribute. If no "ItemHISId" attribute is defined for the selection, the direct value associated with the parameter will be used instead.
OBX-6	Units	"Unit" attribute

The OBX segment containing the custom parameter would appear as:

OBX|1|NM|BloodSugar|0.0.0.0|203.0|mg/dL|||||F|||20150304205727+0000|||Manual^|100000584014^Connex Spot Monitor^1000|

1.5.2.1.1.3 Custom Scores/Calculations

Global ID: GID-1646861

Project ID: PRJ01248-DES-2077

Each parameter, intermediate score and the overall score will have their own OBX segment. These OBX segments will appear in the output HL7 data in the same order as they appear within the source data from the device. This means the order of scores/calculations is dynamic, and no specific order should be expected or relied upon. When generating an OBX segment for a custom score/calculation, the OBX fields are generated by the following mapping:

Field	Description	Comments
OBX-2	Value Type	NM ("Type" attribute = "Integer" or "Decimal"); ST ("Type" attribute = "Alphanumeric" or "List")
OBX-3	Observation Identifier	User selection/entry <"CalcName" attribute>.<"HISId" attribute >.<Name> Calculated score value

Field	Description	Comments
		<"CalcName" attribute >.<"HISId" attribute >.<Value> Rank text value <"CalcName" attribute >.<"HISId" attribute >.<Rank> Color associated with rank <"CalcName" attribute >.<"HISId" attribute>.<Color>
OBX-4	Observation Sub-ID	0.0.0.0
OBX-5	Observation Value	When OBX-2 is NM, the selected value is located in the direct numeric value entered by the user When OBX-2 is ST, the selected value is located in the "ItemHISId" attribute
OBX-6	Units	"UnitHISId" attribute

The OBX segment containing the custom scores / calculations would appear as:

OBX|18|ST|Transform scoring.AVPUScoring.Name|0.0.0.0|Unresponsive|||||F|||20180925194533+0000||321412|Manual^|100031732717^Connex Spot Monitor^73MT||
OBX|19|NM|Transform scoring.AVPUScoring.Value|0.0.0.0|4|||||F|||20180925194533+0000||321412|Manual^|100031732717^Connex Spot Monitor^73MT||
OBX|20|ST|Transform scoring.AVPUScoring.Rank|0.0.0.0|HSO|||||F|||20180925194533+0000||321412|Manual^|100031732717^Connex Spot Monitor^73MT||
OBX|21|ST|Transform scoring.AVPUScoring.Color|0.0.0.0|HSOO|||||F|||20180925194533+0000||321412|Manual^|100031732717^Connex Spot Monitor^73MT||

1.5.2.1.2 Response

Global ID: GID-1646862

Project ID: PRJ01248-DES-2078

In response to a vitals data send, the Digital Health Gateway shall expect back an ACK/NACK type HL7 message:

An ACK to signify successful processing

A NACK to signify the processing was not successful

The Digital Health Gateway can then send an equivalent ACK/NACK message back to the device. An ACK message shall have the following structure:

MSH|^~\&|EMR|HIS|CDIS-NCE|WelchAllyn|20131016055244-0500||ACK^A01|20131016055248|P|2.6|||AL|NE
MSA|AA|20131004110527014

A NACK message shall have a similar structure as an ACK message; the only difference being the MSA 1 field is set to AE

MSH|^~\&|EMR|HIS|CDIS-NCE|WelchAllyn|20131016055244-0500||ACK^A01|20131016055248|P|2.6|||AL|NE
MSA|AE|20131004110527014

1.5.2.2 Hillrom Connected Bed HL7 Interface

Global ID: GID-1797691

Project ID: PRJ01248-DES-2079

This section describes the outbound HL7 interface for connected Hillrom beds. Supported beds include:

- Accella
- Centrella

1.5.2.2.1 Outbound Example

Global ID: GID-1797969

Project ID: PRJ01248-DES-2080

The format of the bed data send shall be an HL7 ORU message. The following tables describe the mapping between incoming connected Hillrom bed data and the outbound HL7 message.

Common Data Points

OBX-3	OBX-5	OBX-6
180^SurfaceInfo.SurfaceMode^99HRCBD	0^Unknown	
	1^Prevention	
	2^Normal	

	3^TurnAssistLeft	
	4^TurnAssistRight	
	5^Sleep	
	6^MaxInflate	
	7^OptiRest	
	8^HeelSuspend	
	9^SeatDeflate	
230^TransportInfo.BrakePosition^99HRCBD	0^Unknown	
	1^Inactive	
	2^Active	
240^PpmInfo.AlarmMode^99HRCBD	0^Unknown	
	1^Off	
	2^BasicBedExit	
	3^OutOfBedMode	
	4^ExitingMode	
	5^PositioningMode	
	6^OffWithAutoReEnable	
	7^Suspended	
250^PpmInfo.AlarmStatus^99HRCBD	0^Unknown	
	1^NotAlarming	
	2^Alarming	
320^TherapyInfo.RotationTherapy^99HRCBD	0^Unknown	
	1^NotInstalled	
	2^Off	
	3^Active	
	4^Suspended	
	5^SuspendedWithReminder	
330^TherapyInfo.PercussionTherapy^99HRCBD	0^Unknown	
	1^NotInstalled	

	2^Off	
	3^Active	
	4^Suspended	
	5^SuspendedWithReminder	
340^TherapyInfo.VibrationTherapy^99HRCBD	0^Unknown	
	1^NotInstalled	
	2^Off	
	3^Active	
	4^Suspended	
	5^SuspendedWithReminder	
470^ScaleInfo.CapturedWeightInKg^99HRCBD	<numeric>	kg
490^ScaleInfo.PatientDetected^99HRCBD	0^Unknown	
	1^Detected	
	2^NotDetected	

Uncommon Data Points

OBX-3	OBX-5	OBX-6
10^ConnectivityInfo.Protocol^99HRCBD	0^Unknown	
	1^Standard	
	2^Enhanced	
20^ConnectivityInfo.ConnectionState^99HRCBD	0^Unknown	
	1^Disconnected	
	2^Connected	
30^ConnectivityInfo.LastKnownConnectorId^99HRCBD	<string>	
40^FrameArticulationInfo.BedPosition^99HRCBD	0^Unknown	
	1^Low	
	2^NotLow	
	3^Chair	
50^FrameArticulationInfo.HeadRailsPosition^99HRCBD	0^Unknown	

	1^OneOrMoreRailsDown	
	2^LeftRailDown	
	3^RightRailDown	
	4^BothRailsDown	
	5^BothRailsUp	
60^FrameArticulationInfo.FootRailsPosition^99HRCBD	0^Unknown	
	1^OneOrMoreRailsDown	
	2^LeftRailDown	
	3^RightRailDown	
	4^BothRailsDown	
	5^BothRailsUp	
70^FrameArticulationInfo.HobAngleInDegree^99HRCBD	<numeric>	deg
71^FrameArticulationInfo.HobAngle30DegreeLimitActive^99HRCBD	0^Unknown	
	1^True	
	2^False	
80^IndicatorsInfo.NurseCall^99HRCBD	0^Unknown	
	1^Off	
	2^FlashSlow	
	3^FlashFast	
	4^On	
90^IndicatorsInfo.NurseAnswer^99HRCBD	0^Unknown	
	1^Off	
	2^FlashSlow	
	3^FlashFast	
	4^On	
100^IndicatorsInfo.NaviCareAlerts^99HRCBD	0^Unknown	
	1^Off	
	2^FlashSlow	
	3^FlashFast	
	4^On	

110^IndicatorsInfo.BedCleaned^99HRCBD	0^Unknown	
	1^Off	
	2^FlashSlow	
	3^FlashFast	
	4^On	
120^IndicatorsInfo.BedOnlineWithServer^99HRCBD	0^Unknown	
	1^Off	
	2^FlashSlow	
	3^FlashFast	
	4^On	
130^ManufacturingInfo.Model^99HRCBD	<string> with one of the following values: Unknown Accella AdvanceSeries Advanta CareAssistSeries Centrella CenturyCC Compella Progressa TotalCare VersaCare VersaCareEP	
140^ManufacturingInfo.IdNumber^99HRCBD	<string>	
141^ManufacturingInfo.FrameSerialNumber^99HRCBD	<string>	
150^ManufacturingInfo.SoftwareRevision^99HRCBD	<string>	
160^ScaleInfo.LastCommand^99HRCBD	0^Unknown	
	1^ZeroScale	
	2^WeighPatient	
170^ScaleInfo.PatientWeightInKg^99HRCBD	<numeric>	kg
190^SwitchesInfo.NurseCall^99HRCBD	0^Unknown	
	1^Inactive	

	2^Active	
200^SwitchesInfo.NaviCare^99HRCBD	0^Unknown	
	1^Inactive	
	2^Active	
210^SwitchesInfo.CprMode^99HRCBD	0^Unknown	
	1^Inactive	
	2^Active	
220^SwitchesInfo.BedCleaned^99HRCBD	0^Unknown	
	1^Inactive	
	2^Active	
260^PpmInfo.MovementMagnitude^99HRCBD	0^Unknown	
	1^None	
	2^Positioning	
	3^Exiting	
	4^OutOfBed	
270^PpmInfo.MovementDirection^99HRCBD	0^Unknown	
	1^None	
	2^TowardHead	
	3^TowardFoot	
	4^TowardPatientLeft	
	5^TowardPatientRight	
280^ServiceInfo.ServiceStatus^99HRCBD	0^Unknown	
	1^ServiceNotRequired	
	2^ServiceRequired	
285^ServiceInfo.ServiceCode^99HRCBD	<string>	
290^PowerInfo.AcPower^99HRCBD	0^Unknown	
	1^Disconnected	
	2^Connected	
350^HobAlarmInfo.Mode^99HRCBD	0^Unknown	

	1^Off	
	2^BasicHobArmed	
	3^Below30Armed	
	4^Below45Armed	
360^HobAlarmInfo.AudibleAlarmMode^99HRCBD	0^Unknown	
	1^Silenced	
	2^Audible	
370^HobAlarmInfo.Alarming^99HRCBD	0^Unknown	
	1^NotAlarming	
	2^Alarming	
	3^Suspended	
380^LockoutsInfo.HobAngleMotors^99HRCBD	0^Unknown	
	1^Unlocked	
	2^Locked	
390^LockoutsInfo.KneeAngleMotors^99HRCBD	0^Unknown	
	1^Unlocked	
	2^Locked	
400^LockoutsInfo.BedHeightMotors^99HRCBD	0^Unknown	
	1^Unlocked	
	2^Locked	
410^LockoutsInfo.TiltAngleMotors^99HRCBD	0^Unknown	
	1^Unlocked	
	2^Locked	
420^LockoutsInfo.AllMotors^99HRCBD	0^Unknown	
	1^Unlocked	
	2^Locked	
430^PatientHistoryInfo.LastCommand^99HRCBD	0^Unknown	
	1^PatientHistoryCleared	
440^PatientEnvironmentInfo.LastCommand^99HRCBD	0^Unknown	

	1^RoomLightToggled	
	2^ReadLightToggled	
450^SafeViewInfo.Mode^99HRCBD	0^Unknown	
	1^Off	
	2^Error	
	3^Armed	
	4^Alerting	
	5^ControlledRemotely	
460^SafeViewInfo.IndicatorState^99HRCBD	0^Unknown	
	1^Off	
	2^SolidGreen	
	3^FlashingGreenSynched	
	4^FlashingGreenAlternating	
	5^SolidAmber	
	6^FlashingAmberSynched	
	7^FlashingAmberAlternating	
	8^FlashingGreenAndAmber	
500^PatientRoomStatus^99HRCBD	0^Unspecified	
	1^InRoom	
	2^OutOfRoom	
510^IncontinenceInfo.IncontinenceDetected^99HRCBD	0^Unknown	
	1^True	
	2^False	
520^DeteriorationInfo.DeteriorationDetected^99HRCBD	0^Unknown	
	1^True	
	2^False	

Battery Data

The following table contains valid Observation Identifiers for battery data. OBX-3.3 will be 99HRCBD.

OBX-3.1	OBX-3.2
HR1515	BatteryTypeMain
HR1516	BatteryTypeComfort
HR1517	BatteryTypeEmergency
HR1518	BatteryTypeMattress

The following table contains the valid Observation values for battery data. OBX-3.3 will be 99HRCBD.

OBX-5.1	OBX-5.2
HR1519	BatteryStatusError
HR1520	BatteryStatusOff
HR1521	BatteryStatusDisconnected
HR1522	BatteryStatusCharging
HR1523	BatteryStatusFull
HR1524	BatteryStatusLow
HR1525	BatteryStatusDeepDischarge

Surface Info Therapy

OBX-3.1 = HR1526

OBX-3.2 = SurfaceInfoTherapy

The following table contains the valid Observation values for Surface Info Therapy data. OBX-3.3 will be 99HRCBD.

OBX-5.1	OBX-5.2
HR1527	SurfaceInfoTherapyOn
HR1528	SurfaceInfoTherapyModeCLP
HR1529	SurfaceInfoTherapyModeALP
HR1530	SurfaceInfoTherapyMCM

SensorInfo

The following table contains the valid Observation Identifiers for sensor info regarding an attached non-contact monitoring device.

OBX-3.1	OBX-3.2
HR1534	SensorInfoRunHours
HR1535	SensorInfoRemainingHours
HR1536	SensorInfoVersion
HR1537	SensorInfoType
HR1543	SensorInfoTimestamp
HR1544	SensorInfoMovementLevel
HR1545	SensorInfoRestlessnessLevel
HR1546	SensorInfoTimeInBed
HR1547	SensorInfoCountUp

Example

```
MSH|^~\&|DHG|Hillrom|HIS||20201005140623+0000||ORU^R01^ORU_R01|20201005140
623+00004bf220f2-a72d-4326-940e-ec2b4a87b46a|P|2.6|||AL|NE
PID|1||90646||Test90638^Patient1^N||1942-07-05|M
PV1|1|I|GTWY1301^11190639222^B^1^^^State Street^Floor1
OBR|1||20201005140623+0000^S||||20201005140623+0000||||||||||||||||||R||||
|||||
OBX|1|CWE|230^TransportInfo.BrakePosition^99HRCBD|1|2^Active^99HRCBD|||N||
|R|||20200922052840+0000||||S045PF1267^Centrella^hillrom
```