![Hillrom logo]

Welch Allyn®
MDI HL7 EHR
Implementation Guide

⚠ **CAUTION:** Federal law restricts this device to sale by or on the order of a physician.

PATENT/PATENTS
hillrom.com/patents
May be covered by one or more patents. See above Internet address. The Hill-Rom companies are the proprietors of European, US, and other patents and pending patent applications.

Hillrom Technical Support
For information about any Hillrom product, contact Hillrom Technical Support at 1.888.667.8272, mor_tech.support@hillrom.com.

REF 9506-166-50-ENG Rev D
Revision date: 2021-06

\# 901147 SOFTWARE DATA INTERFACE

Welch Allyn, Inc.
4341 State Street Road
Skaneateles Falls, NY 13153 USA

hillrom.com
Welch Allyn, Inc. is a subsidiary of Hill-Rom Holdings, Inc.

Hillrom™

TABLE OF CONTENTS

Scope

This document defines the MDI (Mortara Device Interface) HL7 device interface specifications for an EHR or PACS system. This document includes the ELI™ ECG device HL7 interface to Health Information Technology (HIT) systems that utilize these technologies.

If you have any questions regarding execution of this guide, contact technical support at:

- 1.888.667.8272
- mor_tech.support@hillrom.com

ECG Overview

Welch Allyn manufactures and sells diagnostic ECG (electrocardiogram) equipment that monitors and analyzes the electrical activity of the heart with subsequent diagnoses. Welch Allyn makes three different modalities of ECG equipment:

1. Resting ECG (referred to as ECG or EKG) – this modality acquires 10-seconds of ECG data with the patient at rest. This is a very common screening test for heart disease and heart-related incidents such as heart attacks.

2. Stress test ECG – this modality acquires ECG data as a stressor is applied to the patient. The stressor is typically a treadmill or bicycle. Pharmacological agents can also be applied that stress the patient's heart. The purpose of the test is to determine if stressing the heart elicits abnormal heart conditions. A stress exam is often done in conjunction with an echocardiogram (ultrasound of the heart) or nuclear imaging (picture of blood flow) procedure. The length of the procedure is typically 5 – 15 minutes.

3. Holter monitoring ECG – this modality acquires ECG data of the patient during normal activity. Data is typically collected for 24-48 hours. The purpose of the test is to capture transient events of the heart that do not occur at rest or during stress conditions. A Holter exam can be used to screen for heart disease. It is also used for post heart-procedure monitoring, e.g., pacemaker implant.

ECG Workflow

Most healthcare providers have adopted an ECG workflow with the following steps. This workflow applies to all modalities (resting ECG, stress and Holter).

1. Order Placed
   a. Optionally – patient identification (demographics) obtained via a patient registration event.
2. Patient Information (including order and account#) entered onto the device.
3. Test is taken on the device.
4. Test is printed.
5. Test is scanned and attached to patient record in the EHR chart.
6. Physician overreads and signs the report
   a. Optionally - physician adds note to procedure, but does not sign report.
7. Patient (insurance) is billed for the procedure.

The intended use of the MDI HL7 interface is to automate the process described in the ECG workflow above. Benefits to the customer of the electronic workflow are:

1. Reduce or remove paper.
2. Eliminate or reduce typing and typing errors.
3. Improved patient identification with an exam.
4. Automated attachment of exam to patient record in the EHR.
5. Easy access to electronic patient record via EHR application.
6. EHR capabilities:
    a. Security
    b. Audit logs
    c. Electronic signature of report
7. Improved revenue cycle management; billing and re-imbursement.

The following diagram depicts a fully electronic ECG procedure workflow. It utilizes an orders-based procedure, although it could support an encounter-based workflow as well if supported by the EHR.
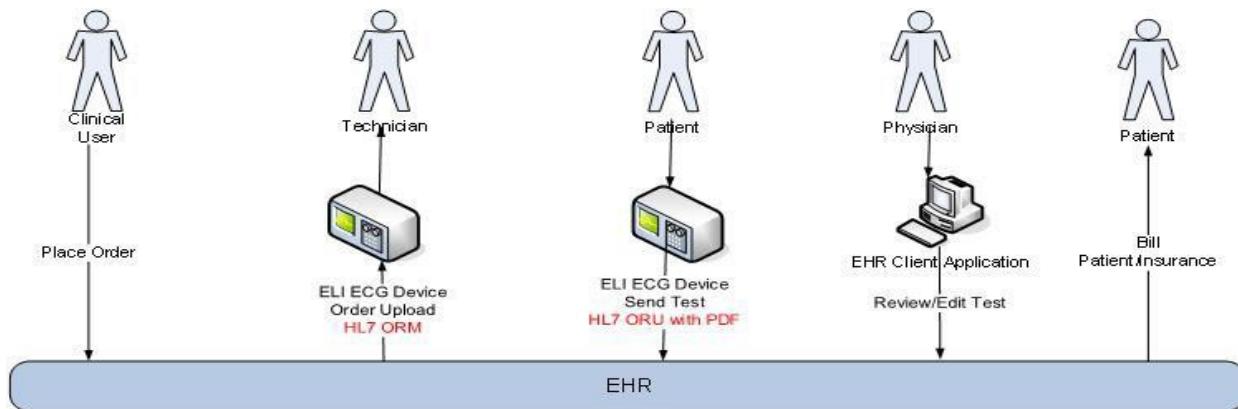
The MDI-supported devices support HL7 interface technologies:

1. Inbound Patient demographics
    a. Orders – HL7 ORM and OMG
    b. Encounter – HL7 ADT
2. Outbound Test Exam
    a. HL7 (text only)
    b. HL7 with PDF (referenced or encapsulated)
    c. PDF Export (COLD Feed)

This interface isolates the EHR system from any knowledge of the # and types of devices. MDI HL7 interfaces can be customized on a per EHR basis such that every installation for all customers follows the same configuration and methodology, i.e., a reproducible process.

HL7 Interface Overview

The diagram below depicts the operation of the MDI HL7 interface with supported ELI ECG devices. The diagram depicts the clinical workflow of information from the point of providing patient demographic information (via HL7 ADT or HL7 ORM message) to sending the ECG report back to the EHR application.

The HL7 ADT, Orders and Results interface can support multiple ELI ECG devices. Each of the ELI ECG devices is configured to communicate with the MDI application per a variety of protocols: wireless network, wired network, USB serial communications, and file shares. The MDI HL7 interface performs the following functions:

- hosts the patient demographic information received from the ADT messages.
- hosts the orders received from the order messages.
- provides the single point of HL7 interface connectivity between the ELI ECG devices and the EHR application.
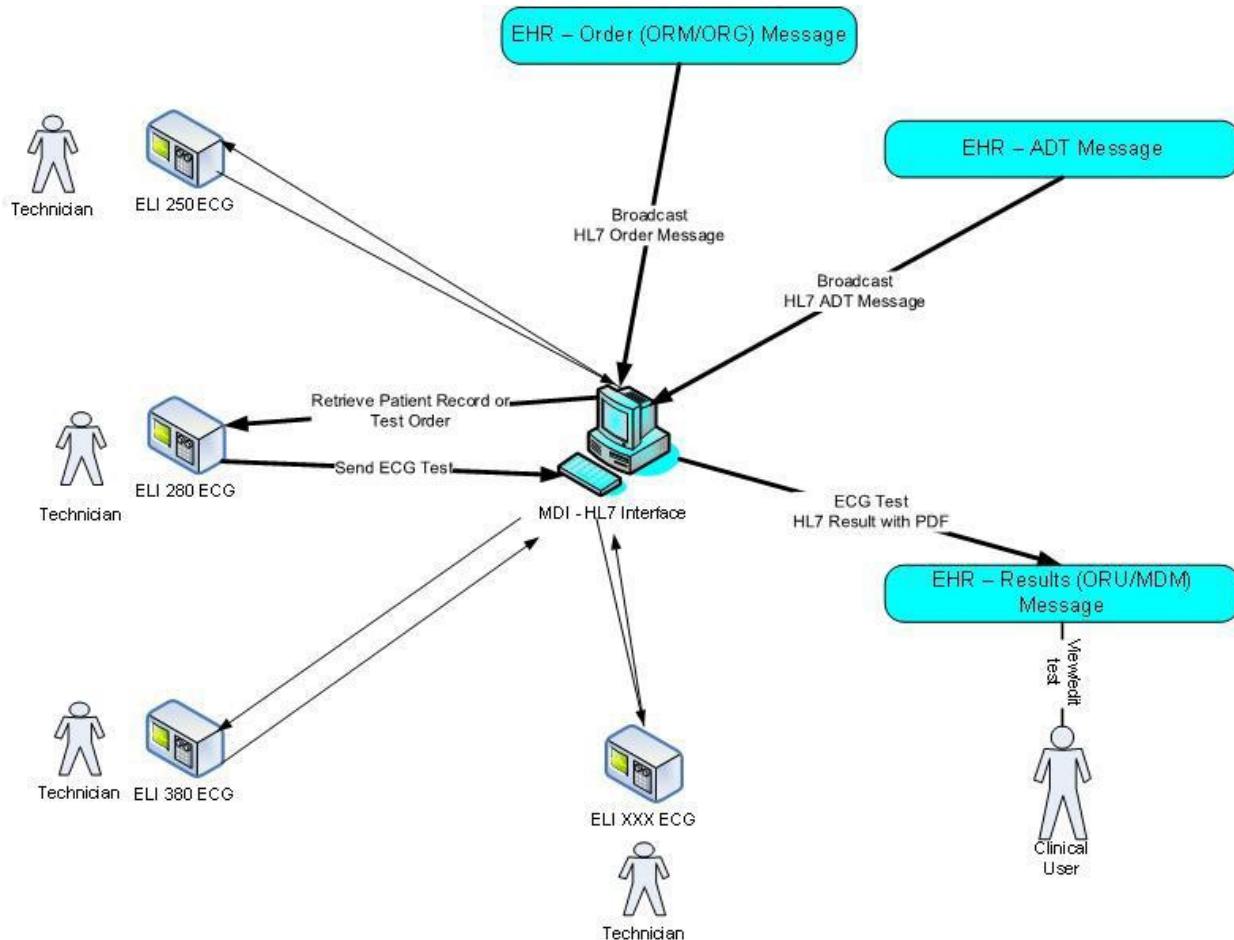
HL7 Interface Operating Environments

The MDI HL7 interface is commonly deployed in two types of operating environments when interfacing to an EHR application;

1. LAN
2. Hosted
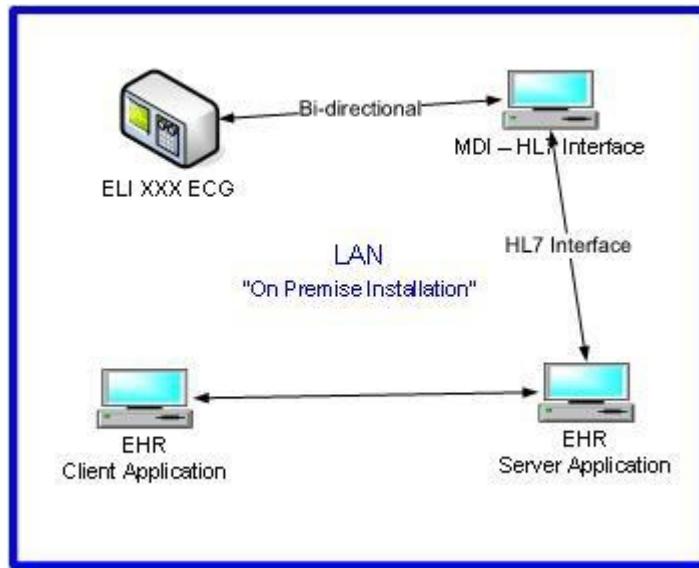
LAN Scenario

In this scenario the MDI - HL7 Interface communicates on the same local area network (domain) as the EHR application server. The MDI interface would be installed on an "on premise" system that is located on the same network (LAN) as the EHR application. ELI ECG devices connect to the MDI using the provider local area network.
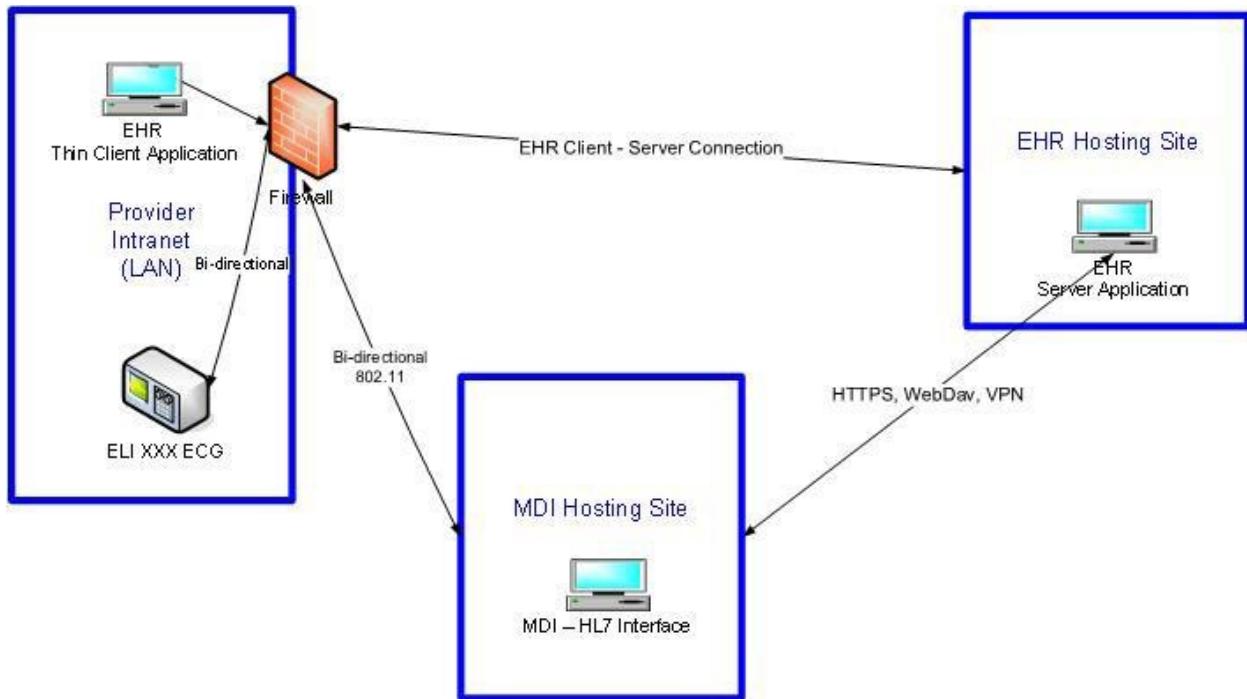
Hosted Scenario

In this scenario the MDI - HL7 Interface resides in a hosted environment in the cloud. The EHR Server application can be installed in the cloud as well or be installed on premise at the customer site. The hosted MDI application can be connected to the EHR application by one of the following secure connections based on the capabilities of the EHR application:

- HTTPS
- WebDav
- Secure VPN

ELI ECG devices connect to the MDI application using a secure wireless (802.11) communications to the MDI hosting site.

Operating System Environments

The MDI HL7 interface can run on the following operating systems:

- Windows 10 (64-bit)
- Windows 2012 Server R2 (64 bit)
- Windows Server 2016
- Windows Server 2019

The MDI HL7 interface can be run in a virtual environment.

HL7 Interface Setup

Implementation goals for the HL7 interface are:

- Simplicity of implementation, process, and personnel.
- Highly reproducible process.
- Non-disruptive to customer.
- Non-disruptive to EHR vendor.

In order to obtain these goals Welch Allyn shall engage with an EHR vendor to design and test the interface prior to deployment to any mutual customer. This design and test phase yields:

- Interface template:
  - used for deployment for all mutual customers
  - reduces the labor effort associated with interface customization
- Implementation process:
  - well defined roles and activities
  - reproducible

Interface Technology Overview

The MDI HL7 interface supports both TCP/IP (sockets based) and file share-based communications. TCP/IP is the preferred method of communications for HL7 interfaces as it eliminates the risks associated with file share security and setup.

When using HL7 over TCP/IP, the need arises for managing the discrete HL7 messages, i.e., message demarcation. The lower-layer protocol of the MDI HL7 interface refers to the software, which is responsible for, at the very least, maintaining the message boundaries implied by the application layer protocol. The MDI HL7 interface supports the following lower-layer protocols:

- Minimal Lower Layer Protocol (MLLP); default
- None; raw message without a LLP wrapper

Separate TCP/IP ports would be established for each

of:

- ADT interface; persistent connection, listener mode
- Orders interface; persistent connection, listener mode
- Results interface; transient connection, send mode

If an external PDF document is included as part of the test report, a share location shall be established in which the MDI HL7 interface will create the document and the EHR shall process this document. In the deployment environment where the MDI application is not on the same network as the EHR Server application a secure share location (WebDav) will be established in which to share the external PDF document.

> NOTE: The MDI HL7 interface can support the transfer of PDF (image-based report) to an EHR via:
> - External document - where location of the document is included in the HL7 result message.
> - Encapsulation - PDF document encoded and included in the HL7 result message. In the encapsulated methodology, a network share is not required.

Interface Configuration Checklist

The following chart outlines the configuration checklist necessary to establish a bidirectional HL7 interface between an EHR/PACS application and the MDI HL7 interface.

Item	Responsible Party	Notes
ADT Source – IP Address and Port Number	EHR	Only required if ADT feed is part of the HL7 interface and using TCP/IP communications.
Orders Source – IP Address and Port Number	EHR	Only required if Orders feed is part of the HL7 interface and using TCP/IP communications.
ADT Source – Network File Share	EHR	Only required if ADT feed is part of the HL7 interface and using File Share communications.
Orders Source – Network File Share	EHR	Only required if Orders feed is part of the HL7 interface and using File Share communications.
Results Endpoint – IP Address and Port Number	EHR	Only required if using TCP/IP communications.
Results Endpoint – Network File Share	EHR	Only required if using File Share communications.
Results PDF Document – Network File Share	EHR	Only required if the PDF document will be sent as a "referenced" document from the HL7 ORU message.
ADT Configuration Template	Welch Allyn	Only required if ADT feed is part of the HL7 interface.
Orders Configuration Template	Welch Allyn	Only required if Orders feed is part of the HL7 interface.
Results Configuration Template	Welch Allyn	

HL7 Interface Deployment

This section describes the high-level activities with deploying the MDI HL7 interface.

MDI Installation – applies only to "on premise" installation of the MDI application
- Identify computer or virtual machine to host the MDI application
- Install MDI software.

Interface setup:
- Configure the interface based on settings described in the HL7 Interface Setup section. See Interface Setup Checklist.
- Install the interface engine template configuration files as applicable to the EHR vendor, modalities and required HL7 operations.
  a. Copy adt.config file (Drive:/Mortara Instrument Inc/Mdi/bin; *if applicable.*
  b. Copy orders.config file (Drive:/Mortara Instrument Inc/Mdi/bin; *if applicable.*
  c. Copy interface engine configuration files to the staging location; Drive:/Program Files (x86)/MirthConnect/channels.
      i. EHR.ADT.Channel.xml
      ii. EHR.Orders.Channel.xml
      iii. EHR.Results.Channel.xml
  d. Setup IP addresses in interface engine; reference Interface Setup Checklist.
  e. Setup file shares in interface engine; reference Interface Setup Checklist; *if applicable.*
  f. Import and deploy the interface engine configuration files using the Mirth Connect Administration tool.
  g. Deploy channels in interface engine.
  h. Start the ADT service *if applicable.*
  i. Start the Orders service *if applicable.*
  j. Start the Results service
- Apply facility, service location, and modality filters in the interface engine for HL7 ADT and Orders as specific to the customer requirements.

Verification:
- Test the interface using the test setup configuration. Validate the following as applicable:
  a. Patient Roster - based on required facilities; *if applicable.*
  b. Test Orders - based on required modalities and facilities; *if applicable.*
  c. Test Results - based on required modalities and PDF reporting type.

The MDI HL7 interface is now running live in production mode to the EHR system.

Scheduled Workflow Considerations

This section highlights some common customer expectations in regard to resting ECG and stress procedure scheduled workflow. This section explores the capabilities of the EHR application in regard to these requirements.

1. Procedure Status – applicable to orders-based interfaces
   a. When a test is sent from the MDI HL7 interface without physician overread, the test procedure status will be "preliminary." This is reflected in the HL7 ORU message.
   b. If the test has been overread by the physician on an ELI ECG device, the test procedure status will be set to "final," also reflected in the HL7 ORU message

   Requirement – does the EHR update the order status of the procedure based on the test status found in the HL7 ORU message?

2. Physician Worklist Assignment – applicable to orders-based interfaces
   a. If the ordering physician is placed in the HL7 ORM message, the MDI HL7 interface will retain this information. The ordering physician will be sent back in the HL7 ORU message.

   Requirement – does the EHR assign the test to the physician worklist upon receipt of the test from the MDI HL7 interface?

3. Electronic Signature – signed reports
   a. Some customers want the electronic signature of the physician (along with date-time) affixed to the ECG report once it has been finalized in the EHR.

   Requirement – does the EHR have the ability to electronically sign a reviewed ECG report?

4. Affixing a note to the procedure
   a. It is common practice to add a "note" to a procedure. In this case it might be the physician adding a "conclusions" note in lieu of electronically signing a report. The EHR then logs the name of the provider and date-time with the procedure note.

   Requirement – does the EHR have the ability to add a note to an ECG test?

5. Reviewing prior resting ECGs
   a. In the process of a physician overreading a resting ECG, it is helpful if the physician can be provided access to prior ECG exams. This helps the physician determine if there have been changes in the ECG.

   Requirement – does the EHR have the ability to retrieve and visually display prior reports?

6. ECG – reporting requirements

   Requirement – does the EHR have the ability to send reports using the following methods:
   - *print*
   - *fax*

7. ECG – procedure billing requirements
   a. It is often necessary to have the provider bill the patient (or insurance company) for ECG procedures that have been performed. These procedures typically are composed of two components:
      i. technical – billing code for performing the procedure
      ii. professional – billing code for physician overread of the procedure

It is common for both components to be combined into a single billing code.

The MDI HL7 reporting interface will provide information on the patient identity, modality of the procedure and the status of the report for a given procedure. This provides sufficient information to the EHR application to generate downstream billing.

Requirement – does the EHR have the ability to provide a bill charging for ECG procedures?

Unscheduled Workflow Considerations

This section highlights workflow situations where a test is performed without scheduled order and patient demographic information. This situation can occur for a couple of common reasons:

- Emergency situation; test must be performed prior to order being available.
- Order was not uploaded to the device prior to performing the procedure.

Key challenges to the EHR application for unscheduled tests are how does it:

a. reconcile the text to the correct patient?
b. assign the encounter #?
c. assign the order #?

EHR applications will behave differently when receiving a test result without an associated patient (MRN), Encounter # or Order#. The purpose of this section is to identify how the EHR will respond to an unscheduled test and what workflow provisions must be put into place to overcome the limitations of the unscheduled tests.

Possible behavior of the EHR to receipt of an unscheduled test:

- EHR will reject the test
  - This requires the device or the interface to reconcile a test with an order which in turn requires a re-send of the test to the EHR application.

- EHR will create a unique "unsolicited test" order as a placeholder for the test to be matched to
  - This requires a user of the EHR to manually associate the test with the correct patient/encounter.

- EHR will "receive and hold" the test. It is not associated with any order
  - This requires a user of the EHR to manually associate the test with a newly created order that specifies the patient/encounter.

Once the test information has been reconciled to the correct patient, encounter and order number; the unscheduled workflow resembles the scheduled workflow.

Resting ECG Modality

Clinical Parameters of Interest

A resting ECG report consists of the following categories of information:

1. Patient identification and recording information
2. Measurements
3. Interpretation
4. ECG Waveforms

Displayable Reports

A displayable report represented by a PDF document contains all of the information outlined above. Being a PDF document, it has limited editing capabilities for clinician annotation. The diagram below depicts a typical resting ECG report in PDF format.
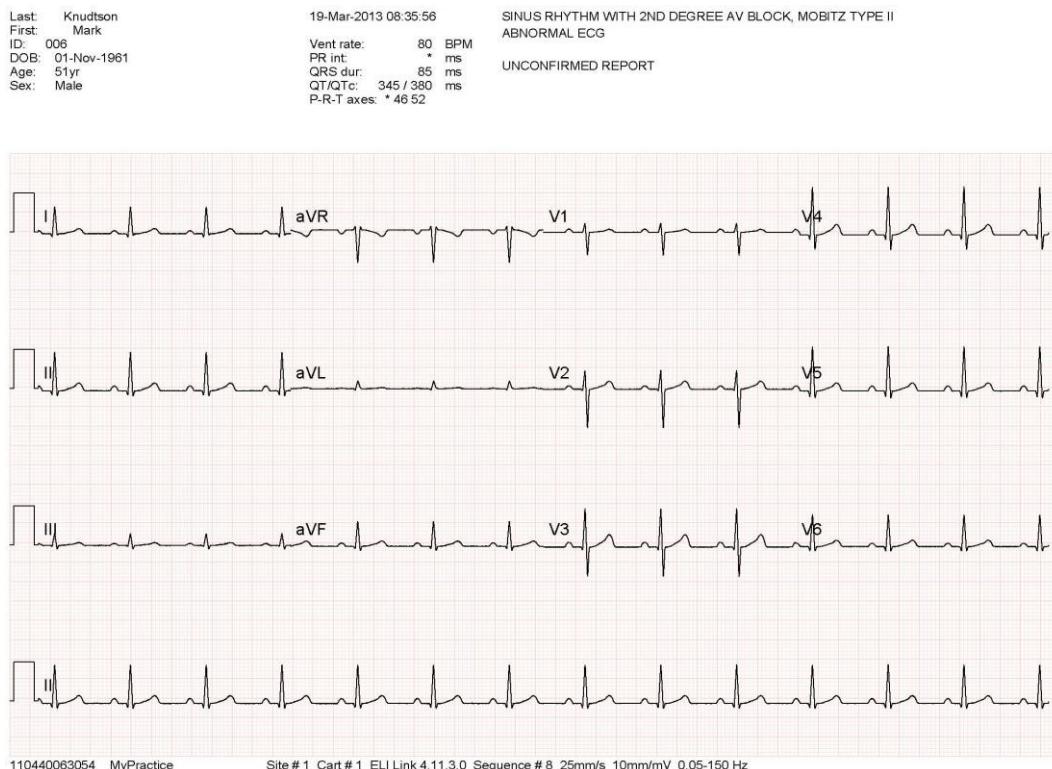
ECG Reporting Template

Many clinicians find it useful to display and edit the discrete data from a resting ECG report. This can be done by extracting information in categories 1-3 from *Clinical Parameters of Interest* into what is called an ECG reporting template. The diagram below provides a graphical presentation of an ECG reporting template. This template provides the ability to view and optionally edit ECG report parameters. The "Interpretation" field contains the diagnostic findings of the ECG exam. The original findings are generated by the ELI ECG devices. The physician then reviews the evidence of the ECG report (i.e., ECG waveforms from the PDF document) and enters their conclusions in this interpretation field.

HL7 Definitions

This section defines the MDI (Mortara Device Interface) HL7 interface specifications. Specifications will be restricted to the following HL7 message types:

- ADT
- ORM
- OMG
- ORU - modality specific
- MDM - modality specific

Common HL7 Message Segments

ADT, orders (ORM or OMG) and results (ORU or MDM) messages contain common HL7 message segments. This section will define those message segments, definition and database mappings. Common message segments defined in this section include:

- MSH
- EVN
- PID
- PV1
- PD1

Required fields are shown as **bold** REQUIRED FIELD. Optional fields are shown as OPTIONAL FIELD within the field description.

MSH – Message Header Segment

MSH Segment Example

MSH|^~\&|EHR|MyHospital|||20120223123704||ORM^001|4G*wGWz1xUyYnGCstzS*|P|2.5|||AL|NE|USA MSH

Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Field Separator	1	|	Y	

Message Encoding Characters
  ^ - Component Separator
  ~ - Repetition Separator
  \   - Escape Character
  & - Subcomponent Separator
	2	^~\&	Y	

Sending application	3.1	EHR		
Sending facility ID (Name)	4	MyHospital	Y	Facility ID is sometimes missing from the ADT message. The IE channel will have default Facility ID, if not present
Receiving application	5			
Receiving facility ID (Name)	6			
Date-time message was created	7	20120223123704		yyyyMMddHHmmss. Note: The HL7 application shall allow for zeros in the time values .
Message type	9.1	ORM	Y	
Message event type (code)	9.2	001	Y	Reference HL7 Table 0003 - Event types Use EVN-1 if the event type code is not supported in the MSH segment.
Unique message ID (sending application)	10	4G*wGWz1xUyYnGCstzS*		
HL7 message status (P-production, T-Test)	11	P		
HL7 message version	12	2.5		
Accept Acknowledgement type	15	AL		
Application Acknowledgement type	16	NE		
Country Code	17	USA		

EVN – Event Type Segment

EVN Segment Notes

The EVN segment is only required if the HL7 message event type code is not specified in MSH 9.2. In that case, the only field required from the EVN segment is the event type code. All other fields are ignored.

EVN Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Message event type (code)	1	001	Y	Reference HL7 Table 0003 - Event types Use EVN-1 if the event type code is not supported in the MSH segment.

PID – Patient Identification Segment

PID Segment Notes

Following PID segment fields are not processed:

- Alternate Patient ID
- Address
- Contact information
- Mother's information
- Language
- Marital status
- Religion
- Alias
- Any fields after PID-18

PID Segment Example

PID|1|XXXXX|6842-458||Buckmaster^Kristofer||19790918|M||B|1011 MCLAUGHLIN
ROAD^^BRIDGEVILLE^PA^15017||(412)221-8056|||||187148304

PID Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Patient Identifier (External)	2	XXXXX		EIN
Patient Identifier List	3	6842-458	Y	MRN
Patient Last Name	5.1	Buckmaster		
Patient First Name	5.2	Kristofer		
Patient Middle Name	5.3			
Patient Date of Birth	7	19790918		yyyyMMdd
Patient Gender	8	M		Supports HL7 2.5 Table 0001
Patient Race	10	B		W - White B – Black A – Asian H – Hispanic I – American Indian E – Eskimo P – Polynesian N – Hawaiian O – Other U – Unknown ***Does not use HL7 2.5 Table 0005***
Patient Account Number	18	187148304	Y; if using PID	Encounter, Visit Numbers. If present, PID-18 will take precedence over PV 1-19

PV1 – Patient Visit Segment

PV1 Segment Notes

Only the fields defined below are processed by the interface. PV1 segment fields of note that are not processed are:

- Admit Doctor
- Financial Class

Secondary Visit Number – some EHR applications send a "secondary visit number" in PV1-19. This visit number is distinct from the Encounter (visit) Number found in PID-18. In such cases, the Secondary Visit Number will be stored as a user defined field in the associated order.

PV1 Segment Example

PV1|1|R|ED^3|R|||ID^DR. ATTENDING|||||||||||10000|

PV1 Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Patient Class	2	R		Supports HL7 2.5 Table 0004 as follows: ' ' – undefined 'E' – emergency 'I' – inpatient 'O' – outpatient 'P' – pre-admit 'R' – recurring 'B' – obstetrics 'C' – commercial 'D' - daypatient
Assigned Patient Location	3.1	ED		Department
Patient Room	3.2	3		
Attending Doctor ID	7.1	ID		
Attending Doctor Name	7.2 – 7.6	DR.ATTENDING		Name Format: Prefix (7.6), First (7.3), Middle (7.4), Last name (7.2), Suffix (7.5)
Referring Doctor ID	8.1			
Referring Doctor Name	8.2 – 8.6			Name Format: Prefix (8.6), First (8.3), Middle (8.4), Last name (8.2), Suffix (8.5)
Consulting Doctor ID	9.1			
Consulting Doctor Name	9.2 – 9.6			Name Format: Prefix (9.6), First (9.3), Middle (9.4), Last name (9.2), Suffix (9.5)

Patient Account Number	19	10000	Y; if using PV1	Encounter, Visit Numbers. If present, PID-18 will take precedence over PV 1-19 NOTE: If secondary visit number specified in PV1-19; this value is mapped to a user defined field in the associated order.

PD1 – Patient Additional Demographic Segment

PD1 Segment Notes

The PD1 segment is only required if the "Family Physician" information is required as part of the report sent from the interface to the EHR application. This segment is typically included in the order message (ORM or OMG). Only the PD1-4 field is supported. All other fields are ignored.

PD1 Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Primary Care Doctor ID	4.1			
Primary Care Doctor Name	4.2 – 4.6			Name Format: Prefix (4.6), First (4.3), Middle (4.4), Last name (4.2), Suffix (4.5)

ADT (Admit, Discharge, Transfer) Messages

The MDI HL7 interface is able to receive ADT messages (HL7 ADT). These messages contain patient demographic information that are then stored by the MDI application, which is then used for patient selection for a resulting ECG exam. This patient demographic information can be used in the following ways:

- Used for patient selection by participating Welch Allyn diagnostic devices. This would be the method of choice for identifying a patient if an orders-based methodology is not available.
- Updating patient demographics for associated orders; via patient MRN and account number.

The MDI HL7 interface supports HL7 ADT Messages A01 – A62. These event code types can be configured (On/Off) based on customer/EHR requirements. NOTE: A19 (Patient Query) is not supported.

Messages that can be configured but not enabled (by default):

A15
A16
A17
A20
A24
A25
A26
A27
A37
A48
A51
A56
A57
A58
A59
A60

ADT Message Segments

ADT messages shall consist of the following message segments. Some of these segments are optional based on interface requirements discussed prior in this document.
- MSH
- EVN
- PID
- PD1
- PV1
- MRG (only required for merge message type transactions; see below.

MRG - Patient Merge Request Segment

The following are the field definitions of a patient merge request - MRG segment.

MRG|453434||||50000

MRG Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Prior Patient Identifier List	1	453434	Y	MRN
Prior Patient Account Number	5	50000	Y	Encounter, Visit Numbers.

Order Messages

ORM – General Order Message
OMG – General Clinical Order Message

The MDI HL7 interface is able to receive order messages (ORM or OMG). It is preferable if the EHR application sending the order request can filter orders based on the modalities of interest. If filtering cannot be provided by the EHR application, the MDI HL7 Interface can filter the order requests by modality.

The MDI HL7 interface supports the following types of HL7 ORM or OMG messages control types (see ORC-1):

- New (NW)
- Cancel (CA; OC, OD)
- Update (XX, XO)
- Hold/Release (HD, RL); not supported

The ORM or OMG order messages consist of the following message segments. Some of these segments are optional based on interface requirements discussed prior in this document.

- MSH
- PID
- PD1
- PV1
- ORC
- OBR

The following is a sample HL7 ORM message request for a resting ECG procedure. The MDI HL7 interface can be customized to receive HL7 ORM messages with varying formats. This sample message will be used in the specification of the supporting order message segments.

```
MSH|^~\&|MyHospital||||20120223123704||ORM^O01|4G*wGWz1xUyYnGCstzS*|P|2.5|||AL|NE|USA
PID|1|XXXXX|6842-458||Buckmaster^Kristofer||19790918|M||B|1011 MCLAUGHLIN
ROAD^^BRIDGEVILLE^PA^15017||(412)221-8056|||||187148304
PV1|1|R|ED^3||||ID^DR. ATTENDING||||||||||||10000|||||||||||||||||||||||||||20121015082500|
ORC|NW|ORM123^EHR|9qJtOOgSG0G2hBXqCI8RZg|||||20121015082500|ID^Dr. A||ID^NAME|
OBR||ORM123|9qJtOOgSG0G2hBXqCI8RZg|93005^ECGTest^L|||20110114175631|20110114181056||||||||||||
||||20120223123544|||R||^^^20120901080000^^R|||WALK|Chest Pain|||||20110114175631|||||||||||
```

ORC – Common Order Segment

ORC Segment Notes

Only the fields defined below are processed by the interface. ORC segment fields of note that are not processed are;:

- All fields after ORC-10

SC (status change) order control types are not supported.

Parent orders with quantity-timing is not supported. The rationale behind this is based on reporting requirements of the EHR. For example let's assume that the MDI-HL7 interface generated a unique order number based on quantity timing. When the report is submitted by the MDI-HL7 interface to the EHR application, the unique order number associated with that report will not match any placed orders in the EHR. As a result, the report will be rejected.
Therefore it is incumbent that the EHR issue orders with placed order numbers that it generates such that reports based on those order numbers can be sent back to the EHR and resulted appropriately.

ORC Segment Example

ORC|NW|ORM123^EHR|9qJtOOgSG0G2hBXqCI8RZg||||||^^^20121015082500|ID^Dr. A||ID^NAME| ORC Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Order Control	1	NW	Y	Supports following control types; • NW – new order • CA, OC, OD – cancel order • XX, XO – update order • HD – hold order Does not support all control types in HL7 2.5 table 0119; most notably SC
Placer Order Number	2.1	ORM123	Y	If present, OBR-2.1 takes precedence over ORC-2.1
Placer Application	2.2	EHR		Name of requesting application
Order Number				Order number derived from Placer Order Number
Order Status	5			Supports most order status types defined in HL7 2.5 table 0038
Order Start Time (Quantity Timing)	7.4			Test scheduled perform time If present, OBR-27.4 takes precedence over ORC-7.4 If only date present; fill in time based on current time.
Entered By ID	10.1	ID		ID of person entering the order
Entered By Name	10.2 – 10.6	Dr. A		Name of person entering the order. Name Format: Prefix (10.6), First (10.3), Middle (10.4), Last name (10.2), Suffix (10.5)

OBR – Observation Request Segment

OBR Segment Notes

Only the fields defined below are processed by the interface. OBR segment fields of note that are not processed are:

- Fields of the OBR segment that are related to "result messages" only
- All fields after OBR-31

Parent orders with quantity-timing is not supported. See notes regarding this in ORC section.

ORC Segment Example

OBR||ORM123|9qJtOOgSG0G2hBXqCI8RZg|93005^ECG
Test^L|||20110114175631|20110114181056|||||||||||||20120223123544|||R||^^^20120901080000^^R|||
WALK|Chest Pain|||||20110114175631|||||||||||

OBR Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Placer Order Number	2.1	ORM123	Y	If present, OBR-2.1 takes precedence over ORC-2.1
Placer Application	2.2	EHR		Name of requesting application
Order Number				Order number derived from Placer Order
Universal Service Identifier	4	93005	Y	Procedure modality. Utilizes CPT Codes **ECG** 93005 (preliminary with waveforms and interpretation), 93000, 93010 **Stress** 93015, 93016, 93017, 93018, 93320, 93325, 93350, 78452 **Holter** 93224, 93225, 93226, 93227
Order Modality				ECG, STRESS, HOLTER,… Translated from the Universal Service ID; OBR.4
Order Start Time (Quantity Timing)	27.4	201209010800000		Test scheduled perform time If present, OBR-27.4 takes precedence over ORC-7.4 If only date provided, add current time.
Order Priority (Quantity Timing)	27.6	R		U – undefined L – low priority R – Routine A – ASAP S – STAT
Reason For Study	31	Chest Pain		

Result (ORU) Messages

The ORU result message can consist of the following message segments:
- MSH
- PID
- PV1
- ORC
- OBR

The definitions for these segments apply to the resting ECG, stress testing and Holter monitoring modalities. Fields shown are configured by default for ECG modality. HL7 Configuration can be changed to support additional fields or modification of default fields.

(MSH) Message Header

MSH Segment Example
MSH|^~\&|ELI^93005||EMR^93005|MyHospital|20130102160413||ORU^R01|F47IUqBH8U+xMSY7s87i|P|2.5|||AL|NE|eng

MSH Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Field Separator	1	|	Y	
Message Encoding Characters ^ - Component Separator ~ - Repetition Separator \ - Escape Character & - Subcomponent Separator	2	^~\&	Y	
Sending application	3.1	ELI	N	ELI Cardiograph
Code for Observation Tasks	3.2	93005	N	Configurable test type (see OBR-4) 93005 – Resting 12 lead ECG Code is the same for segment items MSH-3-2, MSH-5-2, and OBR-4
Receiving application	5.1	EMR	N	
Code for Observation Tasks	5.2	93005	N	Configurable test type (see OBR-4) 93005 – Resting 12 lead ECG Code is the same for segment items MSH-3-2, MSH-5-2, and OBR-4
Receiving facility ID (Name)	6	MyHospital		
Date-time message was created	7	20130102160413	Y	yyyyMMddHHmmss.
Message type	9.1	ORU	Y	
Message event type (code)	9.2	R01	Y	Reference HL7 Table 0003 - Event types
Unique message ID (sending application)	10	F47IUqBH8U+xMSY7s87i		
HL7 message status (P-production, T-Test)	11	P		
HL7 message version	12	2.5		
Accept Acknowledgement type	15	AL		
Application Acknowledgement type	16	NE		
Country Code	17	USA		

(PID) Patient Identification

PID Segment Example

PID|XXXXX|6842-458||Buckmaster^Kristofer||19790918|M||B|1011 MCLAUGHLIN
ROAD^^BRIDGEVILLE^PA^15017||(412)221-8056|||||187148304

PID Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Patient Identifier (External)	2	XXXXX		EIN (Enterprise ID Number)
Patient Identifier List	3	6842-458	Y	MRN
Patient Last Name	5.1	Buckmaster		
Patient First Name	5.2	Kristofer		
Patient Middle Name	5.3			
Patient Date of Birth	7	19790918		yyyyMMdd
Patient Gender	8	M		Supports HL7 2.5 Table 0001
Patient Race	10	B		W - White B – Black A – Asian H – Hispanic I – American Indian E – Eskimo P – Polynesian N – Hawaiian O – Other U – Unknown ***Does not use HL7 2.5 Table 0005***
Patient Account Number	18	187148304	Y; if using PID	Encounter, Visit Numbers. If present, PID-18 will take precedence over PV 1-19

(PV1) Patient Visit

PV1 Segment Example

PV1|R|ED^3|R|||ID^DR. ATTENDING|||||||||||187148304|

PV1 Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Patient Class	2	R		Supports HL7 2.5 Table 0004 as follows: ' ' – undefined 'E' – emergency 'I' – inpatient 'O' – outpatient 'P' – pre-admit 'R' – recurring 'B' – obstetrics 'C' – commercial 'D' - daypatient
Assigned Patient Location	3.1	ED		Department
Patient Room	3.2	3		
Attending Doctor ID	7.1	ID		
Attending Doctor Name	7.2 – 7.6	DR.ATTENDING		Name Format: Prefix (7.6), First (7.3), Middle (7.4), Last name (7.2), Suffix (7.5)
Referring Doctor ID	8.1			
Referring Doctor Name	8.2 – 8.6			Name Format: Prefix (8.6), First (8.3), Middle (8.4), Last name (8.2), Suffix (8.5)
Consulting Doctor ID	9.1			
Consulting Doctor Name	9.2 – 9.6			Name Format: Prefix (9.6), First (9.3), Middle (9.4), Last name (9.2), Suffix (9.5)
Patient Account Number	19	187148304	Y; if using PV1	Encounter, Visit Numbers. If present, PID-18 will take precedence over PV 1-19 NOTE: If secondary visit number specified in PV1-19; this value is mapped to a user defined field in the associated order.

(ORC) Common Order

ORC Segment Example

ORC||ORM123^EHR|9qJtOOgSG0G2hBXqC||||201301021559^^R|||D^Dr.A|

ORC Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Placer Order Number	2.1	ORM123	Y	If present, OBR-2.1 takes precedence over ORC-2.1
Placer Application	2.2	EHR		Name of requesting application
Filler Order Number	3	9qJtOOgSG0G2hBXqC		Filler order number derived from filler interface
Order Start Time (Quantity Timing)	7.4	201301021559		Test scheduled perform time If present, OBR-27.4 takes precedence over ORC-7.4 If only date present; fill in time based on current time.
Test Priority	7.6	R		Test priority 'U' – undefined 'L' – low priority 'R' – Routine 'A' – ASAP 'S' – STAT
Entered By ID	10.1	ID		ID of person entering the order
Entered By Name	10.2 – 10.6	Dr. A		Name of person entering the order. Name Format: Prefix (10.6), First (10.3), Middle (10.4), Last name (10.2), Suffix (10.5)

(OBR) Observation Request

OBR Segment Example
OBR||ORM123^EHR|9qJtOOgSG0G2hBXqC |93005^ECG
Test|||||||||||||||||||201301031000|||P|^^^201301021559^^R||||Chest Pain|ID^NAME|

OBR Segment Definitions and Mapping

Description	HL7 Field	Data (e.g.)	Reqd	Notes
Placer Order Number	2.1	ORM123	Y	If present, OBR-2.1 takes precedence over ORC-2.1
Placer Application	2.2	EHR		Name of requesting application
Filler Order Number	3	9qJtOOgSG0G2hBXqC		Filler order number derived from filler interface
Universal Service Identifier	4.1	93005	Y	Procedure modality. Utilizes CPT Codes **ECG** 93000, 93005, 93010 **Stress** 93015, 93016, 93017, 93018, 93320, 93325, 93350, 78452 **Holter** 93224, 93225, 93226, 93227
Universal Service Identifier Mnemonic	4.2	ECG Test		
Confirmed Date-Time	22			Results/Report - Status Change Date-Time; i.e. date-time when a clinician overread the report. yyyyMMddHHmmss
Test Result Status	25	P		Result Status - Supports HL7 2.5 Table 0123 as follows: 'F' – final 'P' – preliminary
Order Start Time (Quantity Timing)	27.4	201301021559		Test scheduled perform time If present, OBR-27.4 takes precedence over ORC-7.4 If only date provided, add current time.
Order Priority (Quantity Timing)	27.6	R		U – undefined L – low priority R – Routine A – ASAP S – STAT
Reason For Study	31	Chest Pain		
Confirmed By	32			Principal Result Interpreter Name Format: Prefix (32.6), First (32.3), Middle (32.4), Last name (32.2), Suffix (32.5) If present, OBR-32 takes precedence over ORC-32

Resting ECG Example Message

ORU Message:

```
MSH|^~\&|ELI^93005||EMR^93005|MyHospital|20130102160413||ORU^R01|F47IUqBH8U+xMSY7s87i|P|2.5|||AL|NE|eng
PID|XXXXX|6842-458||Buckmaster^Kristofer||19790918|M||B|1011 MCLAUGHLIN ROAD^^BRIDGEVILLE^PA^15017||(412)221-8056|||||187148304
PV1|R|ED^3|R|||ID^DR. ATTENDING|||||||||||||187148304|
ORC||ORM123^EHR|9qJtOOgSG0G2hBXqC||||201301021559^^R|||D^Dr.A]
OBR||ORM123^EHR|9qJtOOgSG0G2hBXqC |93005^ECG Test||||||||||||||||201301031000|||P|^^^201301021559^^R||||Chest Pain|ID^NAME|
```

OBX Segments

Preface Notes

1. Free text document formatting (interpretation) – common sentence delimiter examples provided
2. PDF Document Management – supports both referenced and encapsulated PDF documents
3. Referenced PDF document – common path delimiter examples provided

```
OBX|1|NM|93005.1^Ventricular Rate ECG^ELI||74|bpm|||||P
OBX|2|NM|93005.2^P Wave Duration^ELI||89|ms|||||P
OBX|3|NM|93005.3^P-R Interval^ELI||183|ms|||||P
OBX|4|NM|93005.4^QRS Duration^ELI||168|ms|||||P
OBX|5|NM|93005.5^Q-T Interval^ELI||408|ms|||||P
OBX|6|NM|93005.6^Q-T Interval (corrected)^ELI||436|ms|||||P
OBX|7|NM|93005.7^P Wave Axis^ELI||44|deg|||||P
OBX|8|NM|93005.8^QRS Axis^ELI||-56|deg|||||P
OBX|9|NM|93005.9^T Axis^ELI||115|deg|||||P
OBX|10|NM|93005.71^Q-T Interval (Mortara)^ELI||436|ms|||||P
OBX|11|NM|93005.72^Q-T Interval (Bazett)^ELI||455|ms|||||P
OBX|12|NM|93005.73^Q-T Interval (Hodges)^ELI|| |ms|||||P
OBX|13|NM|93005.74^Q-T Interval (Framingham)^ELI|| |ms|||||P
OBX|14|NM|93005.75^Q-T Interval (Fredericia)^ELI||439|ms|||||P
```

Note: Free text (interpretation) with line delimiters
OBX|15|FT|93005.10^Interpretation^ELI||SINUS TACHYCARDIA~ABNORMAL RHYTHM ECG~UNCONFIRMED REPORT~||||||P
or
OBX|15|FT|93005.10^Interpretation^ELI||SINUS TACHYCARDIA\.br\ABNORMAL RHYTHM ECG\.br\UNCONFIRMED REPORT\.br\||||||P

Note: Referenced PDF document – supported path delimiters
**OBX|16|RP|93005.11^ECG IMAGE^ECG IMAGE LOCATION^ELI||\\SHARE-MACHINE\Cardiology\ECG\ELI\Reports\
BuckmasterChristopher201301031000.pdf^ELI^PDF||||||P**
or
**OBX|16|RP|93005.11^ECG IMAGE^ECG IMAGE LOCATION^ELI||\E\\E\SHARE-MACHINE\E\Cardiology\E\ECG\E\ELI\E\Reports\E\
BuckmasterChristopher201301031000.pdf^ELI^PDF||||||P**

Note: Encapsulated PDF document
OBX|16|ED|93005.11^Base64 Encode||JVBERi0xLjQKJeLjz9MKMSAw................hyZWYKMjgyMjU5CiUlRU9GCg==|PDF|||||P

Resting ECG OBX Segment Definitions

(OBX 1) Observation Ventricular Rate

```
OBX|1|NM|93005.1^Ventricular Rate ECG^ELI||74|bpm
```

Data Element	Field	Data	Description
Calculated HL7	1	1	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.1	ECG Message ID – 93005.1
Static	3.2	Ventricular Rate ECG	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Heart Rate	5	74	Data - #
Static	6	bpm	Units - bpm

(OBX 2) Observation P Wave Duration

OBX|2|NM|93005.2^P Wave Duration^ELI||89|ms

Data Element	Field	Data	Description
Calculated HL7	1	2	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.2	ECG Message ID – 93005.2
Static	3.2	P Wave Duration	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
P Wave Duration	5	89	Data - #
Static	6	Ms	Units - ms

(OBX 3) Observation P-R Interval

OBX|3|NM|93005.3^P-R Interval^ELI||183|ms

Data Element	Field	Data	Description
Calculated HL7	1	3	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.3	ECG Message ID – 93005.3
Static	3.2	P-R Interval	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
P-R Interval	5	183	Data - #
Static	6	Ms	Units - ms

(OBX 4) Observation QRS Duration

OBX|4|NM|93005.4^QRS Duration^ELI||168|ms

Data Element	Field	Data	Description
Calculated HL7	1	4	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.4	ECG Message ID – 93005.4
Static	3.2	QRS Duration	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
QRS Duration	5	168	Data - #
Static	6	Ms	Units - ms

(OBX 5) Observation Q-T Interval

OBX|5|NM|93005.5^Q-T Interval^ELI|408|ms

Data Element	Field	Data	Description
Calculated HL7	1	5	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.5	ECG Message ID – 93005.5
Static	3.2	Q-T Interval	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Q-T Interval	5	408	Data - #
Static	6	Ms	Units - ms

(OBX 6) Observation Q-T Interval (Corrected)

OBX|6|NM|93005.6^Q-T Interval (corrected)^ELI||436|ms

Data Element	Field	Data	Description
Calculated HL7	1	6	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.6	ECG Message ID – 93005.6
Static	3.2	Q-T Interval (corrected)	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Q-T Interval	5	436	Data - #
Static	6	Ms	Units - ms

(OBX 7) Observation P Wave Axis

OBX|7|NM|93005.7^P wave axis^ELI||44|deg

Data Element	Field	Data	Description
Calculated HL7	1	7	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.7	ECG Message ID – 93005.7
Static	3.2	P Wave Axis	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED

Data Element	Field	Data	Description
P wave axis	5	44	Data - #
Static	6	deg	Units - deg

(OBX 8) Observation QRS Axis

OBX|8|NM|93005.8^QRS Axis^ELI||-56|deg

Data Element	Field	Data	Description
Calculated HL7	1	8	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.8	ECG Message ID – 93005.8
Static	3.2	QRS Axis	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
QRS Axis	5	-56	Data - #
Static	6	deg	Units - deg

(OBX 9) Observation T Axis

OBX|9|NM|93005.9^T axis^ELI||115|deg

Data Element	Field	Data	Description
Calculated HL7	1	9	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.9	ECG Message ID – 93005.9
Static	3.2	T Axis	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
T Axis	5	115	Data - #
Static	6	deg	Units - deg

(OBX 10) Observation Q-T Interval (Mortara)

OBX|10|NM|93005.71^Q-T Interval (Mortara)^ELI||436|ms

Data Element	Field	Data	Description
Calculated HL7	1	10	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.71	ECG Message ID – 93005.71
Static	3.2	Q-T Interval (Mortara)	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Q-T Interval	5	436	Data - #
Static	6	Ms	Units - ms

(OBX 11) Observation Q-T Interval (Bazettes)

OBX|11|NM|93005.72^Q-T Interval (Bazettes)^ELI||455|ms

Data Element	Field	Data	Description
Calculated HL7	1	11	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.72	ECG Message ID – 93005.72
Static	3.2	Q-T Interval (Bazettes)	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Q-T Interval	5	455	Data - #
Static	6	Ms	Units - ms

(OBX 12) Observation Q-T Interval (Hodges)

OBX|12|NM|93005.73^Q-T Interval (Hodges)^ELI|||ms

Data Element	Field	Data	Description
Calculated HL7	1	12	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.73	ECG Message ID – 93005.73
Static	3.2	Q-T Interval (Hodges)	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Q-T Interval	5		Data - #
Static	6	Ms	Units - ms

(OBX 13) Observation Q-T Interval (Framingham)

OBX|13|NM|93005.74^Q-T Interval (Framingham)^ELI|||ms

Data Element	Field	Data	Description
Calculated HL7	1	13	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.74	ECG Message ID – 93005.74
Static	3.2	Q-T Interval (Framingham)	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Q-T Interval	5		Data - #
Static	6	Ms	Units - ms

(OBX 14) Observation Q-T Interval (Fredericia)

OBX|14|NM|93005.75^Q-T Interval (Fredericia)^ELI||439|ms

Data Element	Field	Data	Description
Calculated HL7	1	14	Set ID – OBX
Static	2	NM	Data Type - Numeric
Static	3.1	93005.75	ECG Message ID – 93005.75
Static	3.2	Q-T Interval (Fredericia)	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Q-T Interval	5	439	Data - #
Static	6	Ms	Units - ms

(OBX 15) Observation Test Interpretation

Free text - ~ text formatter

OBX|15|FT|93005.10^Interpretation^ELI||SINUS TACHYCARDIA~ABNORMAL RHYTHM ECG~UNCONFIRMED REPORT~||||||P

Free text - \.br\ text formatter

OBX|15|FT|93005.10^Interpretation^ELI||SINUS TACHYCARDIA\.br\ABNORMAL RHYTHM ECG\.br\UNCONFIRMED REPORT\.br\||||||P

Data Element	Field	Data	Description
Calculated HL7	1	15	Set ID – OBX
Static	2	FT	Data Type – Free Text
Static	3.1	93005.10	ECG Message ID – 93005.10
Static	3.2	Interpretation	ECG parameter description
Static	3.3	ELI	ECG Device
---	4		NOT USED
Test Diagnosis	5.1	SINUS TACHYCARDIA~ABNORMAL RHYTHM ECG~UNCONFIRMED REPORT~	Test – Analysis Interpretation (~ example)
Test Diagnosis	5.1	SINUS TACHYCARDIA\.br\ABNORMAL RHYTHM ECG\.br\UNCONFIRMED REPORT\.br\	Test – Analysis Interpretation (\.br\ example)
Test Summary Code	5.2		Test – Analysis Interpretation Summary Code

(OBX 16) Observation ECG Image - Referenced

Document Reference – no path delimiter

OBX|16|RP|93005.11^ECG IMAGE^ECG IMAGE LOCATION^ELI||\\SHARE-MACHINE\Cardiology\ECG\ELI\Reports\
BuckmasterChristopher201301031000.pdf^ELI^PDF||||||P

Document Reference – path delimiter

OBX|16|RP|93005.11^ECG IMAGE^ECG IMAGE LOCATION^ELI||\E\\E\SHARE-MACHINE\E\Cardiology\E\ECG\E\ELI\E\Reports\E\
BuckmasterChristopher201301031000.pdf^ELI^PDF||||||P

Data Element	Field	Data	Description
Calculated HL7	1	16	Set ID – OBX
Static	2	RP	Data Type – Reference pointer
Static	3.1	93005.11	ECG Message ID – 93005.11
Static	3.2	ECG IMAGE	ECG parameter description
Static	3.3	ECG IMAGE LOCATION	ECG parameter description
Static	3.4	ELI	ECG Device
---	4		NOT USED
Image File Location	5.1	\\SHARE-MACHINE\Cardiology\ECG\ELI\Reports\BuckmasterChristopher201301031000.pdf	Image Document – File Location – no path delimiter
Image File Location	5.1	\E\\E\SHARE-MACHINE\E\Cardiology\E\ECG\E\ELI\E\Reports\E\BuckmasterChristopher201301031000.pdf	Image Document – File Location – path delimiter
Static	5.2	ELI	ECG Device
Static	5.3	PDF	Image Document – File Type; PDF

(OBX 16) Observation ECG Image – Encapsulated

OBX|16|ED|93005.11^Base64 Encode||JVBERi0xLjQKJeLjz9MKMSAw................hyZWYKMjgyMjU5CiUlRU9GCg==|PDF|||||P

Data Element	Field	Data	Description
Calculated HL7	1	16	Set ID – OBX
Static	2	ED	Data Type – Encapsulated document
Static	3.1	93005.11	ECG Message ID – 93005.11
Static	3.2	Base64Encode	Encapsulation method
---	4		NOT USED
Encapsulated Content	5.1	Encapsulated document data	Encapsulated PDF document content
Static	6	PDF	Encapsulated Image Document – Type; PDF

Resting ECG OBX Segment IDs

The following tables show the ECG OBX segment IDs used with the Resting ECG HL7 ORU Message

OBX Segment	Segment ID	Description
1	93005.1	Ventricular Rate ECG
2	93005.2	P Wave Duration
3	93005.3	P-R Interval
4	93005.4	QRS Duration
5	93005.5	Q-T Interval
6	93005.6	Q-T Interval (corrected)
7	93005.7	P Wave Axis
8	93005.8	QRS Axis
9	93005.9	T Axis
15	93005.10	Test Interpretation
16	93005.11	ECG Image (Referenced or Encapsulated)
10	93005.71	Q-T Interval (Mortara)
11	93005.72	Q-T Interval (Bazettes)
12	93005.73	Q-T Interval (Hodges)
13	93005.74	Q-T Interval (Framingham)
14	93005.75	Q-T Interval (Fredericia)

Resting ECG Summary Statement Codes

The following table describes the ECG interpretation summary codes.

Reference: SCPECG Standard, v1.2, Annex B

Summary Statement Code	Summary Statement Definition
NLECG	Normal ECG
ABECG	Abnormal ECG
BOECG	Borderline ECG
WHNOR	ECG within normal limits for age and sex
POSNL	Possibly normal ECG
POSAB	Possibly abnormal ECG
NFA	Normal for age
NFB	Normal for build
ABFA	Abnormal for age
ABFB	Abnormal for build
UFB	Unusual for build