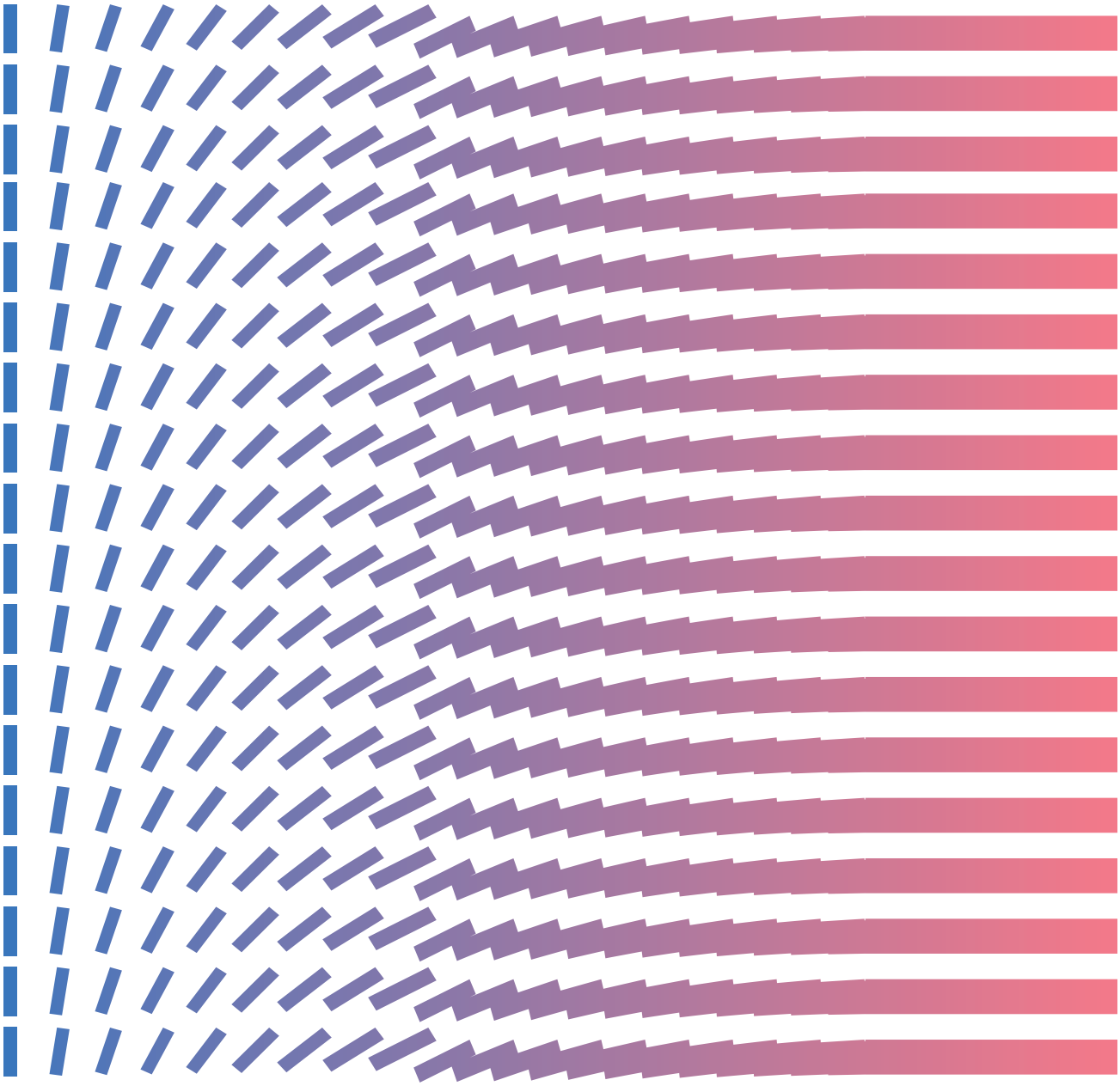
Hillrom™

Digital Health Platform



External Digital Health Platform Help Center

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Contents

Hillrom Smart Device Connectivity R1.2.4 Help Center

Start here to view information about the Smart Device Connectivity product.

Select one of the following sub-topics for more information:

Printable Smart Device Connectivity User Guide

Click the link below for a printable version of the information in this Help Center.

Digital Health Gateway Printable External Help Center

About Smart Device Connectivity

Product Description:

Guidelines for Use

Hillrom Smart Device Connectivity facilitates communication between input and output devices and systems connected to a hospital network. It also relays EMR configured information to mobile devices using the Enterprise Gateway solution.

1. All patient medical care is to be performed by a licensed health care professional, practicing within the bounds and scope defined in their licensure.
2. The Smart Device Connectivity solution is for use within a healthcare environment only.
3. The Smart Device Connectivity solution, including, but not limited to all integrated components, is not intended to provide patient treatment or safety decisions or serve as a substitute for professional healthcare judgement.
4. The Smart Device Connectivity solution is not a replacement (or substitute) for vital signs monitoring and is not intended to be used as the primary notification system for alert equipment.

5. The Smart Device Connectivity solution is indicated for use with specific integrated medical devices that have been verified and validated with the Smart Device Connectivity solution only and is not intended to provide patient status information from non-verified and non-validated services.

Intended Use Statement

The Smart Device Connectivity solution is intended for the collection and transmission of patient data to and from information systems. It will communicate compatible device data, associated alerts, and configured notifications in near real-time to the clinical team. The clinical team can access the data provided and determine applicable actions according to hospital-defined protocols.

Documentation

Select one of the following sub-topics for more information:

LAB01457 Smart Device Connectivity HL7 Interface Specification

LAB01420 Digital Health Platform Product Compatibility Matrix

Technical Specifications

Smart Device Connectivity Voalte Nurse Call Server Specifications

Voalte Nurse Call Server Specifications

Voalte Server Specifications

Welch Allyn Wireless Best Practices

Welch Allyn Connex Spot Monitor Spec

Welch Allyn Connex Devices Spec

Centrella Specifications

Accella Specifications

A printable version of the Help Center is available in the following languages:

Dutch

French

German

Italian

Spanish

Swedish

Before You Begin

Select one of the following sub-topics for more information about Smart Device Connectivity.

Supported Systems and Versions (Compatibility Matrix) (on page 7)

Features (on page 8)

How Does Smart Device Connectivity Work? (on page 18)

Supported Systems and Versions (Compatibility Matrix)

Smart Device Connectivity currently supports the following systems, devices and versions.

Browser Compatibility

The Digital Health Portal shall be compatible with the following browsers:

- Google Chrome version 76 or higher
- Microsoft Internet Explorer Version 11 or higher (excluding Reporting and Dashboard)
- Microsoft Edge Browser Version 84 or higher (excluding the Dashboard)

Note: Rules Manager is only compatible with the Google Chrome browser and will not work with Microsoft Internet Explorer.

Third Party Integrations

The Digital Health Platform can be integrated to work with various third-party systems. The following matrix outlines the third party systems that are compatible with Smart Device Connectivity 1.2.400 and Patient Risk Surveillance 1.0.400.

Product	**Compatible Versions**
Connex Spot Monitor (CSM)	>=1.52 (via Connex CS to Enterprise Gateway) >=1.52 (to Enterprise Gateway)
Connex Vital Signs Monitor (CVSM)	>=2.43 (to Enterprise Gateway)
Connex CS	>= 1.8.4
EarlySense (Integrated)	03.13.030 or above
Centrella Bed (with or without embedded EarlySense)	Wired: Version 1.30 or later (wired only) Wireless: Version 1.35.000 or later (wireless)
Accela Bed (wireless)	Bed >=CS900B41xxx with an HRP (serial number) > HRP004026834

Product	Compatible Versions
	HIB 2.x or later and ICB 2.x or later WAM >=1.05.000
Epic	Versions via standard HL7 interface
Meditech	Versions via standard HL7 interface
Virtual Care Solution	1.0
Voalte® (including Nurse Call and Status Board)	3.9.600 and above
Voalte® Server	3.7.10 and above
Voalte® Family Messaging	1.0
Symedical	2.2.7.10 or above

Features

Select one of the following sub-topics for more information:

Customer Organizational Hierarchies

Hillrom Smart Device Connectivity supports integration through the creation of a hierarchy configuration that represents the customer's organizational structure and location layout. Smart Device Connectivity requires a minimum of five (5) levels to be configured in order to provide a workflow for data from Hillrom devices to flow through to the EMR and/or out to third-party systems. Gateway connectivity also supports receiving EMR/ADT data from the Hospital Information System.

Customer hierarchy levels

Hierarchy	Description	Allowed
Enterprise	This is the highest level of a hierarchy, and should be considered the top-most level of a customer. Only **one** Enterprise level can exist for a customer.	One
Region	This is the logical (or physical) geographical information where a grouping of organizations may occur (for example, East region, West region, and so forth).	Many
Organization	This is a group of one or more Facilities within a Region.	Many
Facility	This is a **required** hierarchy level, and should consist of the actual *physical location* of a building. This level is used to ensure that data is received from Hillrom devices. **Note:** From a system perspective, this would be the "Tenant" level of the hierarchy.	Many
Unit	This is a **required** hierarchy level, and should consist of nursing units (or groups of locations) *within* a Facility. This level is used in performing unit level mapping that matches the EMR logical location. It is also instrumental in ensuring that data is received from Hillrom devices. **Note:** Connections are **not** supported at this level; therefore, connection inheritance does not apply.	Many

Multiple hierarchy levels within a given Enterprise

A typical organizational hierarchy consists of **one** Enterprise and *at least* one of each of the following items: Region, Organization, Facility, and Unit. Multiple-level hierarchies are supported under the Enterprise level. The last two hierarchy levels (for example, Facility and Unit) of any hierarchy configuration are required in order to receive device data from Hillrom devices.

EMR location mapping

Creating unit location mapping acts as a bridge between the EMR system location and the physical location where patients may be located. Facility devices, such as wired Centrella beds, are registered to known locations within the Gateway. In order to perform unit location mapping, a Facility and Unit must be configured in the Digital Health Portal. This mapping of EMR locations is an integral part of allowing data to flow between Hillrom devices, Smart Device Connectivity, the EMR, and third party systems and interfaces.

Device and System Connections

Smart Device Connectivity provides integration between Hillrom devices and software, Hospital Information Systems, and various third-party systems. The connectivity is established through the setup of inbound and outbound connections at any level of the hierarchy. Connections configured at an upper hierarchy level will be inherited downward until a connection of the same type has been configured at a lower hierarchy level.

The creation of inbound and outbound connections allows data to flow from the Hospital Information System (for example, EMR/ADT) into the Gateway, and for supported device data to flow into the Gateway to configured outbound connections.

The Gateway supports secure transmission methods such as Virtual Private Network (VPN), Certificates, Transport Layer Security (TSL), and Secure Socket Layer (SSL) HTTPS endpoints.

Supported Inbound Connection types

- EMR/ADT systems using Health Level 7 (HL7) and utilizing a VPN or TLS with Certificates connection for receiving patient information.
- IHE Alarms utilizing a VPN or TLS with certificates connection for receiving alert notifications from third-party alert managers.
- Welch Allyn Connex Spot Monitor and Connect Vitals Signs Monitor utilizing a VPN or TLS with certificates connection using HL7 for receiving patient vitals and custom data.
- Wired and wireless Hillrom beds and ISE mattresses to enable transmission of bed data/alerts/events and contact-free continuous monitoring device data/alerts received via the MQTT SSL connection to Smart Device Connectivity and ISE mattresses.

Supported Outbound Connection types

- ADT – For sending HL7 utilizing a VPN or TLS with Certificates connection to HIT (Health Information Technology) systems.
- Clinical Data Repository – Receives clinical data inputs. and via configured algorithms, generates risk scores. It outputs calculated risk scores and clinical data to clinical interfaces, and also instantiates notifications to be sent to clinical interfaces.
- Confirmed Data Interfaces – For Sending data received from patient vital monitoring devices CSM/CVSM in an HL7 format, to the configured endpoint utilizing a VPN or TLS with Certificates connection. Data sent out the confirmed data interface is required to be associated with both a positively identified patient and clinician.
- IHE Alarms – For sending Clinical Vector risk-based notifications and bed alerts (including Contact-Free Continuous Monitoring devices) as HL7 formatted PCD-04 alerts utilizing a VPN or TLS with Certificates connection. Note: PCD-04 alerts sent to Voalte® Nurse Call are a modified HL7 json-like format and do not use this interface. Alerts sent to Voalte® Nurse Call are over a federated message bus.
- On-Call Scheduler (Lightning Bolt) – For sending scheduling and assignments for clinicians.
- On-Call Scheduler (QGenda) – For sending scheduling and assignments for clinicians.
- Patient Risk Surveillance – For sending patient data for scoring and receiving risk scores, risk stratifications, risk context, notifications, and clinical tasks to be communicated to supported clinical interfaces.
- Reporting – Provides connectivity between the Gateway and the Reporting data warehouse over an Https TLS connection and configurable permissions options to authorize the extraction of data for reporting and long-term storage of reporting data.
- Terminology Provider – Provides a tool for terminology mapping of both local and standardized codes, and rolls trigger logic up to internal Hillrom codes via value sets build by a clinical content team.
- Unconfirmed Data – For sending data received from beds and vitals devices (CSM/CVSM) in an HL7 format to the configured endpoint, where the data being sent does not have both a positively identified patient and clinician.
- Voalte – Sends ADT/EMR and patient-related data.

Next up:

ADT (Admit/Discharge/Transfer) Integration (on page 11)

ADT (Admit/Discharge/Transfer) Integration

The Smart Device Connectivity can receive ADT messages from configured hospital HIT (Health Information Technology) inbound connections, and process the ADT messages to configured

outbound connections, such as Voalte. ADT information can include patient admits/discharge/transfers, records, and patient demographics. The supported format for ADT Interfaces is HL7.

EMR (Electronic Medical Record) Integration

Smart Device Connectivity can be configured to receive data from and send data to a hospital HIT (Health Information Technology) system. The data received from the HIT system, such as vitals, labs, medications, or diagnoses, can be provided to configured outbound interfaces including Patient Risk Surveillance, Voalte® Status Board, Voalte, or third-party HL7 interfaces.

Vitals monitoring data received by Smart Device Connectivity can be sent to the EMR. Vitals can be configured to send with a confirmed timestamp or captured timestamp. The use of the confirmed timestamp would allow vitals to be viewed in a single column within the EMR for charting ease.

Standard medical codes and terminology are used by the Smart Device Connectivity when processing received data or preparing data to send to outbound interfaces. Such supported standards include LOINC, SNOMED-CT, MDC, RxNorm, ICD-10, and CPT.

Lightning Bolt On-Call Scheduling Integration

Lightning Bolt is a third-party solution used by health care facilities to manage scheduling and assignments for clinicians. Smart Device Connectivity can be configured to access scheduling, assignment, and personnel information from the Lightning Bolt On-Call Scheduler via a REST API using standard messaging protocols.

QGenda On-Call Scheduling Integration

Qgenda (https://restapi.qgenda.com/) is a third-party solution used by health care facilities to manage scheduling and assignments for clinicians. Access to scheduling, assignment, and personnel information is available through a REST API.

Receiving Data from Vitals Devices

Smart Device Connectivity provides support for CSM/CVSM and bed-integrated contact-free continuous monitoring devices.

CSM/CVSM devices

1. Provide support for positively identifying a patient, using device barcode scanning of a patient's wrist band and querying the data received from the EMR for patient confirmation. Additional demographics can be returned to the device.
2. Support the hospital local Active Directory for role-based authentication on the device
3. Receive clinician ID, patient ID, patient vitals data and custom data from supported CSM and CVSM monitoring devices
4. Have the ability to accept custom data from vitals devices
5. Send vitals and custom data to the following:

a. EMR
b. Configured outbound connections, such as Patient Risk Surveillance, Voalte, Smart Device Connectivity Dashboard, and Status Board

Contact-free vitals monitoring via Centrella Smart+ Bed

1. Receives HR/RR data from contact-free vitals devices such as EarlySense
2. Receives Contact-Free alerts such as High/Low HR and RR
3. Sends contact-free vitals data (for example, HR/RR) to configured outbound connections such as Patient Risk Surveillance, Voalte, Smart Device Connectivity Dashboard and Status Board
4. Sends contact-free alerts (for example, High/Low HR/RR) to IHE Alert Managers and Voalte® Nurse Call.
5. Performs alert reporting activities

Smart Device Connectivity can operate as an alert reporter, sending alerts to IHE-compliant alert managers. Alerts currently supported include vitals and technical alerts from bed-integrated contact-free continuous vitals monitors and Patient Risk Surveillance risk-based notifications. The alerts are received by Smart Device Connectivity and sent to IHE-compatible alert managers as PCD-04 messages.

About Dashboard

The Dashboard enables caregivers to monitor a facility's patients within each configured nursing unit.

The Dashboard loads the default view when rendered for the first time. It can be configured to display a different view, according to user preferences. The default view cannot be edited.

Authorized Dashboard users have the ability to:

- Configure the facility that the Dashboard is servicing.
- Configure the nursing units within the facility that will be displayed on the Dashboard.
- Configure the columns that will be displayed, as well as the names of the columns.
- Configure the options for scrolling, row count, and paging.
- Configure patient name masking.
- Remove data after an elapsed time period.
- Change the column size and order.
- Save the configuration as a view (the Dashboard supports multiple saved views).
- Utilize the same view across several dashboards within the facility.
- Edit, delete, and rename views.

The Dashboard display shows each room location with an associated wired or wireless bed, along with the following information:

- The patient name (with masking options applied).
- Patient-related data received, such as heart rate and respiratory rate.
- Bed status data, such as rails up/down, patient detect, and so forth.
- Risk scores and stratifications.
- Contact-free continuous monitoring data and vitals alert status.

Dashboard users can access the dashboard for a period up to 90 days. Dashboard configuration users have one hour from login or last usage of configuration authorization access to make updates, after which they reverted to read-only mode and will be required to re-login to perform additional configuration changes.

Dashboard access is configured in the User Roles section of the Enterprise Configuration Portal. Users can be provided the following access rights:

- Read-only users can access, view, and configure only the local browser Dashboard view.
- Configuration Admin users can access, view, and configure local and global Dashboard views. Global Dashboard views can be seen by every Dashboard within the Facility.
- Administrators can access, view, and configure the Dashboard for the local browser view and can also globally publish their edited views to Dashboard instances within the same facility, displaying the same view.

The following elements and controls comprise the Dashboard:

- The main page, which displays a list of patient rooms with the associated patient, call, staff, and bed information, dynamically displayed in a grid.
- A message area in the header that displays code and emergency calls, depending on your settings.
- The Current View list (displayed by clicking
- The Settings menu (displayed by clicking ), which enables you to change the visible columns, messages, and other settings.

  You can view more information about the Dashboard, such as the current version, information for technical support, and global privacy notice, by clicking  and selecting About Dashboard.

About Reporting

The Reporting application within the Digital Health Platform (DHP) provides you with the ability to generate reports based on patient and device data. You can use this data to analyze your patient population and help identify areas for staff and facility improvements. Users can generate reports that cover patient deterioration, sepsis, and contact-free continuous monitoring. These reports can also assist with patient monitoring, caregiver protocol adherence, investigation into patient deterioration. Additionally, they can be used to gain insights into improving patient management and care.

Use the Reporting system to generate a standard set of reports. These reports can contain protected health information (PHI) and access to them is configured via the Enterprise Configuration Portal User Roles sections. Users who have permissions to generate reports containing PHI can view all available reports (both those that contain PHI and those that do not). Users without PHI permission will only be able to generate reports that do not contain PHI.

Standard reports that do contain PHI include:

- Early Warning Scores – Patient View

  Includes patient demographics, admission details, location history, patient scores, and clinical parameters used in score calculations, as well as a time line of events during the patient's stay and severe sepsis details, if the patient was identified as having severe sepsis.

- Early Warning Score Insights

  Provides insights which include patient deterioration metrics, score statistics and comparisons, and regression analysis between sepsis risk factors and average scores.

- Contact Free Continuous Monitoring – Patient View

  Includes patient demographics, admission details, location history, vitals averages (both daily and hourly) and standard deviations, observed vitals, and alerts.

- Contact Free Continuous Monitoring – Insights

  Includes devices metrics by device type for heart rate and respiratory rate, including the number of observations, minimum and maximum observation values, and the number of minutes between observed values.

- Contact Free Continuous Monitoring – Sensor Expiration and Alerts

  Includes sensors that expired between a selected start and end date, or sensors that expire within 30 days of the current date.

Standard reports that do not contain PHI, include:

- Sepsis Insights

  For tracking compliance with a facility's severe sepsis prevention protocol. This report includes patient demographics, patients treated with antibiotics, severity of sepsis, outcome (discharge or death), patients having pathogens, outcome trends (mortality vs. discharge), and the overall length of stay.

- Sepsis Bundle Compliance

For tracking compliance with a facility's severe sepsis prevention protocol. This report includes the percentage of sepsis bundle tasks completed, the percentage completed on time, 3-hour bundles completed on time, and 6-hour bundles completed on time. This data is delivered across locations within a customer's hierarchy over time periods. The average number of minutes from sepsis onset to 3 and 6-hour bundle completion times is also included.

The Reporting system uses defined criteria to determine Sepsis Onset Time, Septic Shock Onset Time, and Sepsis Bundle Compliance. Refer to the following sections for additional details:

- Sepsis Onset Time Criteria (on page 87)
- Septic Shock Onset Time Criteria (on page 89)
- Sepsis Bundle Compliance Criteria (on page 89)

Voalte Family Messaging

Voalte Family™ Messaging enables a patient's nurse or doctor to communicate with that patient's family members while the patient is under the provider's care.

Patients are enrolled in Voalte Family™ Messaging when they are admitted to a hospital with in-patient status or are admitted to the hospital for a surgical procedure (an OR visit).

Patient family members are divided into two categories: Primary Family Members and Secondary Family Members. Primary Family Members interact directly with the caregiver who is responsible for the patient. Primary Family Members are also the caregiver's contact person for the patient. Secondary Family Members can provide contact information and are managed by the Primary Family Member, and sometimes the caregiver.

When communicating with family members, clinical caregivers can send an update in the form of text or media. Updates are unidirectional, meaning that they are sent only by the caregiver to patient's family members. In addition to these updates, family members can see a set of fixed content associated with the applicable patient care organization, such as visiting hours, discharge instructions, and so forth.

Users with the applicable privileges can use the Voalte Family Administration portal within the Digital Health Platform to configure Voalte Family™ Messaging.

Virtual Care Solution

The Virtual Care Solution enables a patient's caregivers to request and conduct an audio and video virtual consultation with a remote provider (that is, a physician specialist) regarding a patient's condition, including access to contextual patient data.

Attention: Virtual Care Solution is not currently released. The **Virtual Care Solution** tile is displayed in the Digital Health Portal, but you will not be able to access it until the Virtual Care Solution is officially made available to customers.

Patients become eligible for virtual care consults when they are admitted to a hospital with in-patient status. Users include Virtual Care Requestors, Virtual Care Providers, and Virtual Care Configuration Administrators. Virtual Care Requestors consist of patient caregivers who request

a consult via the Virtual Care Solution. Virtual Care Providers consist of remote physicians and specialists who can accept virtual care requests via the Virtual Care Solution. Only Virtual Care Configuration Administrators can create, modify, or delete configurations within the Virtual Care Solution.

Virtual care consultations can be conducted via audio and/or video. Contextual information such as the request type and a summary of the request can be entered by the Requestor and viewed by the Provider, as well as available patient demographic and clinical data.

Bedside Association Enabled by Smart Device Connectivity

Smart Device Connectivity supports wireless bed association. Wireless bedside association is the process by which a caregiver assigns a wireless bed to a Gateway location so that data can flow from the bed through the Gateway, and out to interfaces, such as the electronic medical record (EMR) application, Dashboard, Voalte, Status Board, and Patient Risk Surveillance. Bedside Association is only supported for wireless beds. Wired beds are plugged into a connector, provided their location by the Navicare system, and do not require bedside association.

Note: Hillrom bed devices include beds and ISE mattresses.

To support bedside association, customers must provide the Gateway with a list of the EMR locations to which beds can be associated. The location list is loaded into the Digital Health Portal, either manually or by importing the list from a file. Once the location list is loaded, it can be sent to the wireless beds.

Only wireless beds connected to the Gateway receive the location list. The wireless beds use the location list to display location in a hierarchical form on the bed. The caregiver navigates through the menus and location list hierarchy and assigns the bed to a location. The bed to location association is provided back to the Gateway and saved in the system. This becomes the bridge between the bed and the Gateway for passing bed data to other clinical interfaces.

Only one wireless bed can occupy a location at any time. A wireless bed can be associated with an already-occupied location by another wireless bed when the wireless bed provides a force override indication. This will result in a disassociation of the previously located wireless bed. A wireless bed will be denied the location when a wired bed already occupies the location, regardless of whether the wireless bed indicated a forced override scenario.

For beds that support dual mode (wired and wireless), the bed can maintain a connection to the Gateway via both methods, but only to the same location. If a dual mode bed is connected and associated to a location in wireless mode, and gets plugged into a different location, the Gateway will disassociate the wireless connection and the bed will reassociate to the wired connection based on the Smart Device Connectivity location update response.

Wireless beds associated to locations receive information related to the admission, discharge, and transfer of patients in that location. This provides the caregiver with additional information to assist in ensuring that the patient in the bed is the actual patient the ADT system has admitted. Smart Device Connectivity supports three patient verification statuses: Unverified (default), Verified (the caregiver indicated that patient was correct), and Incorrect (the caregiver indicated that the patient was incorrect). The caregiver sets this patient status at the bedside

only on wireless devices. When a caregiver indicates that the patient is incorrect, data received from the location is not provided to external clinical interfaces and is used only for display on the Smart Device Connectivity Dashboard with an indication the patient is incorrect.

Scalable and Reliable Architecture

Smart Device Connectivity is a cloud-hosted solution providing 99.9% uptime and scaling on demand to meet the business needs. The multi-tenant architecture ensures customers are uniquely identified and have a dedicated repository.

Ability to manually re-play data messages to downstream systems

In the event a downstream system or device is offline or transmission of data is unsuccessful, the replay of data messages to downstream systems and devices will allow for the systems to remain in sync with Smart Device Connectivity.

System Messages to Site Contacts

Smart Device Connectivity sends system messages to configured site contacts for certain events, such as expiring certificates, data received in an unexpected format, failure to deliver messages to an outbound connection, and scheduled downtime.

How Does Smart Device Connectivity Work?

Overview

Smart Device Connectivity is a cloud-based solution that facilitates communication between supported hospital devices, hospital information systems, and supported clinical interfaces. Smart Device Connectivity is comprised of various software components, each performing a specific set of functions that allow Smart Device Connectivity to control access to, accept, store, process, and send data, as it is configured within the system.

Smart Device Connectivity is deployed in Azure Cloud, Microsoft's public cloud platform that provides services that include, but are not limited to, the following:

- Azure SQL Database
- Azure Cosmos DB
- Azure Key Vault
- Azure Event Hubs
- Azure IoT Hub
- Azure Synapse
- Microsoft Power BI
- Many other core Azure services

Smart Device Connectivity provides the ability to create connections to various endpoints, thereby leveraging Mirth NextGen Connect middleware for bi-directional communication between disparate systems that support various protocols (such as HTTPS, TCP, WTCP) and data formats (such as HL7 and JSON).

Data received by Smart Device Connectivity from devices and customer information systems is stored in a Clinical Data Repository and is provided to various interfaces for display, alert management, clinical decision support, and charting (in an EMR) so caregivers can stay informed of the status of each patient.

Click on one of the following topics for more information:

Production and Sandbox Environments (on page 19)

Smart Device Connectivity Regions Globally (on page)

Supported Languages (on page 19)

Available Features (on page 20)

Production and Sandbox Environments

The Digital Health Platform offers a Sandbox environment in addition to a Production environment. The Sandbox environment gives you the ability to interact with the system in a testing/verification capacity. When possible, you should use the Sandbox environment to integrate your own test environments with the Digital Heath Platform and to fully test and validate all components that you intend to use in Production, using software configurations that are as close to what will be used in Production as possible.

Supported Languages

The following languages (and applicable alphabetic characters) are supported for use in Bedside Association (that is, bed connectivity without the use of Voalte SmartSync™) through Smart Device Connectivity.

- English - Default
- Dutch - Netherlands, Belgium
- French - France, Belgium, Switzerland
- German - Germany, Austria, Belgium, Switzerland
- Italian - Italy, Switzerland
- Spanish - Spain
- Swedish - Sweden

Characters from the following sets are also supported:

- UTF-8
- ISO-8859-1
- ISO-8859-2
- ISO-8859-3
- ISO-8859-4
- ISO-8859-15
- Windows 1252

Available Features

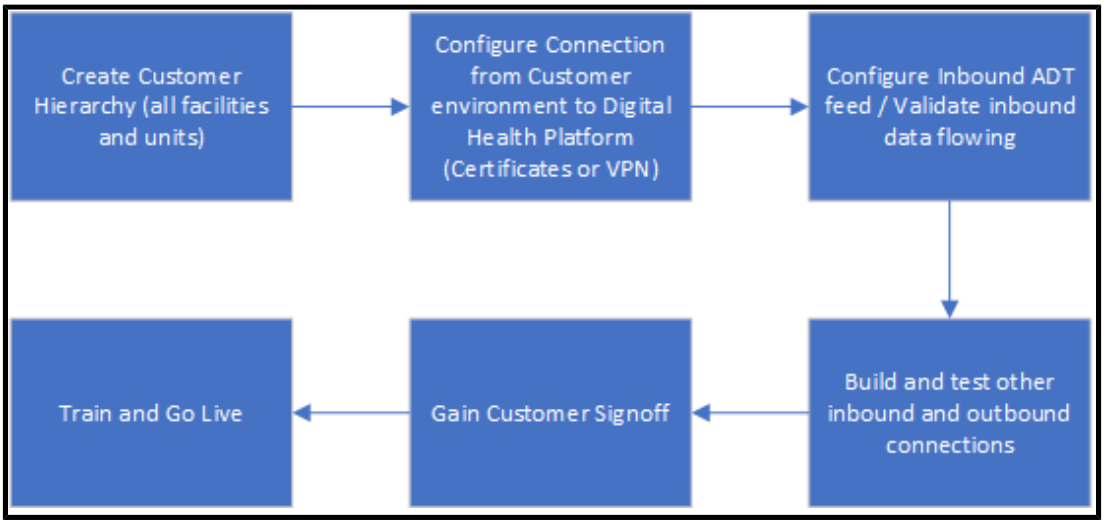
The following Smart Device Connectivity features are currently supported:

- ADT/EMR notifications via Voalte Mobile
- Wireless bed connectivity (with manual bedside association) including ISE mattresses
- Outbound bed data/alerts to EMR and supported clinical interfaces
- Outbound integrated EarlySense vitals data and alerts to EMR and supported clinical interfaces
- Connex(R) Spot Monitor (CSM) and Connex(R) Vital Signs Monitor (CVSM) connectivity
- Outbound CSM/CVSM vitals data to EMR and supported clinical interfaces
- Outbound de-identified data to authorized third party interfaces
- On-Call Scheduling Integration (Lightning Bolt/QGenda)
- Smart Device Connectivity Dashboard for display of bed and patient status
- Smart Device Connectivity Reporting for customer-facing display and analysis of patient data
- Patient Risk Surveillance integration for clinical decision support
- Virtual Care Solution for perform voice and video collaboration regarding patient condition

Onboarding Instructions

The term "onboarding" refers to the creation of a connection from a facility's electronic medical record (EMR) system to Hillrom Smart Device Connectivity. This process cannot be completed unless a virtual private network (VPN) connection has been configured or Certificates have been shared between Hillrom and the customer.

See Building a Customer Connection to Smart Device Connectivity (on page 21) for more details, or proceed to Steps to Complete Onboarding (on page 25).



Building a Customer Connection to Smart Device Connectivity

The preferred method of connecting customer environments to Smart Device Connectivity is via TLS Certificates, which can be generated by Hillrom or uploaded, if the customer prefers to provide them. VPN connectivity is another option to connect these environments.

Click one of the following topics for more information:

VPN Connectivity to the Enterprise Gateway (on page 21)

Using Certificates to Connect to the Digital Health Platform (on page 23)

VPN Connectivity to the Enterprise Gateway

Hillrom offers a variety of methods to communicate data into the Digital Health Platform. For customers who require a site-to-site VPN in order to transmit or receive data, the following process may be used to collect the appropriate information to create a successful VPN deployment.

1. Identify Network Address Translation (NAT) Pools

Inbound NAT (Customer → Hillrom)

Hillrom uses the **172.25.128.0/17** subnet to allocate NAT pools to customers. All customer connections into the Digital Health Platform (DHP) that come over a VPN will NAT to a portion of this IP address pool.

Note: In some cases, there may be configurations which do not support the Hillrom-provided NAT block. These must be reviewed on a case-by-case basis, so please reach out to your Hillrom representative to discuss.

In order to allocate an appropriately sized IP address block, Hillrom must know the number of server(s) that will VPN require connectivity into the Digital Health Platform. This may include

test or sandbox server(s). Typically, this does not include clinical devices (such as beds, vitals devices).

Once the number of servers is identified, Hillrom will allocate a subnet to be used for NAT during the site-to-site VPN communication.

Outbound NAT (Hillrom → Customer)

Hillrom uses the following RFC1918 address space for its Digital Health Platform gateway servers:

- 172.27.192.0/24
- 172.27.195.0/24
- 172.27.208.0/24
- 172.27.211.0/24

If any of these subnets overlap with existing customer subnets, Hillrom can provide NAT mapping in the VPN tunnel to prevent IP address space conflicts. The customer must provide appropriate IP address(es) for the NAT mapping. Typically, only a few addresses are required.

2. Collect Information

Hillrom and the customer must jointly complete the Site to Site VPN Request form. In the Tunnel Information section, Hillrom's preferred parameters are listed. However, Hillrom can support a variety of deployment parameters to ensure compatibility with a broad array of tunnels. The customer should select values which support its own internal security and configuration policies.

Note: The "preferred" parameters are the maximum hashing, encryption and Diffie-Hellman parameters that Hillrom can support in an IKEv1 tunnel. If different parameters are requested, an IKEv2 tunnel will be used.

3. Tunnel Deployment

Once all parameters and configurations have been agreed to, it is recommended that a working session of one hour be scheduled to deploy the VPN tunnel. During this time, the Hillrom engineer and the customer engineer can collaborate to deploy the tunnel in real-time, ensuring the best outcome with a minimum of wasted time.

It is recommended that a Pre-Shared Key be selected communicated in real-time during this meeting. Hillrom recommends a minimum of 24 randomly-generated letters and numbers.

On the Hillrom side, a configuration may look similar to the following:

```
object network springfield-hospital-vpn-subnet
 subnet 172.25.128.0 255.255.255.224
!
object network hillrom-prod-east-vm-subnet
 subnet 172.27.195.16 255.255.255.240
!
access-list cryptomap_springfield-hospital extended permit ip object
 hillrom-prod-east-vm-subnet object springfield-hospital-vpn-subnet
!
```

```
crypto map outside_map 2 match address cryptomap_springfield-hospital
crypto map outside_map 2 set pfs
crypto map outside_map 2 set peer 8.8.8.8
crypto map outside_map 2 set ikev1 transform-set ESP-AES-256-SHA
!
group-policy policy-8.8.8.8 internal
group-policy policy-8.8.8.8 attributes
 vpn-tunnel-protocol ikev1
!
tunnel-group 8.8.8.8 type ipsec-l2l
tunnel-group 8.8.8.8 general-attributes
 default-group-policy policy-8.8.8.8
tunnel-group 8.8.8.8 ipsec-attributes
 ikev1 pre-shared-key 9ShnUPML5TMDaMUv5rUCkj2Z24BHyNyf
```

Configurations will vary depending on the parameters selected.

4. Testing

VPN tunnels can be initiated from either end. Therefore, it is important to test connectivity that is initiated from both sides. In order to accomplish this, it is recommended that the engineers test (using ICMP, or TCP connections, or whatever method is deemed appropriate) from one side (e.g. a Hillrom server reaching a customer server), then reset the VPN tunnel and test the reverse direction (e.g. a customer server reaching a Hillrom server).

Using Certificates to Connect to the Digital Health Platform

The Enterprise Configuration Portal enables users to manage X.509 certificates that can be used to secure **Inbound** and **Outbound Connections**. The Enterprise Configuration portal also enables users to communicate how they intend to use certificates within their integration software, but is not responsible for performing that configuration.

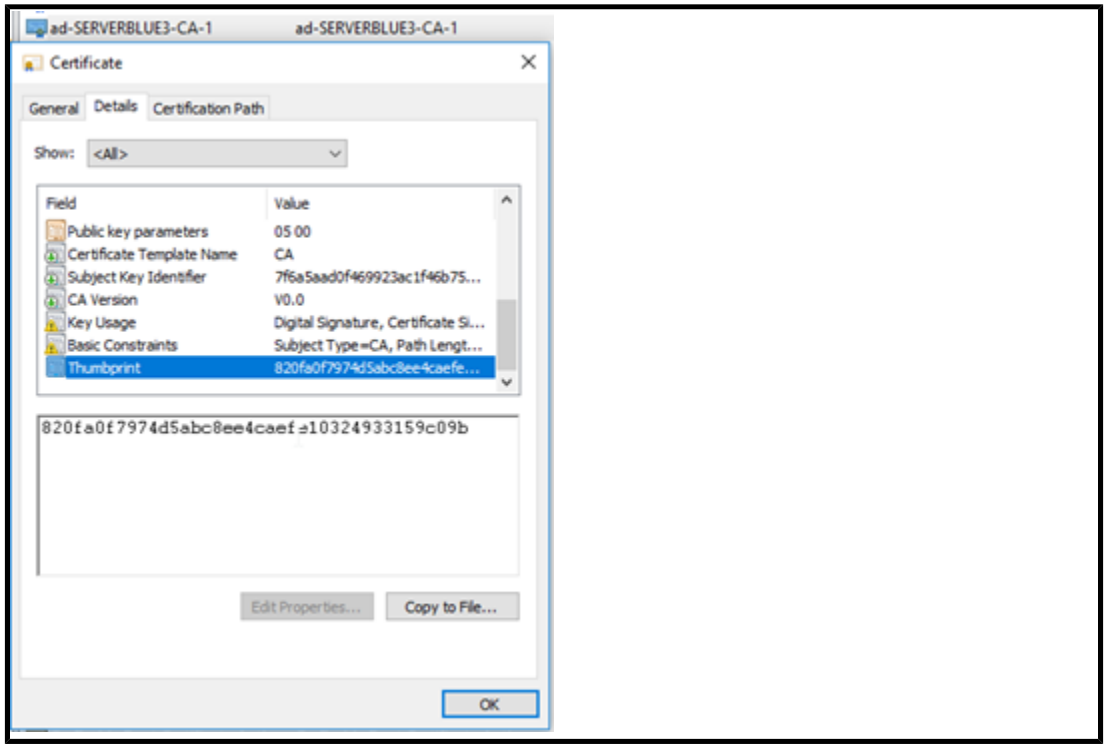
Note: All direction provided in this topic is related to a user configuring their software and is meant to be presented at a high level, as there is no way to cover each type of specific integration software that is in use by a given customer.

General

First, the user must have the **Certificate and Private Key** that was used to create the **Inbound** or **Outbound Connection** within the Enterprise Configuration Portal. The user must import that Certificate and Private Key into the **Key Store** that is used by their software in order to establish TLSv1.2 (or better) connections.

The most effective way to uniquely identify a certificate is by its SHA-1 thumbprint. The Enterprise Configuration Portal displays certificate thumbprints within Certificate Management, and when assigned to Inbound and Outbound connections.

Any certificate can be inspected to determine its thumbprint.



When a user configures their software, it must be configured to use the certificate that was assigned to the **Inbound** or **Outbound Connection** within the Enterprise Configuration Portal.

Inbound Connections using Certificates

The user's integration software is acting as a **Client** and the Digital Health Platform is acting as a **Server**. As such, the user must configure their software to present the appropriate client or client/server certificate when initiating a connection with the Digital Health Platform.

When configuring client connections, the user should enable the following configuration items to improve security:

1. Server Certificate Validation - The user's software will validate the chain of trust associated with the Server Certificate that is presented by Smart Device Connectivity. The public portion of Smart Device Connectivity's server certificate chain can be pulled down and configured as the Trusted Server Certificates associated with the client connection.
2. Hostname Verification - Validation fails if the hostname presented in the server certificate does not match the actual endpoint that the user's software is connecting to.

Outbound Connections using Certificates

The Digital Health Platform is acting as a **Client** and the user's software is acting as a **Server**. As such, the user must configure their software to present the appropriate server or client/server certificate when the Digital Health Platform initiates a connection with their software. Smart Device Connectivity performs Server Certificate and Hostname Verification.

Certificate Expiration

By design, certificates expire after a given amount of time. If a certificate expires while it is currently in use by an **Inbound or Outbound Connection**, that connection will no longer function. The Digital Health Platform will notify the applicable users when any given certificate is nearing expiration at the following intervals:

1. 30 days from the expiration date
2. 14 days from the expiration date
3. 7 days from the expiration date

Additionally, the Digital Health Platform will notify the applicable users when a certificate has expired.

When a certificate expires, action must be taken by the user to replace the certificate associated with the Inbound or Outbound Connection to avoid down time.

Steps to Complete Onboarding

The steps necessary to complete the onboarding of a customer are documented below. Some of these sections are covered in more detail in subsequent pages.

1. To enable secure communications between a customer's network and Hillrom Enterprise Gateway (EG), you must either configure a Virtual Private Network (VPN) (which requires direct collaboration between both customer and Hillrom network representatives) or you can use TLS certificates.
2. Customer to provide Hillrom with the following information:

- Endpoint host names and IP addresses for the following:
    - EMR Source
    - Voalte server(s)
    - Welch Allyn server(s)
- VPN Tunnel Parameters: IKE/ISAKMP
    - VPN Tunnel Encryption Method
    - VPN Tunnel Hash Algorithm
    - VPN Tunnel Diffie-Hellman Group
    - VPN Tunnel Lifetime
- VPN Tunnel Parameters: IPSEC
    - Peer IP Address
    - ESP Tunnel Mode
    - ESP Encryption
    - ESP Authentication
    - SA Lifetime (Time)
    - SA Lifetime (Traffic)

Hillrom will provide the customer with the following information:

- Hillrom Gateway Network IP address
- Hillrom Gateway Network Subnet

3. **Define the Clinical Mapping required for the customer's EMR.**

Note: Clinical Terminology Mapping facilitates interoperability by allowing customers to specify preferred terminology standards for data transactions. In turn, this allows Hillrom to send and receive data in our customer's native format for seamless consumption and processing by the EMR.

a. Work with the customer to define the type of clinical code mappings, such as LOINC, MDC, SNOMED.
b. Create the mappings in the terminology provider.

4. **Define the customer's hierarchy structure at each level (as listed below)—including the time zone, address, and admin contact information for each level**.

a. Enterprise
b. Region
c. Organization
d. Facility
e. Unit

Note: You cannot configure a separate time zone for Units. Units will automatically use the same time zone as the parent Facility.

5. **Perform Unit Location Mapping** - Performing unit location mapping provides a bridge between the customer's ADT/EMR locations and the Smart Device Connectivity location.
6. **Inbound Connections** - Gather the required information for the connection being configured. Connection configurations require a combination of the following types of information:

    • Connection type (for example, inbound/outbound)
    • Communication type (for example, HL7)
    • Security method (for example, VPN)
    • URL
    • Username
    • Password
    • Port number (Range 10000 - 65535)
    • Define inbound connections, protocols, ports:

        a. **ADT/EMR** - Set up an ADT/EMR connection type, such as HL7.
        b. **EMR (Non-ADT)** - Set up an EMR connection type, such as HL7.
        c. **Hillrom Bed Device** - Only required if connecting bed devices via MQTT. Hillrom bed devices include beds and ISE mattresses.
        d. **IHE Alarms** - supports only one.
        e. **Welch Allyn Vitals Devices** - Set up as many as are needed to support the IP addresses from which vitals devices will be sending data.

7. **Outbound Connections** - Gather the required information for the connection being configured. Connection configurations require a combination of the following types of information:

- Connection type (for example, inbound/outbound)
- Communication type (for example, HL7)
- Security method (for example, VPN)
- Hostnames/IP addresses for connections
- URL
- Username
- Password
- Port number (Range 1000 - 65535)
- Vitals data outbound
    - Unit of measure for temperature, height, weight
    - Standardized code mapping
- Data retention period
- ADT/EMR data path - confirmed or unconfirmed
- Define outbound connections, protocols, ports, as follows:

    a. **ADT**
    b. **CDR** - For storing data in the Clinical Data Repository (CDR); required for all
    c. **Confirmed Data**
    d. **IHE Alarms** - For sending alerts to an interface
    e. **On-Call Scheduler (Lightning Bolt)** - For sending scheduling, assignment, and personnel information
    f. **On-Call Scheduler (QGenda)** - For sending scheduling, assignment, and personnel information
    g. **Patient Risk Surveillance (optional)** - For sending vitals to the Patient Risk Surveillance product for patient scoring
    h. **Reporting**
    i. **Terminology Provider**
    j. **Unconfirmed Data**
    k. **Voalte** - For sending ADT to Voalte
    l.

8. **Create Credentials** - Required only for a device connection when an inbound connection type of Hillrom Bed Device is set up. The credentials provide the means necessary to authenticate connecting bed devices. Credentials must be assigned to the correct

Facility and provided to the Facility to configure the devices, such as the BMS proxy on-premises.

9. **Define Customer Roles** - Gather the customers Active Directory (AD) domain and authentication type information in order to map the roles in the AD to Smart Device Connectivity supported roles.
10. **Configure NaviCare BMS proxy to communicate with Smart Device Connectivity** - The technicians will use the hierarchy Facility ID and credentials created for the Facility to configure the BMS proxy. This information can be gathered from the ECP.
11. **Configure Rabbit MQ federation between the NaviCare on-premises Rabbit MQ broker and the Smart Device Connectivity Rabbit MQ broker** - The federation is handled through a set of scripts that Voalte must execute to federate to Smart Device Connectivity in order to receive messages from the Rabbit MQ bus
12. **Validation** - Perform the validation of data to and from the customer's ADT/EMR and connected devices. Ensure that data is sent to the configured outbound interfaces. All validations are based on the configured inbound/outbound interfaces and can vary between customers.

 Note: Voalte validation versions 3.7.10 over Rabbit.

Configuration paths to test include, but are not limited to the following:

- **ADT Events** - ADT events can include, but are not limited to, Admitting, Transfers, Moves, and Discharges.
    - ADT received and sent to NaviCare
    - ADT received and sent to Voalte
- **EMR Data** - EMR data can include, but is not limited to, heart rate, respiratory rate, and custom data.
    - EMR charted vitals and custom data:
        - Received and sent to Voalte® Status Board.
        - Received and sent to Voalte
- **CSM/CVSM** - Vitals data can include, but is not limited to, heart rate, respiratory rate, and custom data.

    - **Patient Query** - Results provided to the vitals monitor from the Enterprise Gateway.
    - **Vitals monitor data**
        - Sent to the customer's EMR (confirmed)
        - Sent to the customer's EMR (unconfirmed)
        - Sent to the Voalte® Status Board
        - Sent to Patient Risk Surveillance
    - **Vitals monitor alerts** - Received and stored in CDR only; nothing is sent outbound.
- **Contact-free Monitoring (for example, EarlySense integrated with Centrella bed)** - Vitals data can include, but is not limited to, heart rate, respiratory rate, and alerts (high heart rate, low respiratory rate, and so forth).
    - **Vitals data (HR/RR)**
        - Sent to Voalte
        - Sent to Voalte® Status Board
    - **Vitals alerts** - Received and stored in CDR only; nothing is sent outbound.
- **Patient Risk Surveillance** - Risk scores and risk-based notifications can include, but are not limited to, medium/high MEWS and high SIRS.
    - **Risk scores**
        - Sent to Voalte® Status Board
        - Sent to Voalte
- **Risk-based notifications**
    - Sent as an alert to Voalte® Status Board
- **Bed data (for example, Centrella wired bed)** - Bed data can include, but is not limited to: Brakes on, rails status, and HOB angle.
    - Centrella bed data is received into the Bed Device Gateway.
    - **Note**: No validation is required for the Smart Device Connectivity 1.2.400 release.

Troubleshooting Guide

Select one of the options below for more detailed information.

Basic Troubleshooting (on page 31)

Troubleshooting Technical Issues (on page 33)

Basic Troubleshooting

If a Smart Device Connectivity connection issue arises that is not covered in the troubleshooting guide below, please contact Hillrom's technical support team at 1-800-445-3720 for assistance. For more technical issues, please see Troubleshooting Technical Issues (on page 33).

I am having an issue with the:

ADT Connection

1. Check that the hostname for the outbound HL7 connection is correct:
    a. For Production: **gateway.dhp.hillrom.com**
    b. For Sandbox: **sbx-gw.zen.hillrom.com**
2. Check that the port is correct and unchanged.

    Tip: This information should be available within your Customer copy of the Digital Health Platform Pre-Deployment Workbook. If, after consulting the pre-deployment workbook, you are still unsure of the proper port, please contact Hillrom Technical Support at 1-800-445-3720.

3. Check that there are no issues with the VPN connection to Smart Device Connectivity.
4. Confirm that the HL7 messages being sent conform to the Interface Specification Guide found in Hillrom Smart Device Connectivity HL7 Interface Specification.

    Remember: Smart Device Connectivity only processes messages for known and configured units.

5. Confirm the Unit ID of any units that may have issues, before calling Technical Support.
6. If you are still having issues with the ADT connection after following the steps above, please contact Hillrom Technical Support at 1-800-445-3720.

Vitals Connection

1. Check that patient admissions and transfers have processed successfully before attempting to send and receive vitals information.
2. Check that the vitals devices have been configured to send to the appropriate hostname.
3. Confirm that the vitals devices have been configured to send to the correct port.

   Tip: This information should be available within your Customer copy of the Digital Health Platform Pre-Deployment Workbook. If, after consulting the pre-deployment workbook, you are still unsure of the proper port, please contact Hillrom Technical Support at 1-800-445-3720.

4. Check that there are no issues with the VPN connection to Smart Device Connectivity.

   Remember: Smart Device Connectivity only processes messages for known and configured units.

5. Confirm the Unit ID of any units that may have issues before calling Technical Support.
6. If you are still having issues with the vitals connection after following the steps above, please contact Hillrom Technical Support at 1-800-445-3720.

Alarm Manager

1. Check that patient admissions and transfers have processed successfully before attempting to send and receive vitals information.
2. Check that the Alarm Manager is configured to send to the appropriate hostname.
3. Confirm that the Alarm Manager is configured to send to the correct port.

   Tip: This information should be available within your Customer copy of the Digital Health Platform Pre-Deployment Workbook. If, after consulting the pre-deployment workbook, you are still unsure of the proper port, please contact Hillrom Technical Support at 1-800-445-3720.

4. Check that there are no issues with the VPN connection to Smart Device Connectivity.
5. Confirm that the HL7 messages being sent conform to the Interface Specification Guide found in LAB01457 Digital Health Gateway HL7 Interface Specification.

   Remember: Smart Device Connectivity only processes messages for known and configured units.

6. Confirm the Unit ID of any units that may have issues before calling Technical Support.
7. If you are still having issues with the Alarm Manager after following the steps above, please contact Hillrom Technical Support at 1-800-445-3720.

Troubleshooting Technical Issues

I am having trouble with:

ADT/EMR

Patient data from vitals monitors is not properly being processed by the system.

- Failed communication will generate a visual indication on CSM/CVSM, indicating that data was not successfully transferred and providing suggested troubleshooting actions.
- Patient vitals and risk scores may still be available if manually charted in EMR.
- Caregivers will still be able to assess a patient's condition based on other EMR data, and respond per the facility's protocol.

If you are still having issues with patient data from vitals monitors not being processed by the system, please call Hillrom Technical Support at 1-800-445-3720.

Data from the hospital's ADT system that is not being processed by the system.

- CSM/CVSM will indicate failed patient queries and provide suggested troubleshooting actions.
- Status Board will indicate if an ADT admit/discharge for a patient wasn't received.
- Voalte mobile will indicate if an ADT admit/discharge for a patient wasn't received.
- Alternative interfaces and the charge nurse may be available for tracking admits, discharges, and transfers.
- Caregivers will still be able to assess a patient's condition based on vital signs and EMR data, and respond per the facility's protocol.

If you are still having issues with data from the hospital's ADT system not being processed by the system, please call Hillrom Technical Support at 1-800-445-3720.

A system fault due to loss of power.

- CSM/CVSM will indicate loss of network connectivity and provide suggested troubleshooting actions.
- Status Board will indicate a power outage via lack of data displayed for a patient and/or bed.
- Voalte mobile will indicate a power outage via lack of data displayed for a patient and/or bed.
- Hospitals should use backup generators to restore power in the event of an outage.

Once power is restored, contact Hillrom Technical Support at 1-800-445-3720 in the event of any further issues.

Patient data is corrupted.

- CSM/CVSM will indicate when data transmission to EMR fails and provide suggested troubleshooting actions.
- Assess patient's condition based on vital signs and EMR data, and respond per the facility's protocol.
- If you are still having issues with corrupted patient data, contact Hillrom Technical Support at 1-800-445-3720.

Association of patient data to the wrong tenant.

The system deployment is certified prior to clinical use. If there have been changes to the system and you require assistance, contact Hillrom Technical Support at 1-800-445-3720.

- Only patient data from vital signs monitor will be impacted; notifications based on orders/lab values/meds will not be affected.
- Erroneous data may be detected by comparing displayed data on vitals monitor to data in hospital ADT and EMR systems.

System failure due to software update.

If you experience a system failure after a planned Hillrom software upgrade, please contact Hillrom Technical Support at 1-800-445-3720.

- Single, clustered servers will be taken offline for software updates without affecting other servers.
- The system deployment is certified prior to clinical use.
- System may be rolled back to a prior software release in the event of a system failure.
- Software updates are validated at the system level prior to deployment.

System failure due to network outage.

Suggested workarounds:

- Status Board will indicate a network outage via lack of data displayed for a patient and/or bed.
- Voalte mobile will indicate a network outage via lack of data displayed for a patient and/or bed.
- CSM/CVSM will indicate loss of network connectivity and provide suggested troubleshooting actions.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

System failure due to configuration change during system operation.

The system deployment is recertified after configuration changes. If there have been changes to the system and you require assistance, contact Hillrom Technical Support at 1-800-445-3720.

System failure due to incompatible software versions.

Confirm software version is listed in the system compatibility matrix.

- Software updates are validated at the system level prior to deployment.
- Failed communication will generate a visual indication on CSM/CVSM, indicating that data was not successfully transferred.
- Status Board will indicate failed communication via lack of data displayed for a patient and/or bed.
- Voalte mobile will indicate failed communication via lack of data displayed for a patient and/or bed.
- System may be rolled back to a prior software release in the event of a system failure.
- Patient vitals and risk scores will still be available if manually charted in EMR.

If you are still experiencing system failures and you require assistance, contact Hillrom Technical Support at 1-800-445-3720.

ADT/EMR data is not being properly processed by the system.

Troubleshoot the ADT connection.

- Caregivers will still be able to assess a patient's condition based on vital signs data and respond per facility protocol.
- Caregivers will still have access to ADT to view patient admissions/discharges/transfers, and EMR to view charted data.

If the ADT/EMR data are still not being properly processed by the system, contact Hillrom Technical Support at 1-800-445-3720.

ADT/EMR-based notifications not transmitted to Voalte mobile devices.

Troubleshoot ADT connections.

- Caregivers will still be able to assess a patient's condition based on vital signs data and respond per facility protocol.
- Caregivers will still have access to ADT to view patient admissions/discharges/transfers, and EMR to view charted data.

If ADT or EMR-based notifications are still not being transmitted to Voalte mobile devices, contact Hillrom Technical Support at 1-800-445-3720.

Bed/integrated contact-free continuous monitoring device

Bed/integrated contact-free continuous monitoring because it is unavailable.

Troubleshoot contact free continuous monitoring vitals displaying on Status Board or Voalte.

- Status Board and Voalte mobile will visually indicate when bed/integrated contact-free continuous monitoring data is unavailable.
- Patient weight, vitals, and bed status will still be available if manually charted in the EMR.
- Caregivers may still assess a patient's condition based on vital signs and EMR data, and respond per facility protocol.

If you are still having trouble with contact free continuous monitoring, please contact Hillrom Technical Support at 1-800-445-3720.

Incorrect/incomplete mapping of clinical data elements to codes (value sets) has occurred.

If you feel you have an incorrect or incomplete clinical mapping of clinical data elements, contact Hillrom Technical Support at 1-800-445-3720.

- The system is not intended to diagnose patients or replace clinical judgment.

Status Board is unable to display patient/bed data.

Refer to Navicare Status Board troubleshooting.

- Status Board will visually indicate when data is not available.
- Patient vitals/risk score data will still be displayed on supported vital signs monitors, the EMR, and other supported clinical interfaces, such as Voalte mobile.

Troubleshoot contact-free continuous monitoring vitals displaying on Status Board or Voalte.

If you are still unable to display patient/bed data on Status Board, contact Hillrom Technical Support at 1-800-445-3720.

Voalte mobile is unable to display patient/bed data.

Suggested workarounds:Refer to the Voalte troubleshooting guide.

- Voalte mobile will visually indicate when data is not available.
- Patient vitals/risk score data will still be displayed on supported vital signs monitors, the EMR, and other supported clinical interfaces, such as Status Board.

Troubleshoot the contact-free continuous monitoring vitals displaying on Status Board or Voalte.

If you are still unable to display patient/bed data on Voalte, contact Hillrom Technical Support at 1-800-445-3720.

Notifications were not sent to alert the communication manager

Suggested workarounds:

- Vital signs, risk scores, risk stratifications, and risk context will still be viewable on supported clinical interfaces.
- Caregivers will still be able to assess a patient's condition based on vital signs/ risk score data, and respond per facility protocol.
- Caregivers will still have access to the EMR to view charted data.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Caregivers

Caregiver alert fatigue.

- Vitals alert thresholds may be configured per patient to minimize false alerts.
- CSM/CVSM vitals alerts may be filtered and/or delayed, as necessary.
- Escalation procedures configured in alert communication manager will ensure ignored notifications are sent to multiple back-up caregivers.
- Alert manager settings can be configured to minimize vitals alert fatigue, as desired.

Contact assigned Clinical Specialist for assistance in configuring risk-based notification settings, as necessary.

Notification not created or processed correctly

Suggested workarounds:

- Caregivers will still be able to assess a patient's condition based on bed, vital signs, and EMR data, and respond per facility protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Risk monitoring does not respond to resume command, which prevents system notifications

Suggested workarounds:

- Caregivers will still be able to assess a patient's condition based on bed, vital signs, and EMR data, and respond per facility protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Patient Data

Miscalculation of incoming data causes erroneous risk monitoring, clinical decision support, and data transmission to clinical interfaces

Suggested workarounds:

- Erroneous data may be detected by comparing displayed data on connected clinical interfaces with data on supported vital signs monitors (e.g., vital signs, risk scores), beds (e.g., patient weight, vitals, and bed safety status), and in the EMR.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Risk-Based Notifications

No display of bed/integrated contact-free continuous monitoring data on supported clinical interfaces due to a late ADT admission.

1. Admit patient via the ADT system.
2. Troubleshoot the ADT connection.
    - Late ADT admission is indicated on Status Board as a row without any patient identifier in the default "Patient" column, but with the patient icon colored green in the default "Rails" column of the Bed Status indicators.
    - Late ADT admission is indicated on Voalte mobile as a patient not being available to a given room, and no patient data being available.
    - Supported wireless beds will indicate that no patient is assigned to bed (patient-centric)(guidance provided in Help Center).
    - Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.

If the ADT is still not properly processed by the system, contact Hillrom Technical Support at 1-800-445-3720.

Incorrect display of bed/integrated contact-free continuous monitoring device data on supported clinical interfaces because the previous patient is still assigned to the bed.

1. Admit patient via ADT system.
2. Troubleshoot the ADT connection.

    - Smart Device Connectivity Dashboard will display the previous patient assigned to the bed in that room.
    - Status Board will display the previous patient assigned to the bed in that room.
    - Voalte mobile will display the previous patient assigned to the bed in that room.
    - Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.
    - Incorrect data display for a patient should prompt caregiver to contact appropriate hospital personnel to rectify the admit record.

If the ADT is still not properly processed by the system, contact Hillrom Technical Support at 1-800-445-3720.

Incorrect display of bed/integrated contact-free continuous monitoring data on supported clinical interfaces because another person has gotten into a patient's bed.

Remove other person from bed and ensure correct patient is returned to bed.

- Bed exit alarm will trigger, when set, due to a patient bed exit or sufficient weight change.
- The bed displays a message that only the patient should be placed in the bed, after a patient reset is performed on the bed.

No display of bed/integrated contact-free continuous monitoring device data on supported clinical interfaces because another person has gotten into bed with the patient.

Remove the other person from the bed.

- Bed exit alarm will trigger, when set, due to a sufficient weight change.
- The bed displays a message that only the patient should be placed in the bed, after a patient reset is performed on the bed.
- EarlySense will generate an "Unstable Signal" alert if EarlySense vitals cannot be measured/interpreted.

Notifications are not being sent to Alarm Manager.

1. Troubleshoot Alarm Manager connection.

    - Vital signs, risk scores, risk stratifications, and risk context will still be viewable on supported clinical interfaces.
    - Caregivers will still be able to assess a patient's condition based on vital signs/risk score data and respond per facility protocol.
    - Caregivers will still have access to the EMR to view charted data.

2. If notifications are still not being sent to Alarm Manager, contact Hillrom Technical Support at 1-800-445-3720.

Misconfiguration of measurement units and/or time zone causes erroneous data transmission to the EMR.

Contact Hillrom Technical Support at 1-800-445-3720.

- Data sent to EMR must still be confirmed by a caregiver before being charted in EMR.
- Erroneous data may be detected by comparing data in EMR to data displayed on connected clinical interfaces.

Measurement units of incoming data result in erroneous data display and/or ADT/EMR-based notifications on clinical interfaces.

Contact Hillrom Technical Support at 1-800-445-3720.

- The system is not intended to diagnose patients or replace clinical judgment

CFCM vitals from the bed displaying on Status Board or Voalte.

For Status Board:

If the columns are visible:

1. Scroll to the right (if available, they may be off screen).

    a. Click Configure and Select Display to customize this view.

2. Click Configure and select Columns.

    a. Scroll to the bottom of the list and select the columns to be added.
    b. If there are no options (for example, MEWS, SIRS, HR, RR), Hillrom Technical Support can provide further assistance.

For Voalte:

Hillrom Technical Support will need to assist with troubleshooting. Before calling, work with hospital IT to ensure that messages provided by the EMR system are successfully

flowing into the Gateway. If there is no backlog/queue of messages, contact Hillrom Technical support at 1-800-445-3720.

Bed data and alerts no associated to a location.

1. For wired beds, plug the bed into the wall connector (ASBC) to associate it to the correct location. For wireless beds, use the bed user interface to assign the bed to the correct location.

    - Local alerting from bed and bed-integrated vitals (for example, EarlySense) will still be active.
    - Patient vitals data should still be displayed on supported beds, vital signs monitors, and in the EMR.
    - Data from sources other than beds would still be available for display on supported clinical interfaces.

2. In the event of any issues, contact Hillrom Technical support at 1-800-445-3720.

Bed data and alerts associated to incorrect location

1. For wired beds, plug the bed into the wall connector (ASBC) to associate it to the correct location. For wireless beds, use the bed user interface to assign the bed to the correct location.

    - Local alerting from bed and bed-integrated vitals (for example, EarlySense) will still be active.
    - Supported clinical interfaces would display bed location associations so that any beds associated to an incorrect location can be identified and correctly associated.
    - Incorrect location display for a bed should prompt caregiver to override its assigned location or correct the patient admit record.

2. In the event of any issues, contact Hillrom Technical Support at 1-800-445-3720.

Bed data not available for charting in EMR because of late ADT admission

1. Admit patient via ADT system.
2. Troubleshoot ADT connection.

- Late ADT admission is indicated on Voalte® Status Board and Smart Device Connectivity Dashboard as a row without any patient identifier in the default "Patient" column, but with the patient icon colored green in the default "Rails" column of the Bed Status indicators.
- Late ADT admission is indicated on Voalte mobile as a patient not being available to a given room, and no patient data being available.
- Supported wireless beds will indicate that no patient is assigned to the bed.
- Bed data may be manually charted in the EMR.
- Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.

3. If the ADT is still not properly processed by the system, contact Hillrom Technical Support at 1-800-445-3720.

Corrective Action: Admit patient via the ADT system.

Bed data not charted (for new patient) in EMR because previous patient is still assigned to bed.

1. Correct patient admit record via the ADT system.
2. Troubleshoot ADT connection.

    - Voalte® Status Board will display previous patient assigned to the bed in that room
    - Voalte mobile will display previous patient assigned to the bed in that room
    - Smart Device Connectivity Dashboard will display previous patient assigned to the bed in that room
    - Bed data may be manually charted in the EMR
    - Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed
    - Incorrect data display for a patient should prompt caregiver to contact appropriate hospital personnel to rectify the admit record

3. If the ADT is still not properly processed by the system, contact Hillrom Technical Support at 1-800-445-3720.

Incorrect bed data charted (for previous patient) in EMR because previous patient is still assigned to bed

1. Correct patient admit record via ADT system.
2. Troubleshoot ADT connection.

    - Smart Device Connectivity Dashboard will display previous patient assigned to the bed in that room.
    - Voalte® Status Board will display previous patient assigned to the bed in that room.
    - Voalte mobile will display previous patient assigned to the bed in that room.
    - Incorrect data display for a patient should prompt caregiver to contact appropriate hospital personnel to rectify the admit record.

3. If the ADT is still not properly processed by the system, contact Hillrom Technical Support at 1-800-445-3720.

Incorrect bed data charted in EMR because another person gets in bed.

1. Remove other person from bed and ensure correct patient is returned to bed.

    - Bed exit alarm will trigger, when set, due to a patient bed exit or sufficient weight change.
    - The bed displays a message that only the patient should be placed in the bed after a patient reset is performed on the bed.
    - Local device alert settings may trigger an alert when a different person is in the bed and prompt caregiver attention.
    - Vitals displayed on Voalte® Status Board, Smart Device Connectivity Dashboard, and/or Voalte mobile for person in bed may be different enough from those of assigned patient to draw caregiver attention.

Bed data not charted in EMR because another person gets in bed with patient

1. Remove other person from the bed.

    - Voalte® Status Board, Smart Device Connectivity Dashboard, and Voalte mobile will visually indicate when patient data is not available, which may prompt caregiver to check on the patient.
    - Bed exit alarm will trigger, when set, due to a sufficient weight change.

- The bed displays a message that only the patient should be placed in the bed after a patient reset is performed on the bed.
- EarlySense will generate an "Unstable Signal" alert if EarlySense vitals cannot be measured/interpreted.

Caregivers not aware of stale or outdated data

1. Contact assigned Clinical Specialist for assistance in configuring stale data settings as necessary.

    - Stale vitals data may be removed from display on NaviCare Status Board and Smart Device Connectivity as configured.
    - Voalte mobile devices display a visual indication of staleness and time stamp indicating when the data was received.
    - Alerts and notifications will still be sent to communicate patients' current clinical status based on the data available.
    - Time stamped patient vitals data should still be displayed on supported vital signs monitors and in the EMR.

Smart Device Connectivity Dashboard unable to access or display patient/bed data

1. Troubleshoot data displaying on Dashboard.

    - Smart Device Connectivity Dashboard will display an indication of connection status so that clinicians are aware of when it has become disconnected and is not receiving updates.
    - Patient vitals data should still be displayed on supported beds, vital signs monitors, and in the EMR.
    - Patient data will still be available for display on other supported clinical interfaces.

2. If you are still unable to display patient/bed data on the Dashboard, contact Hillrom Technical Support at 1-800-445-3720.

Unable to Access Smart Device Connectivity Dashboard

1. Troubleshoot Dashboard access.

    - Patient vitals data should still be displayed on supported beds, vital signs monitors, and in the EMR.
    - Patient data will still be available for display on other supported clinical interfaces.

2. If you are still unable to access the Dashboard, contact Hillrom Technical Support at 1-800-445-3720.

Reporting feature unable to access or display patient/bed data

1. Contact Hillrom Technical support at 1-800-445-3720.

    - Patient vitals data should still be displayed in the EMR.

Unable to access the Reporting feature

1. Troubleshoot Reporting access.

    - Patient vitals data should still be displayed in the EMR.

2. If you are still unable to access Reporting, contact Hillrom Technical Support at 1-800-445-3720.

Additional Resources

Release Notes

Hillrom Smart Device Connectivity 1.2.300 Product Release Notes

Patent Information

The Hillrom companies are leading worldwide manufacturers and providers of medical technologies for healthcare providers, caregivers and patients around the world. We bring passion, dedication, and innovation that matter and make a difference, in the lives of those we touch.

The Hillrom companies are the proprietors of European, US, and other patents and pending patent applications. For a complete list of Hillrom patents, visit http://www.hill-rom.com/patents.

HIPAA Compliance Statement

Smart Device Connectivity conforms to all physical, network, and process security measures set forth in the Health Insurance Portability and Accountability Act (HIPAA) standards. The system includes secure procedures to authenticate users, terminate sessions after inactivity, and encrypt all sensitive data—both in transit and at rest—to prevent unauthorized access to data. The system also supports the export of patient data upon authorized request to provide patients access to their health data. The Smart Device Connectivity solution conforms to HIPAA standards listed in HIPAA 164.312 Technical Safeguards.

Open Source Attributions

This product may contain free open source software (FOSS). Hillrom, Inc. uses and supports the use of FOSS. We believe that FOSS makes our products more robust and secure, and gives us—and our customers—greater flexibility.

To learn more about FOSS that may be used in this product, please visit our FOSS website at https://hillrom.com/opensource. Where required, a copy of FOSS source code is available on our FOSS website.

Related topics:

Hazard Statements (on page 46)

Hazard Statements

Please review the following Smart Device Connectivity hazard statements.

CAUTION: Ensure with hospital administration that the Smart Device Connectivity system and all integrated components have been certified by Hillrom prior to room occupation by patients.

CAUTION: The system must be recertified and validated after configuration changes.

CAUTION: It is important to associate any wirelessly connected beds used for patient care to a valid facility location at the bedside to ensure that data from the bed is provided to the electronic medical record (EMR) and supported clinical interfaces.

CAUTION: If a wirelessly connected bed has been associated with an incorrect location, use the bedside interface to associate it with a valid location. If another wirelessly connected bed has been incorrectly assigned to that location, the incorrect location can be overridden via the bedside interface.

CAUTION: The system will remove a wirelessly connected bed from an assigned location if the bed is connected via a wired connection and the assigned wired and wireless locations are different, to defer to the greater reliability of the wired connection being accurate.

CAUTION: If any Smart Device Connectivity connected devices lose connections to the Gateway, follow your hospital's manual processes to complete all patient and caregiver workflows. For example:

- In the event of a system failure to transmit vitals monitor, bed, and/or risk score data to the EMR, this data should be manually charted in the EMR.
- In the event of a system failure to process or transmit ADT messages or notifications, patient admissions/discharges/ transfers should be viewed within the ADT system, via alternative interfaces, or obtained from the charge nurse.
- In the event of a system failure to process or transmit EMR-based notifications, a patient's condition should be assessed based on vital signs and EMR data.
- In the event of loss of power, a backup generator should be used to maintain connected device operations and network connectivity.
- Incorrect association of patient data is mitigated by the segregation of customer data into distinct databases using a unique identifier for each customer. This risk is also addressed via UX design, usability testing, and other risk control measures on supported vital signs monitors. If incorrect association of patient data were to occur, only patient data from the vital signs monitor would be impacted; notifications based on orders, lab values, medications, and other EMR data *not* from the vital signs monitor *would not be* impacted. Erroneous data could be detected by comparing displayed data on the vitals monitor to data in the ADT and EMR systems.
- The Connex® Spot Monitor and Connex® Vital Signs Monitor will indicate loss of network connectivity and indicate failed patient queries, along with suggested troubleshooting actions.
- System deployment will be certified prior to clinical use and after any configuration changes.
- System software updates are validated by Hillrom at the system level prior to clinical deployment. Software updates should not disrupt clinical operation of the system, as single clustered servers can be taken offline for software updates without affecting online servers.
- In the event of a system failure, the system can be rolled back to a prior software release to maintain operations while troubleshooting occurs.

CAUTION: Smart Device Connectivity relies on complete and accurate data being entered into all integrated systems and devices. It is very important that complete and accurate patient, facility, and location information is entered at the device level for all component systems to ensure the correct data is associated with the correct patients, facilities, and locations.

CAUTION: Hospital network connectivity is necessary for bed data and patient vitals and risk score data to be transmitted to the hospital EMR system and supported clinical interfaces and for hospital ADT- and EMR-based notifications to be sent to caregiver Voalte mobile devices. An indication of loss of network connectivity on Hillrom vitals monitors and caregivers' Voalte mobile devices mitigates the risk of a hospital network outage and is consistent with industry standards.

Standard hospital procedures should be followed to prevent possible delays in treatment. A patient must be manually checked and vitals signs monitor data confirmed by a caregiver at the patient's bedside before treatment decisions are made.

CAUTION: In the event the Dashboard loses connection with the Smart Device Connectivity system, it will display a visual indication of connectivity loss so it is clear that the displayed data may not be the latest available.

CAUTION: In the event of an error in the process of the client browser rendering the Smart Device Connectivity Dashboard, the Dashboard will display an error indication so it is clear that the Dashboard is non-functional.

CAUTION: The Dashboard can be configured to remove stale/outdated patient-related data after a configured amount of time has elapsed. It is important to define appropriate "remove after" times if facility policy dictates that caregivers should not act on stale/outdated data. Otherwise, the most recent data will be displayed until patient discharge or transfer.

CAUTION: The Smart Device Connectivity Dashboard requires the CFCM non-vitals alert column to be displayed when the "Bed HR/RR On" column is selected to ensure users are aware that if a CFCM non-vitals alert is generated the CFCM patient monitoring activities may not occur even though the "Bed HR/RR On" column displays with a green check mark (On).

CAUTION: All instances of the Dashboard will restart in staggered fashion upon a saved edit of a dynamic data column (such as those displaying patient physiologic data) or communication disruption in order to distribute the processing required to load each instance. Each connected Dashboard instance will be randomly assigned a recovery wait time between 2 and 7 minutes, with the remaining wait time displayed counting down in seconds to zero.

CAUTION: Data changes or notifications indicating high risk to a patient must be manually checked and confirmed by a caregiver at the patient's bedside before treatment decisions are made.

CAUTION: When the Smart Device Connectivity system is not operational—either due to system maintenance, servicing, or an unanticipated failure—staff must follow standard hospital notifications and patient care procedures. The system must be recertified and validated after configuration changes. For more information, contact Hillrom Technical Services at (800) 445-3720.

CAUTION: All caregivers should be trained on a hospital's proper notification workflow and be aware of possible consequences to the patient if notification procedures are not followed.

CAUTION: The hospital should perform periodic testing of the Smart Device Connectivity system to ensure the system is working properly, including after any Smart Device Connectivity system upgrades or component device upgrades, connections, disconnections, or resets. The system must be recertified and validated after configuration changes. For more information, contact Hillrom Technical Services at (800) 445-3720.

CAUTION: Hillrom recommends that multiple levels of escalation should be in place for Voalte notification calls.

CAUTION: Clinical decision support systems such as Smart Device Connectivity are not meant to take the place of provider or caregiver interactions and knowledge or judgement. This system is

meant to augment their clinical knowledge and assist in more timely and patient-specific care. Caregivers should not view this system as a replacement for their current clinical practice.

Related topics:

Hillrom Smart Device Connectivity 1.2.300 Product Release Notes

Contact Information

If additional assistance is needed, please contact Hillrom's Technical Services at (800) 445-3720 or email hrccwssupport@hillrom.com.

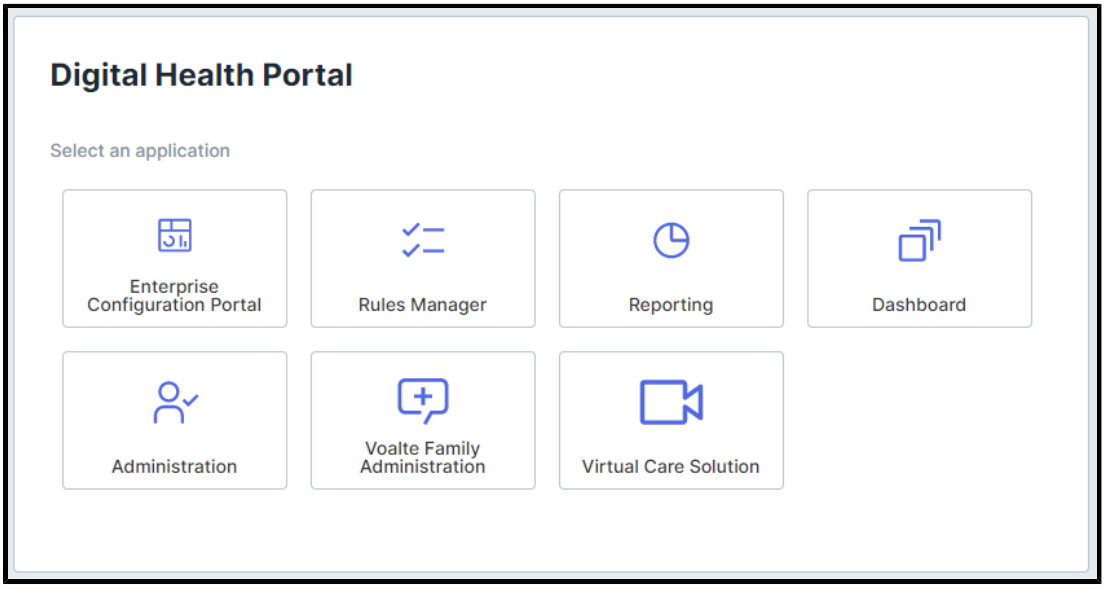
Customer Digital Health Portal User Guide

The sections below outline the various applications and tools available to users of the Digital Health Platform:

The Digital Health Portal

The Digital Health Portal page enables you to launch all Digital Health Platform applications that you are authorized to access. If you are not authorized to access an application, you cannot launch it from this page.

If an application requires an entity context, you can only launch that application within the context of an entity that you have access to. Additionally, you must select a specific entity (or bring it into context) when launching the application.



Environment

This is the Digital Health Platform environment you are interacting with. The Digital Health Platform offers a Sandbox environment, in addition to a Production environment. The Sandbox environment offers you the ability to interact with the system in a testing/verification capacity. When possible, you should use the

Sandbox environment to integrate your own test environments with the Digital Heath Platform and to fully test and validate all components that you intend to use in Production, using software configurations that are as close to what will be used in Production as possible.

Authenticated User's Name

The Digital Health Portal displays the name of the current authenticated user in the top right corner. Clicking the user's name displays a menu a Logout option. Clicking Logout closes all launched applications, logs you out of the Digital Health Portal, and redirects you to the Digital Health Portal login page.

Enterprise Configuration Portal

The Digital Health Portal displays this icon, which enables you to launch the Enterprise Configuration Portal application. The Enterprise Configuration Portal does not require an entity context and enables you to perform the following:

- Entity Management - Manage Enterprise hierarchies
- Role Management - Manage Single Sign On (SSO) access to the Digital Health Platform
- Connection Management - Manage Inbound Connections (the data flowing from an external software system into the Digital Health Platform) and Outbound Connections (the data flowing from the Digital Health Platform to an external software system)
- Troubleshooting - View transactions (messages and connection logs) associated with Inbound and Outbound connections in order to validate integrations with the Digital Health Platform
- Credential Management - Manage credentials used to authenticate components within the Digital Health Platform
- Certificate Management - Manage certificates used to secure Inbound and Outbound Connections

Rules Manager

Click the Rules Manager button to access the Rules Manager application. This application must be launched within the context of an **Enterprise** that has a **Patient Risk Surveillance outbound connection**. When you click Rules Manager, you will be presented with a list of Enterprises that have this type of connection. Select one of these Enterprises to launch the Rules Manager application.

Reporting

Click the Reporting button to launch the Reporting application. The Reporting application requires an Entity context and can be launched within the context of any given entity.

Dashboard

Click Dashboard to launch the Dashboard application. The Dashboard application does not require an entity context.

Administration

Click Administration to launch the Administration application. The Administration application does not require an entity context.

You can use the Administration application to:

- Export a given patient's data from the Digital Health Platform
- Delete a given patient's data from the Digital Health Platform
- Export a given entity's contacts from the Digital Health Platform

Voalte Family Administration

The Digital Health Portal displays an icon that enables administrative users to launch the Voalte Family Administration application. The Ohana Administration application requires an Entity context.

Use the Voalte Family Administration application to:

- Add locations to your healthcare facility.
- Configure settings for Voalte Family™ Messaging.

Virtual Care Solution

Click the Virtual Care Solution tile to launch the Virtual Care Solution. You can use this application to perform voice and video collaboration between Virtual Care Requestors and Remote Providers.

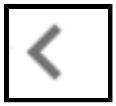
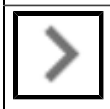
Quick Guide to Icon Information

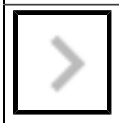
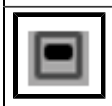
Icon	Description	Function
	Information	Hover to view tool tip for the related object.
	Go Back	Navigates backward to the previous view.
	Home	Navigates to the Home page.
	Expand/Collapse	Expands or collapses the Entity Selection menu.
	Application Navigation	Click to display a menu that enables navigation to other Digital Health Platform applications.
	Edit	Click to edit the object to which the icon is associated.
	Manage Connections	Click to manage the connections for a given entity.

	Role Mapping	Click to manage the roles for a given entity.
	Manage Rules	Click to open Manage Rules for Patient Risk Surveillance. **Note:** Must have a Clinical Decision Support (CDS) outbound Connection setup to display. CDS is used for Patient Risk Surveillance Integration.
	WA Vitals Device Deployment Configured	Indicates that a Welch Allyn (WA) Vitals Device inbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have a WA Vitals Device inbound deployment configured to display.
	Hillrom Bed Device Deployment Configured	Indicates that a Hillrom Bed Device inbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have a Hillrom Bed Device inbound deployment configured to display.
	CDS Deployment Configured	Indicates that a CDS outbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have a CDS outbound deployment configured to display.
	ADT Outbound Deployment Configured	Indicates that an ADT outbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have an ADT outbound deployment configured to display.
	EMR/ADT Deployment Configured	Indicates that an EMR/ADT inbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have an EMR/ADT inbound deployment configured to display.
	Terminology Provider Deployment Configured	Indicates that a Terminology Provider outbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have a Terminology Provider outbound deployment configured to display.
	Alarm Deployment Configured	Indicates that an Alarm outbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have an Alarm outbound deployment configured to display.
	CDR Deployment Configured	Indicates that a CDR outbound deployment has been configured at a CHILD level of the hierarchy.

		Note: Must have a CDR outbound deployment configured to display.
	Voalte Deployment Configured	Indicates that a Voalte outbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have a Voalte outbound deployment configured to display.
	Unconfirmed Data Deployment Configured	Indicates that an Unconfirmed Data outbound deployment has been configured at a CHILD level of the hierarchy. **Note:** Must have a CDR outbound deployment and a WA Vitals Device inbound deployment and/or Hillrom Bed Device inbound deployment configured to display.
	Selected Object	Indicates a check box was selected, such as in the role manager group entity mapping.
	Download	Indicates the content can be downloaded.
	Upload	Indicates the content can be uploaded.
	Export	Typically associated with data that can be downloaded or exported from the Digital Health Platform.
	Status icon - Filtered	Transaction message was filtered from processing. This can occur when a transaction has been filtered. Filtered messages occur from the Source Transformer and are the children messages that are NOT required to fulfill the parent transaction, such as a care team not being identified in an ADT transaction.
	Save	Saves information entered for a unit location mapping.
	Refresh	Refresh the transaction page
	Clear selection	Clear selection from a drop-down list.
	Show	Show hidden text, such as a credential secret (aka password)
	Hide	Hide selected text, such as a credential secret (aka password)
	Admit, Discharge, Transfer (ADT) Outbound Deployment Configured	Indicates that an ADT outbound deployment has been configured at the current level of the hierarchy. **Note:** Must have an ADT outbound deployment configured to display.

	Alarm Deployment Configured	Indicates that an Alarm outbound deployment has been configured at the current level of the hierarchy. **Note:** Must have an Alarm outbound deployment configured to display.
	Patient Risk Surveillance Integration (CDR) Deployment Configured	Indicates that a CDR outbound deployment has been configured at the current level of the hierarchy. **Note:** Must have a CDR outbound deployment configured to display.
	Clinical Decision Support (CDS) Deployment Configured	Indicates that a CDS outbound deployment has been configured at the current level of the hierarchy. **Note:** Must have a CDS outbound deployment configured to display.
	Terminology Provider Deployment Configured	Indicates that a Terminology Provider outbound deployment has been configured at the current level of the hierarchy. **Note:** Must have a Terminology Provider outbound deployment configured to display.
	Electronic Medical Record (EMR)/ADT Deployment Configured	Indicates that an EMR/ADT inbound deployment has been configured at the current level of the hierarchy. **Note:** Must have an EMR/ADT inbound deployment configured to display.
	Hillrom Bed Device Deployment Configured	Indicates that a Hillrom Bed Device inbound deployment has been configured at the current level of the hierarchy. **Note:** Must have a Hillrom Bed Device inbound deployment configured to display.
	Voalte Deployment Configured	Indicates that a Voalte outbound deployment has been configured at the current level of the hierarchy. **Note:** Must have a Voalte outbound deployment configured to display.
	Welch Allyn (WA) Vitals Device Deployment Configured	Indicates that a WA Vitals Device inbound deployment has been configured at the current level of the hierarchy. **Note:** Must have a WA Vitals Device inbound deployment configured to display.
	Unconfirmed Data Deployment Configured	Indicates that an Unconfirmed Data outbound deployment has been configured at the current level of the hierarchy. **Note:** Must have a CDR outbound deployment and a WA Vitals Device inbound deployment and/or Hillrom Bed Device inbound deployment configured to display.

	Reporting Connection Configured	Indicates that a Reporting connection has been configured at the current level of the hierarchy. **Note:** Must have a CDR outbound deployment configured to display.
	Status icon – No warning	Multiple meanings: 1. Connection screen – Indicates the connection inbound / outbound dependencies are satisfied. 2. Transactions screen - A given transaction has been sent.
	Cancel	Cancel adding a unit-level mapping.
	Delete	Click to delete a given object.
	Status icon - Error	Transaction message failed to process.
	Status icon – Warnings	Multiple meanings: 1. Connection screen – Indicates for the connection there may be a dependency on another connection. 2. Transactions screen: a. Queued - Queued to send, but has not been sent yet. b. Received - Received, but has not yet been processed by the system.
	Virtual Private Network (VPN)	Indicates the connection is configured over a VPN connection.
	First page - Enabled	Click to navigate to the first page of results
	Previous page - Enabled	Click to navigate to the previous page of results
	Next page - Enabled	Click to navigate to the next page of results
	Last page - Enabled	Click to navigate to the last page of results

	First page - Disabled	Indicates that paging to the first page is not allowed for the result, likely due to being on the first page
	Previous page - Disabled	Indicates that paging to previous page is not allowed for the result, likely due to being on the first page
	Next page - Disabled	Indicates that paging to next page is not allowed for the result, likely due to being on the last page
	Last page - Disabled	Indicates that paging to last page is not allowed for the result, likely due to being on the last page
	Date selector - Previous month	Click to move back one month
	Current date selector	Click to select current date for the calendar
	Date selector - Next month	Click to move forward one month
	Certificate Status	Associated with Inbound or Outbound connections where the Security Type is Certificate.
	Child Connection	Indicates that the connection is a child connection, or one that is being inherited from a parent entity.
	Connection Summary	Connection summary icon indicator.
	Inbound Connection	Inbound connection indicator.
	Outbound Connection	Outbound connection indicator
	Parent hierarchy level is not included in the group access	Indicates that a parent hierarchy level will not be included in the group entity hierarchy assignment.
	Status icon – Unknown	Transaction message status is unknown.
	Unit Location Mapping	Unit location mapping icon indicator.

	Transactions	Transactions icon indicator
	Replay	Replay a transaction
	Scrolling list	Indicates there is a list that can be scrolled
	Dropdown list	Indicates there is a dropdown list option
	Credentials Management	Credentials Management indicator

Logging into the Digital Health Portal

The Digital Health Platform enables you to authenticate using your organization's Single Sign On (SSO) provider.

Sign In

Clicking the Sign In button launches a Microsoft Single Sign On (SSO) pop-up window that enables you to authenticate with the Digital Health Platform using your organization's SSO provider. This will function *only* if your SSO provider has been configured within the Enterprise Configuration Portal.

Environment

This is the Digital Health Platform environment that you are interacting with. The Digital Health Platform offers a Sandbox in addition to a Production environment. The Sandbox environment offers you the ability to interact with the system in a testing/verification capacity. When possible, you should use the Sandbox environment to integrate your own test environments with the Digital Health Platform to fully test and validate all components that you intend to use in Production, using software configurations that are as close to what you will use in Production as possible.

GTIN

The current Global Trade Identification Number associated with the software.

Version

The current version associated with the software.

Entity Selection

An **Entity** is the Digital Health Platform representation of a physical location or a logical grouping of physical locations within a user's organizational infrastructure.

The following **Entity Levels** can be established within the Digital Health Platform:

Enterprise

The top-level entity that represents a user's organizational infrastructure.

Region

Entities that represent regional delineations within an **Enterprise**.

Organization

Entities that represent organizational delineations within a **Region**.

Facility

Entities that represent physical locations in which patients receive care within an **Organization**.

Unit

Entities that represent a physical location in which patients receive targeted care within a **Facility**.

To execute tasks and perform workflows associated with a given entity, you must first bring an entity into context by selecting the entity that you want to interact with. The Enterprise Configuration Portal offers a navigational menu that enables you to select an entity to bring into context.

Enterprise Selection

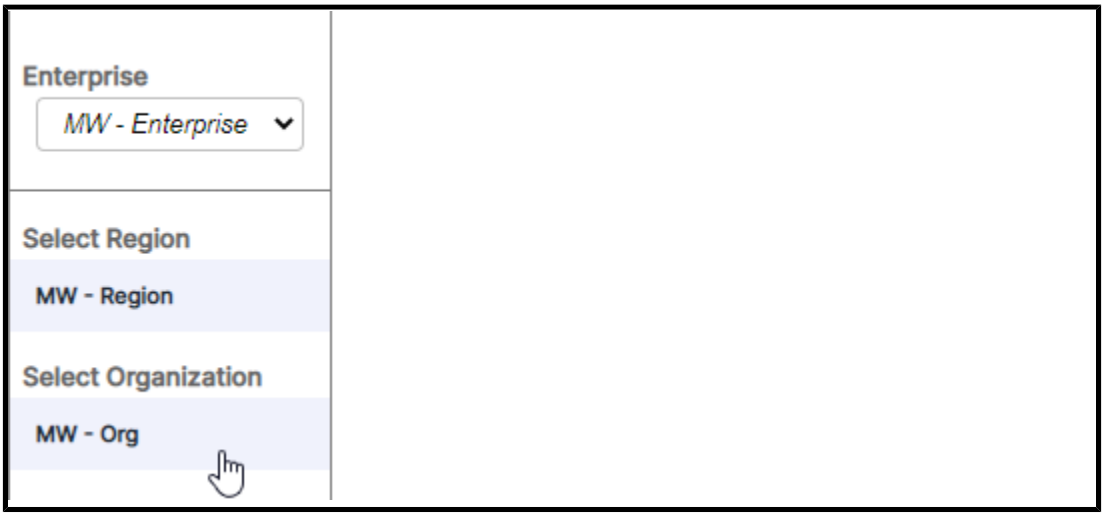
If you have access to more than one Enterprise, you must first select the Enterprise that you want to bring into context to interact with. If you only have access to a single Enterprise, that Enterprise will be in context automatically.

Region Selection

Once you bring an Enterprise into context, a list of Regions associated with that Enterprise are displayed within the navigational menu. Only Regions that you have access to are displayed. You can select the Region that you want to bring into context to interact with.

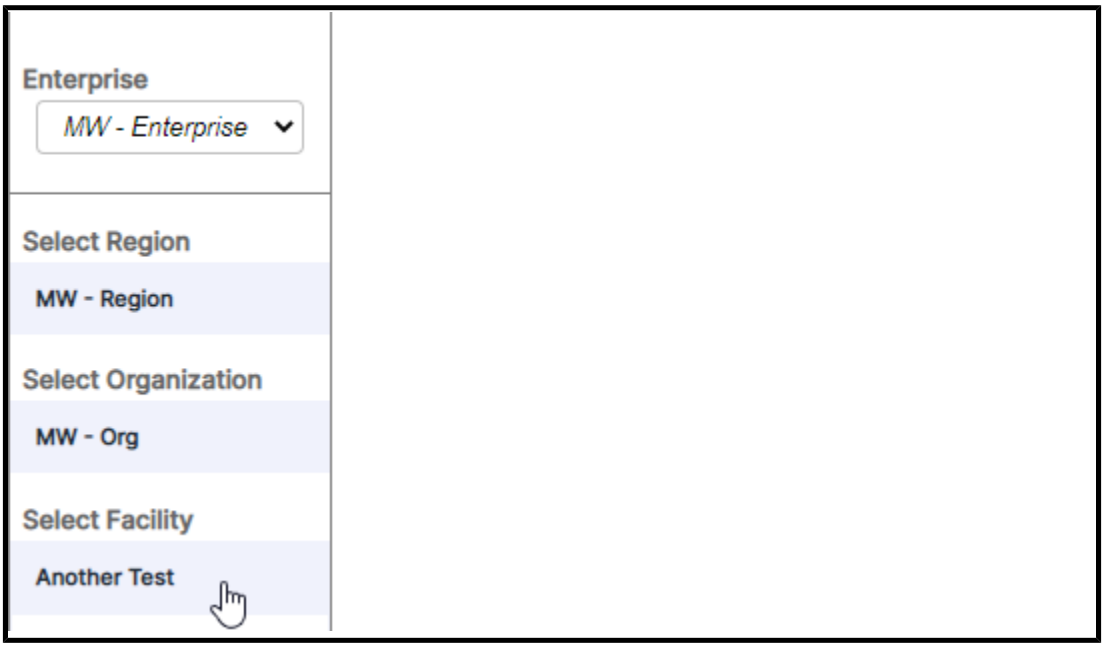
Organization Selection

Once you bring a Region into context, a list of Organizations associated with that Region is displayed within the navigational menu. Only Organizations that you have access to are displayed. You can select the Organization that you want to bring into context to interact with.



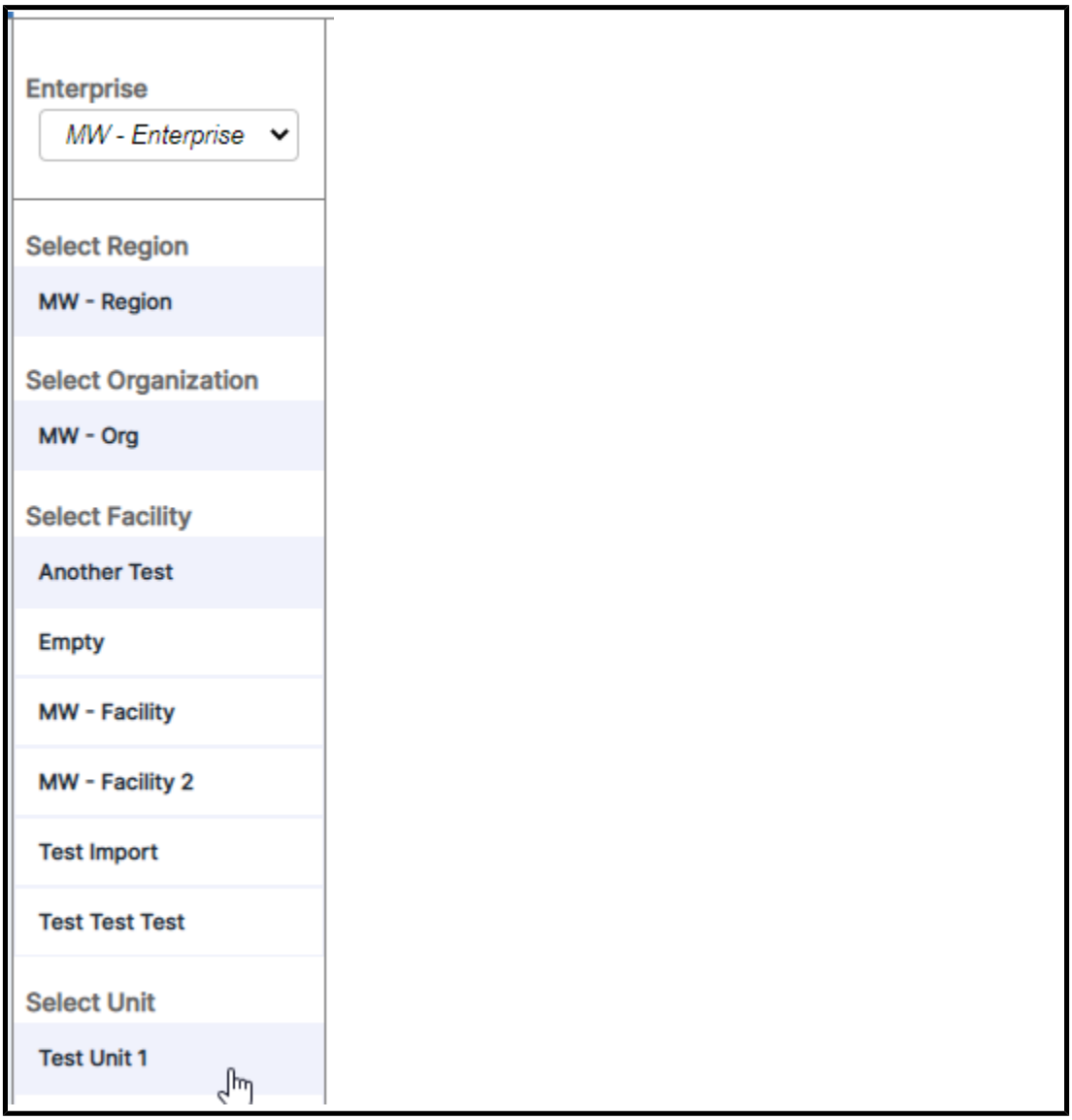
Facility Selection

Once you bring an Organization into context, a list of Facilities associated with that Organization is displayed within the navigational menu. Only Facilities that you have access to are displayed. You can then select a Facility to bring into context and interact with.



Unit Selection

After you bring a Facility into context, a list of Units associated with that Facility is displayed within the navigational menu. Only Units that you have access to are displayed. You can then select a Unit to bring into context and interact with.

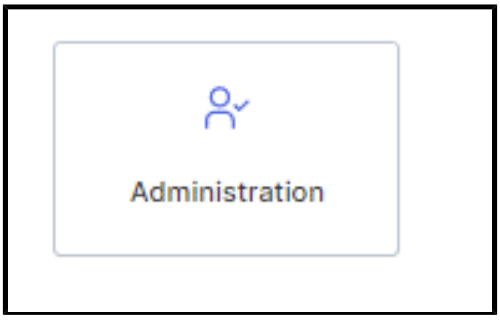


Breadcrumb Navigation

As you navigate through entity selection, a breadcrumb menu is displayed. This menu enables you to navigate to a selected entity's parent entities. Clicking on an entity link within the breadcrumb menu brings that entity into context.

About Administration

Users who have access to the Administration portal will see the Administration tile within the Digital Health Platform Portal when they log in.



The Administration portal within the Digital Health Platform enables you to:

1. Export every **Entity Contact** within the Digital Health Platform.
2. Export every **Entity Contact** associated with a given **Entity Context** within the Digital Health Platform
3. Search for patients within a **Facility Entity Context**
4. Export patient data from a **Facility Entity Context**
5. Delete patient data from a **Facility Entity Context**

About Dashboard

The Dashboard enables caregivers to monitor a facility's patients within each configured nursing unit.

The Dashboard loads the default view when rendered for the first time. It can be configured to display a different view, according to user preferences. The default view cannot be edited.

Authorized Dashboard users have the ability to:

- Configure the facility that the Dashboard is servicing.
- Configure the nursing units within the facility that will be displayed on the Dashboard.
- Configure the columns that will be displayed, as well as the names of the columns.
- Configure the options for scrolling, row count, and paging.
- Configure patient name masking.
- Remove data after an elapsed time period.
- Change the column size and order.
- Save the configuration as a view (the Dashboard supports multiple saved views).

- Utilize the same view across several dashboards within the facility.
- Edit, delete, and rename views.

The Dashboard display shows each room location with an associated wired or wireless bed, along with the following information:

- The patient name (with masking options applied).
- Patient-related data received, such as heart rate and respiratory rate.
- Bed status data, such as rails up/down, patient detect, and so forth.
- Risk scores and stratifications.
- Contact-free continuous monitoring data and vitals alert status.

Dashboard users can access the dashboard for a period up to 90 days. Dashboard configuration users have one hour from login or last usage of configuration authorization access to make updates, after which they reverted to read-only mode and will be required to re-login to perform additional configuration changes.

Dashboard access is configured in the User Roles section of the Enterprise Configuration Portal. Users can be provided the following access rights:

- Read-only users can access, view, and configure only the local browser Dashboard view.
- Configuration Admin users can access, view, and configure local and global Dashboard views. Global Dashboard views can be seen by every Dashboard within the Facility.
- Administrators can access, view, and configure the Dashboard for the local browser view and can also globally publish their edited views to Dashboard instances within the same facility, displaying the same view.

The following elements and controls comprise the Dashboard:

- The main page, which displays a list of patient rooms with the associated patient, call, staff, and bed information, dynamically displayed in a grid.
- A message area in the header that displays code and emergency calls, depending on your settings.
- The Current View list (displayed by clicking
- The Settings menu (displayed by clicking ), which enables you to change the visible columns, messages, and other settings.

  You can view more information about the Dashboard, such as the current version, information for technical support, and global privacy notice, by clicking  and selecting About Dashboard.

Dashboard Supported Data

Dashboard Data

The Dashboard displays the following types of supported data.

- Data from supported Hillrom beds (both wired and wireless) that are associated with a location. Supported bed data includes, but is not limited to:
    - Incontinence Detection
    - Rail Positioning
    - Bed Low
    - Brake Status
    - Patient detected
    - Bed Service Required
    - Bed Connection Status
    - Head of Bed (HOB) Angle
    - Bed Patient Position Monitoring (Bed Exit Mode and Status combinations)
- Location-related data for a Facility's active bed locations, enabling users to view locations that their electronic medical record (EMR) application indicates as available for patient admissions. Location-related data includes:
    - Facility
    - Unit
    - Room
    - Bed
- Patient Name with several display and masking options. These options include:
    - HIPAA encoded (for example, Ja..eD for Jane Doe). This is the default option.
    - First Name Last Initial (Jane D)
    - Last Name First Initial (Doe J)
    - Last Name Only (Doe)
    - Last Name, First Name (Doe, Jane)
    - Full Name (Jane Michelle Doe)
- Contact-Free Continuous Monitoring active alert statuses including, but not limited to:
    - Low/high heart rate
    - Low/high respiratory rate

- Non-Vitals alarms, including, but not limited to:
  - Unstable signal
  - Vitals no motion
  - Unit malfunction
  - Bed sensor problem
  - Expired sensor
- Alert statuses that indicate an active alarm (active, alerting)
- Bed HR/RR On (not an alert)

Note: Active alert statuses are displayed until the alarm status is cleared or until the device is disconnected from Smart Device Connectivity.

- Patient physiological data, including, but not limited to:
  - Incontinence detection (available only when you are using the Hillrom WatchCare® Incontinence Management System
  - Heart rate (from the EMR, vitals monitors, and contact-free devices)
  - Respiratory rate (from the EMR, vitals monitors, and contact-free devices)
  - Temperature (from EMR, vitals monitors)
  - Blood pressure (from EMR, vitals monitors)
  - SpO2 (from EMR, vitals monitors)
  - Pain Score on a scale of 1-10 (from EMR, vitals monitors)
  - Weight (from EMR, vitals monitor, and beds)
- Risks (from the EMR) and Early Warning Risk Scores (from EMR or Patient Risk Surveillance) including, but not limited to:
  - MEWS and stratification
  - SIRS and stratification
  - Falls risk
  - Pulmonary risk
  - Skin risk

The Dashboard displays patient deterioration risk stratifications, when available, that are color-coded (red for high risk, yellow for medium risk, and white for low risk).

Logging into the Dashboard

To open the Dashboard, log into the Digital Health Portal and click the Dashboard tile on the homepage. This opens the Dashboard application and prompts you to log in.

Note: The Dashboard may produce an "invalid username or password" failure when an authenticated user not having been assigned permissions attempts to access the Dashboard.

The actions you can take while logged into the Dashboard application will depend on which permissions are assigned to you. There are three Dashboard permissions:

ViewDashboard

This role enables you to view the Dashboard in read-only mode. All configuration options are unavailable to you, including the Dynamic Column Settings option in the Settings menu and the Rename, Delete, Save, and Save As options on the Current View dialog.

A note is displayed on the Settings menu and on Current View when you are logged in as a read-only user, letting you know that you are in read-only login mode. If you hover over the Dynamic Column Settings menu option, or the controls on Current View, a tooltip is also displayed that says, Authorized login required.

EditDashboardConfig

This role enables you to configure saved views. When you are assigned EditDashboardConfig permissions, the Rename, Delete, Save, and Save As options on the Current View dialog are enabled. You cannot configure dynamic columns, however. When you are logged into Dashboard with EditDashboardConfig permissions, a tooltip is displayed for the Dynamic Column Settings option that says, You are not authorized to use this feature.

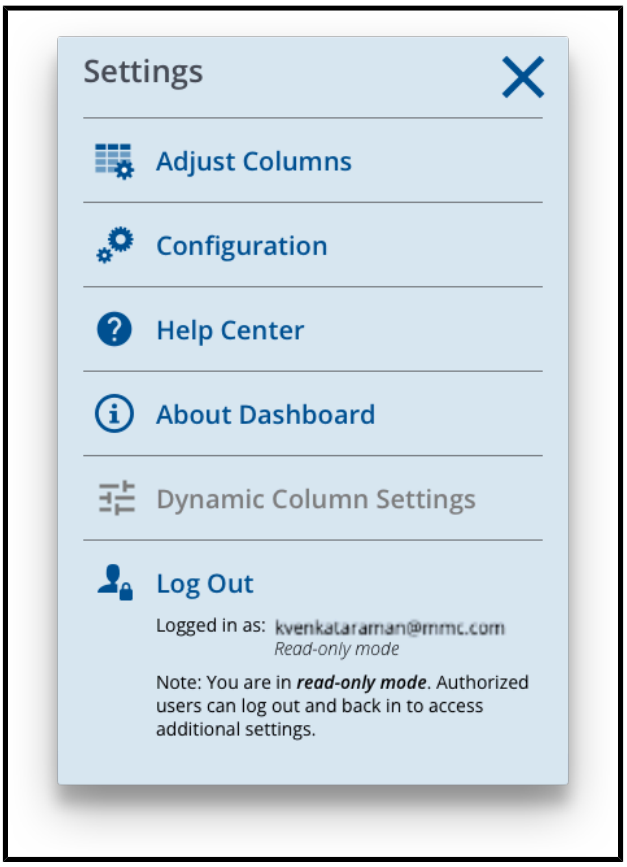
EditDynamicColumn

This role enables you to configure dynamic columns. When you are assigned EditDynamicColumn permissions, the Dynamic Column Settings option on the Settings menu is enabled.

Users with configuration privileges can be logged into the application in configuration mode for one hour from the last use of these privileges.

A session time-out indication is displayed on the Dashboard, notifying the current user of when their session will expire in hours, minutes, and seconds. When the timer reaches zero, the application automatically logs the current user out and returns them to the login page.

The name of the user who is currently logged in is displayed under the Log Out option in the Settings menu, along with the log-in mode.



To log out of the Dashboard, open the Settings menu and click Log Out.

Dashboard Display Behavior

Dashboard display

The Dashboard displays information for rooms and patients in the selected nursing units. Dashboard columns are sorted by unit and room. The Dashboard refreshes often so that the most current data is available. Data is presented as both text and icons within the grid.

Use the Display tab on Settings to configure settings for the Dashboard page display.

Unit Census

The Dashboard displays all rooms within the selected Nursing Unit.

The following icons can be displayed next to the room number in the Room column:

Bed Service Required icon ()

Displays Bed Service Required icon in the Room Number column when a bed associated with that room is in need of service.

CFCM ()

Displays the Contact Free Continuous Monitoring Non-Vitals Alert icon when a non-vitals alert is sent from a bed within that room. Non-vitals alerts can include, but are not limited to, an unstable bed signal, vitals no motion, a unit malfunction, a bed sensor problem, or an expired sensor This column is required to display when "Bed HR/RR On" is selected.

The patient's name is displayed in the Patient column. The manner in which the patient's name is displayed can be configured using the Patient Name Display section on the Display tab of Configuration Settings.

Patient Information

The Dashboard displays a  icon in the Incontinence column (also indicated by the  icon) when incontinence is detected for the patient. This feature is only available when you are using the Hillrom WatchCare® Incontinence Management System.

In the Risks column, the Dashboard displays the risk types assigned to a patient. There are three risks icons: Falls (), Pulmonary (), and Skin ().

Bed Status

When a room contains multiple beds, Dashboard displays as many rows for the room as there are bed designators.

- **Bed Rails** -  indicates whether a patient is detected in the bed and the state of the bed rails. Rail positioning is only available when compatible Hillrom beds are connected.

  The four rounded rectangles around the icon represent head and foot rails on the left and right sides of the bed.

- When a rail is in the UP position, the rail icon is green ().
- When a rail is in the DOWN position, the rail icon is yellow with a downward arrow ().
- Gray rails () indicate that the state of the rails is unknown. Some beds can only indicate that one or more head or foot rail is down, which is indicated by a combination of a gray and yellow down rail icon.

- **Patient Detection** is available with compatible, connected Hillrom beds.
  -  indicates that a patient is detected in the bed.
  -  indicates that the patient is out of the bed.
  -  indicates that patient detection is unknown.

- **Bed Exit** - When the bed exit alarm is set (armed), the icon is a solid green check. When the bed exit alarm is off or silenced (not armed), the icon is a yellow "X". When the bed exit alarm is going off, a red triangle alert icon is displayed.
- **Bed Low** - When the bed is set to the LOW position, the icon is a solid green check. When the bed is not set to the LOW position or is set to chair height, the icon is a yellow "X".
- **Brake On** - When the bed brake is ON, the icon is a solid green check. When the bed brake is OFF, the icon is a yellow "X".
- **Head of Bed (HOB)** - Displays the actual head of bed angle for connected, compatible Hill-Rom beds.

CAUTION: Bed data displayed on the Dashboard should not be used for critical patient decision-making.

CAUTION: The Smart Device Connectivity solution is a supplementary means of placing a request into the nurse call system. This solution should not be used in the event of an emergency and should only be used for routine requests. If the request is an emergency, please use the UL-listed nurse call system.

Table 1. Bed Status Icons

	Bed Status Alerting
	Bed Status OK
	Bed Status Warning

Table 1. Bed Status Icons (continued)

	Bed Exit Alarming

CAUTION: Bed data displayed on the Dashboard should not be used for critical patient decision-making.

Contact-Free Continuous Monitoring Data and Alerts

The Dashboard displays Contact-Free Continuous Monitoring active alarm statuses. Alarm statuses include, but are not limited to:

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

  Low/high heart rates and low/high respiratory rates are indicated by a red background in the HR and RR columns of the Dashboard. For example:

- Bed HR/RR On

  Bed HR/RR On status indicated by icons representing the activation state of bed's CFCM monitoring:

  - On - Green checkmark
  - Off - Yellow X

Active alarm statuses are displayed on the Dashboard until either the alarm status is cleared or the device becomes disconnected from Smart Device Connectivity.

Patient Physiological Data

The Dashboard displays the following physiological data for each patient, including, but not limited to:

- Heart Rate (for example, from the Electronic Medical Record (EMR) application, vitals monitors, contact-free devices)
- Respiratory Rate (for example, from the EMR, vitals monitors, contact-free devices)
- Temperature (from the EMR and vitals monitors)
- Blood Pressure (from the EMR and vitals monitors)
- SpO2 (from the EMR and vitals monitors)
- Pain Score (1-10) (from the EMR and vitals monitors)
- Weight (from the EMR, vitals monitor, beds)

MEWS and SIRS

The Dashboard also displays Early Warning Risk Scores in the MEWS (Modified Early Warning Score) and SIRS (Systemic Inflammatory Response Syndrome) columns. High scores are displayed with a red background.

Recovery Wait Timer

The Dashboard displays a timer showing how long users have until the data on the Dashboard will automatically reload. Each connected Dashboard is randomly assigned a wait time between two and seven minutes. The timer is displayed in seconds and counts down (in seconds) to zero. When the wait timer reaches zero, the Dashboard will automatically refresh.

Dashboard Configuration Overview

Dashboard settings, including the configuration of nursing units, column display and filters are accessed from the Settings menu.

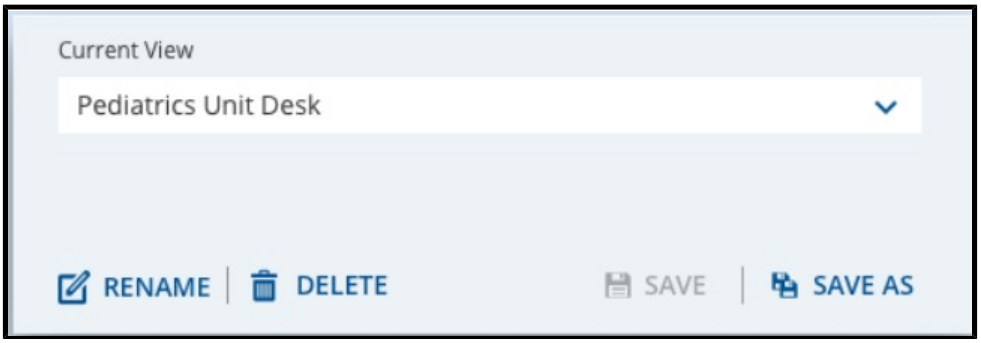
These settings are specific to each browser on a computer workstation. This means you can save different settings for Dashboard by opening it in a new browser on the same workstation. You can have two different Dashboard displays, for instance. One in Google Chrome and one in Microsoft Edge.

Dashboard Views

Dashboard views are set of configuration settings used to display the Dashboard. These settings include the columns selected for display, column sizing, and all other display settings.

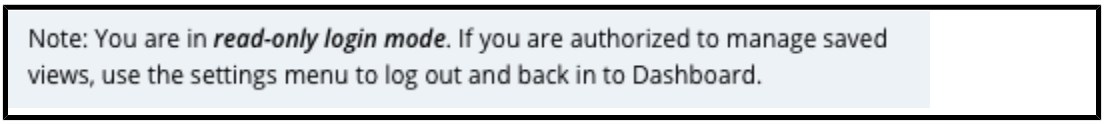
When a new instance of Dashboard is selected (that does not have any local settings saved), the Hillrom default view is displayed. Default views are read-only and cannot be deleted. You can, however, edit a default view locally and save it as a new view.

Click  to open Current View, which you can use to save, edit, and delete views for your hospital or units. You must have the EditDashboardConfig role assigned to you in order to edit views.



Before you can use Current View, you must select at least one unit by clicking  , selecting Configuration, and then selecting a Facility and Units on the Nursing Units tab. If you do not select a unit first, the controls on Current View are greyed out and a message is displayed on the dialog that states, To use views, first select a unit using the Settings > Configuration menu.

Additionally, if you logged into the Dashboard in read-only mode, you cannot managed saved views and the following message is displayed on Current View:



When you are logged into Dashboard with configuration privileges and have selected at least one unit, you can use the controls on Current View to edit existing views.

Rename

Click to enter a new name for the selected existing view.

Delete

Click to delete the selected view.

Save

Click to save the selected view. Save is enabled only after you enter a new name for a view.

Save As

Click to save the selected view with a new name.

Views are globally accessible to anyone who has access to Dashboard. Please note that views do not store the selected nursing units.

Dashboard Settings

Clicking  in the top right of the Dashboard displays the Settings menu.

Settings menu

The Settings menu is used to do the following:

- Click Adjust Columns to adjust the columns on Dashboard.
- Click Configuration to configure settings such as nursing units, which columns to display, and the overall display of the Dashboard.
- Click Help Center to access the Help Center, where you can view the Smart Device Connectivity Dashboard documentation, as well as other documentation on other topics.
- Launch the non-interactive Dashboard.
- Click Dynamic Column Settings to configure dynamic columns.

Clicking Configuration, displays the Configuration Settings page. This page can be used to configure the following items:

Nursing Unit Settings

The Nursing Units tab is used to select or change the units displayed on Dashboard. These settings are retained for each browser on a workstation (Google Chrome or Internet Explorer). This ensures that users will see only information that is relevant to them each time they view the Dashboard.

Column Settings

The Columns tab is used to choose the columns that are displayed on Dashboard. A list of all possible columns that can be displayed on Dashboard can be found in the Dashboard columns section of this document.

Users can add up to eight custom staff columns to the Dashboard. Custom staff columns include the custom column heading, which is required, and up to two roles. Optionally, users can add the located icon, title, and wireless extension for the staff member. Custom staff columns can be deleted, or the user can clear the check box next to them so that they do not display on the Dashboard.

Staff members and their roles and assignments can be interfaced from the electronic medical record (EMR) application. Contact Hillrom Technical Support for assistance.

Display Settings

The Display tab is used to configure settings for the Dashboard display. These settings can include the following.

Text Size

Used to select the text size for the main grid. Available options are Regular, Large, and Extra Large.

Page Display

Used to select the Scrolling list option to add a scrollbar to the right side of the Dashboard when there are too many rooms to display on the page at once.

The Auto-rotate every option automatically switches between "pages" of Dashboard locations when a user has more locations selected than can be displayed on a single page. This option should only be used when a user has no more than three pages of locations.

After you select Auto-rotate every, enter a number for seconds and showing location(s). For example: Auto-rotate every `5` seconds showing `16` location(s).

Attention: When you select the Auto-rotate every option, a warning message is displayed. This message states, `When using auto-rotate, validate the correct number of rooms is visible on each display monitor where the view is shown to avoid hidden rooms.` In other words, when you select Auto-rotate every, it is recommended that you return to the Dashboard and verify that all rooms within the selected unit are displayed for each workstation that displays this Dashboard view. Configuration of a view on a workstation with a resolution that differs from other workstations with the same Dashboard view can result in different display experiences (that is, all available locations failing to be displayed).

Additionally, the dashboard will display a visual indication when one or more rooms are not visible without user interaction.

Patient Name Display

Used to select the type of patient name display format to use. Users should be sure to use their hospital's policies regarding where and how to show patient names and other information.

Configuration Settings page

Clicking Configuration in the Settings menu displays the Configuration Settings page. Users can use this page to configure the items below.

Nursing Units

The Nursing Units tab is used to select or change the units displayed on Dashboard. These settings are retained for each browser on a workstation (such as Google Chrome). Selecting the applicable units ensures that users see only information that is relevant to them each time they view the Dashboard.

Columns

Use the Columns tab to choose the columns that will be displayed on Dashboard.

For more information about the Columns tab, go to Dashboard Columns (on page).

Display

Use the Display tab to configure settings for the Dashboard display. For more information, see Dashboard Display (on page 79).

Select Nursing Units to Display on Dashboard

Follow the steps below to select the nursing units that will be displayed on Dashboard.

1. On the Dashboard click  and select Configuration.

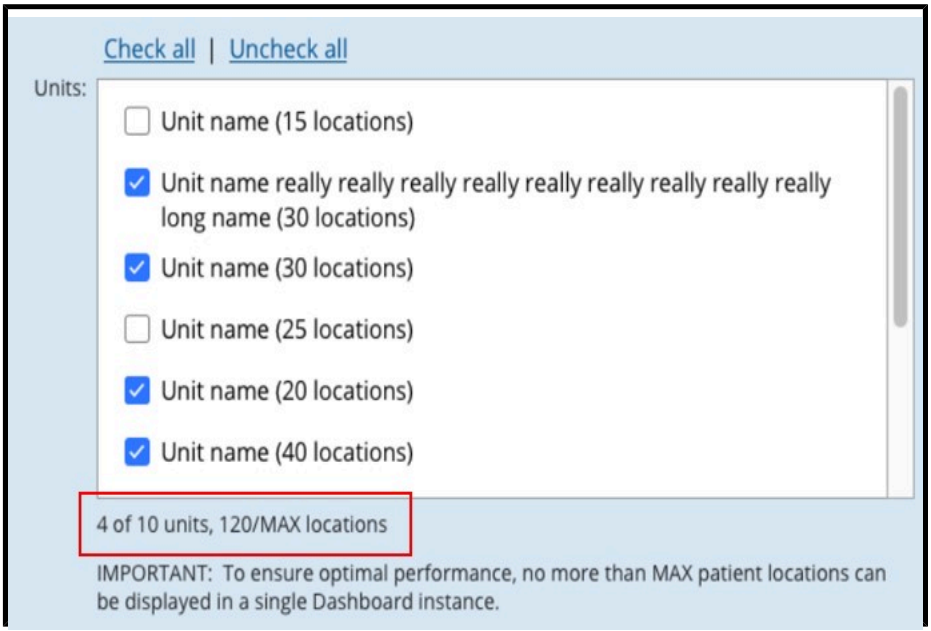
   The Configuration Settings page opens.

2. On the Nursing Units tab, for Enterprise, select the applicable enterprise.
3. Next, use the Facility list to select the applicable facility, or hospital.

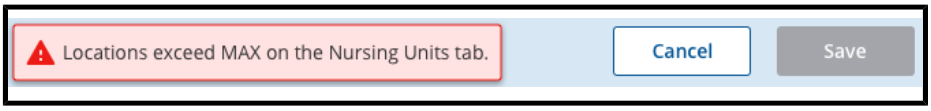
   After you select a facility, all nursing units within that facility are displayed in the Units field.

4. For Units, select the check boxes next to the nursing units you want to display on the Dashboard. To select all of the facility's units, click Check all.

Note: Each unit contains multiple locations. The number of locations within a unit is displayed in parentheses beside the name of the unit. For example, Unit Name (30 locations). Only 130 locations can be displayed on Dashboard at once. The number of units and locations is displayed under the Units field for your reference.



If you select units that contain over 130 combined locations, the below message is displayed and the Save and Cancel buttons are unavailable.



5. After selecting the applicable units, click Save.

Dashboard Columns

Configure the columns that will be displayed on the Dashboard using the Columns tab of the Configuration Settings dialog.

Select the check box next to an item to display it as a column on the Dashboard.

Note: Only bed data for connected, compatible beds is displayed on the Dashboard.

Nursing Unit Name

Displays the name of the selected unit.

Room Number

Displays the room number and bed designator. If there is more than one bed in the room, the bed designator is displayed.

Bed Service Required icon ( )

Displays Bed Service Required icon in the Room Number column when a bed associated with that room is in need of service.

CFCM ( )

Displays the Contact Free Continuous Monitoring Non-Vitals Alert icon when a non-vitals alert is sent from a bed within that room. Non-vitals alerts can include, but are not limited to, an unstable bed signal, vitals no motion, a unit malfunction, a bed sensor problem, or an expired sensor. CFCM is selected and disabled when the "Bed HR/RR On" is selected; re-enabling and remaining selected with "Bed HR/RR On" is deselected.

Patient Name

Displays the patient name. You can change the format of the patient name display in Settings.

Incontinence ( )

Displays the Incontinence icon when incontinence is detected for the corresponding patient.

Risks Icons

Displays the applicable safety risk icons for a patient. There are three risk icons.

- Falls: 
- Pulmonary: 
- Skin: 

Bed Rails/Bed Exit/Bed Low/Brake On/HOB (Head of Bed Angle)

These columns display icons that indicate bed status information for compatible, connected Hillrom beds. A green check mark indicates optimal condition, a yellow X indicates a warning, a yellow triangle indicates a patient safety alert, and a red-filled triangle indicates a bed exit alarm. Click anywhere in the row to view the patient details window for more information about the bed state for a patient.

Here is how these columns appear when they are displayed on the Dashboard:

Bed HR/RR On

Indicates when a caregiver has enabled CFCM monitoring.

Dashboard Dynamic Columns

Dynamic column data is only displayed if the Digital Health Platform sends vitals data for the patient.

HR

Displays the values for patient's heart rate, captured by the EMR, vitals monitors, or contact-free continuous monitoring devices. High/low heart rate values are displayed with a red background.

RR

Displays the values for the patient's respiratory rate, captured by the EMR, vitals monitors, or contact-free continuous monitoring devices. High and low respiratory rate values are displayed with a red background.

Temperature/Blood Pressure/SpO2/Pain Score

Displays the patient's vitals data, captured from the EMR or vitals monitors.

Weight

Displays the patient weight based on a weigh capture initiated either from the EMR, vitals monitor, or the bed.

MEWS/SIRS

Displays the (Modified Early Warning Score (MEWS) and Systemic Inflammatory Response Syndrome (SIRS) score for the patient. High scores are displayed with a red background.

Dashboard Display

The following options are available on the Dashboard Display tab, on the Configuration Settings page.

Text Size

Choose the text size for the main grid. Available options are Regular, Large, and Extra Large.

Page Display

Select the Scrolling list option to add a scrollbar to the right side of the Dashboard when there are too many rooms to display on the page at once.

The Auto-rotate every option automatically switches between "pages" of the Dashboard locations when you have more locations selected than can be displayed on a single page. This option should only be used when you have no more than three pages of locations.

After you select Auto-rotate every, enter a number for seconds and showing location(s). For example: Auto-rotate every `5` seconds showing `16` location(s).

Attention: When you select the Auto-rotate every option, a warning message is displayed. This message states, `When using auto-rotate, validate the correct number of rooms is visible on each display monitor where the view is shown to avoid hidden rooms.` In other words, when you select Auto-rotate every, it is recommended that you return to the Dashboard and verify that all rooms within the selected unit are displayed for each workstation that displays this Dashboard view. Configuration of a view on a workstation with a resolution that differs from other workstations with the same Dashboard view can result in different display experiences (that is, all available locations failing to be displayed).

Additionally, the dashboard will display a visual indication when one or more rooms are not visible without user interaction.

Patient Name Display

Select the type of patient name display format to use. Users should be sure to follow their hospital's policies regarding where and how to show patient names and other information.

Dashboard Dynamic Columns

Dynamic columns consist of patient vitals and risk score data. Vitals data may be provided by supported vitals devices or the EMR. Risk scores may be provided by the EMR or calculated within the Digital Health Platform by the Patient Risk Surveillance product.

Users can configure dynamic columns by clicking  and selecting Dynamic Column Configuration. The user can then select the radio button next to the column they want to configure and click Edit to open the Edit Dynamic Column page. This page contains the following fields:

Column Name

The column heading as it is displayed on Dashboard.

Description

Describes the data element displayed within the Dynamic Column Configuration.

CDR Description

The Clinical Data Repository code and description. CDR Description options include, but are not limited to:

- Heart Rate
- Respiratory Rate
- Temp
- SpO2
- Blood Pressure
- Pain Score
- Weight
- MEWS score
- SIRS score

Data Source URL

The API endpoint that provides the dynamic column data. The information entered for Data Source URL should not contain a suffix (for example, `.com` or `.net`), or a `www.` prefix. However, it should contain a protocol string, such as `http://` or `https://`.

Value Map Math

The JSON path that contains the value of each element.

Interpretation Map Path

The JSON path that contains the risk stratification/status of each data element, when it is defined.

Visible to Dashboard users

Determines whether the column is visible to Dashboard users.

Data Type

The data type for the dynamic column. The Data Type can be one of the following:

- Data Field: Displays a raw value, if applicable.
- Early Warning Score: Displays a value with a background color for the associated risk stratification, or without a background color if the risk stratification is low or unavailable.
- Score with Total: Displays a numerical value, including a denominator provided by CDR, with a background color for the associated risk status, or without a background color if the risk status is low or unavailable.

Data Remove After

Determines the length of time after which the data in the dynamic column will be removed. Users can select a minutes interval (for example, 5, 15, 30) or an hours interval (for example, 1, 8, 24).

About Reporting

The Reporting application within the Digital Health Platform provides you with the ability to generate reports based on patient and device data. You can use this data to analyze your patient population and help identify areas for staff and facility improvements. Users can generate reports that cover patient deterioration, sepsis, and contact-free continuous monitoring. These reports are displayed in local time and can also assist with patient monitoring, caregiver protocol adherence, investigation into patient deterioration. Additionally, they can be used to gain insights into improving patient management and care.

Note: The Smart Device Connectivity Reporting feature is currently only available in the US.

Use the Reporting system to generate a standard set of reports. These reports can contain protected health information (PHI) and access to them is configured via the Enterprise Configuration Portal User Roles sections. Users who have permissions to generate reports containing PHI can view all available reports (both those that contain PHI and those that do not). Users without PHI permission will only be able to generate reports that do not contain PHI.

Standard reports that do contain PHI include:

Early Warning Scores – Patient View

Includes patient demographics, admission details, location history, patient scores, and clinical parameters used in score calculations, as well as a time line of events

during the patient's stay and severe sepsis details, if the patient was identified as having severe sepsis.

Early Warning Scores

Provides insights which include patient deterioration metrics, score statistics and comparisons, and regression analysis between sepsis risk factors and average scores.

Contact Free Continuous Monitoring – Patient View

Includes patient demographics, admission details, location history, vitals averages (both daily and hourly) and standard deviations, observed vitals, and alerts.

Contact Free Continuous Monitoring – Insights

Includes devices metrics by device type for heart rate and respiratory rate, including the number of observations, minimum and maximum observation values, and the number of minutes between observed values.

Contact Free Continuous Monitoring – Sensor Expiration and Alerts

Includes sensors that expired between a selected start and end date, or sensors that expire within 30 days of the current date.

Standard reports that do not contain PHI, include:

Sepsis Insights

For tracking compliance with a facility's severe sepsis prevention protocol. This report includes patient demographics, patients treated with antibiotics, severity of sepsis, outcome (discharge or death), patients having pathogens, outcome trends (mortality vs. discharge), and the overall length of stay.

Sepsis Bundle Compliance

For tracking compliance with a facility's severe sepsis prevention protocol. This report includes the percentage of sepsis bundle tasks completed, the percentage completed on time, 3-hour bundles completed on time, and 6-hour bundles completed on time. This data is delivered across locations within a customer's hierarchy over time periods. The average number of minutes from sepsis onset to 3 and 6-hour bundle completion times is also included.

The Reporting system uses defined criteria to determine Sepsis Onset Time, Septic Shock Onset Time, and Sepsis Bundle Compliance. Refer to the following sections for additional details:

- Sepsis Onset Time Criteria (on page 87)
- Septic Shock Onset Time Criteria (on page 89)
- Sepsis Bundle Compliance Criteria (on page 89)

Reporting Browser Recommendations

We recommend the following browsers for viewing reports:

- Google Chrome version 76 or higher
- Microsoft Internet Explorer Version 11 or higher (excluding Reporting and Dashboard)
- Microsoft Edge Browser Version 84 or higher (excluding the Dashboard)

Note: The Smart Device Connectivity Reporting feature is currently only available in the US.

Reporting Controls

Generates the report using the selected parameters.

Shows or hides the Parameters controls for the selected report. These parameters can include the entity the user wants to use, the start and end dates for the report, and so forth.

Expands the filters for the selected report, if applicable.

File

Displays the Print option, which enables the user to print the current report.

View

Changes the report view and page settings for the report.

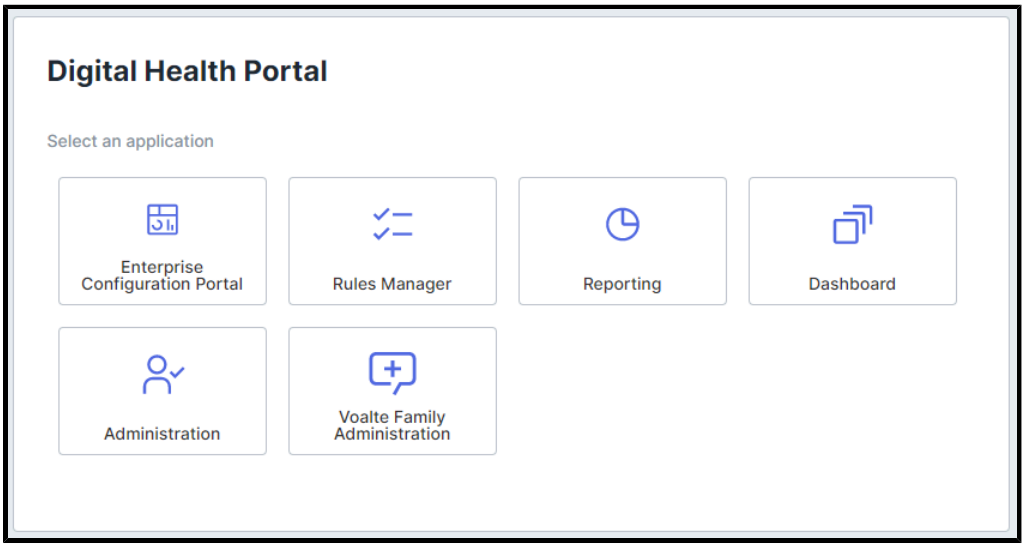
Export

Displays a list of formats and programs into which you can export the report. These options include, but are not limited to, Microsoft Excel, PDF, Microsoft PowerPoint, Microsoft Word. and XML

Generating and Printing Reports

Please note that the Smart Device Connectivity Reporting feature is currently only available to customers in the US.

1. First, log into the Digital Health Portal.
2. Click the Reporting application tile.



3. Next, select the Enterprise, Region, Organization, Facility, and/or Unit for which you want to view reports, and then click Launch.
4. In the drop-down list on the left, select a report to view.

   Only reports that you have permissions to view are displayed in this list. The names of the reports that are displayed are defined in your Enterprise's software requirements.

5. Select the applicable report parameters in the Parameters section of the page, if applicable, and then click View Report.

   The report is displayed according to the parameters you select.

6. Optional: You can take several actions once you generate a report.

- To print a report click File > Print.
- To change the view or page settings for the report that is currently displayed, click View.
- To export the report to a different format or program, click Export and choose one of the options from the list.

Understanding Report Parameters

Report parameters enable users to filter the data returned in the report to what is most relevant to their needs.

Cascading parameters

Many of the parameters in the reports are "cascading", meaning that the parameter is dependent on the selection of the previous parameter to filter the available list of values. For example, when a user opens the Contact Free Continuous Monitoring – Sensor Expiration and Alerts report, they must select an Entity Type before they can select an Entity. Only entities that match the entity type the user selects will be displayed.

Saving

The reports are semi-intelligent in that they will remember the parameters that the user last selected for a report the next time they open that report. This prevents the need to re-enter all of the parameters each time a user opens a report.

Reporting Data Retention: PHI vs. Non-PHI

Data retention and protected health information (PHI) inclusion vary by tenant based on the combination of the following two permissions:

- Reporting permission: Indicates that data can be stored and reported on with PHI intact until that data has reached its reporting retention period.

  Note that the reporting retention period is specified in the tenant catalog.

  - The default is 365 days for Patient Risk Surveillance customers granting reporting permission.
  - The default is 90 days for non-Patient Risk Surveillance customers granting reporting permission.

- Long Term Storage Permission: Indicates that the data can be stored and reported on for any duration of time, with the restriction that the data is de-identified.

Note: Written requests for a patient's data to be purged will result in the patient data being removed, regardless of any permissions or retention configuration.

Regardless of the permissions granted, patient contextual data will not be retained beyond 5 years of the context coming to a close (meaning, the Encounter discharge date or the Episode of Care end date). Patient contextual data includes, but is not limited to, the following Fast Healthcare Interoperability Resources (FHIR) entities that reference an Encounter or Episode of Care.

- Care Team
- Communication
- Condition
- MedicationRequest
- MedicationAdministration
- Observation
- Procedure
- ProcedureRequest
- Encounter
- EpisodeOfCare

Regardless of the permissions granted, patient non-contextual data will not be retained beyond 5 years of its last modified time. Patient non-contextual data includes, but is not limited to, the following FHIR entities:

- Device
- Patient
- Any of the FHIR entities listed under patient contextual data that reference the patient, but have no context when populated.

Sepsis Onset Time Criteria

The Reporting system uses the following criteria to define a time, referred to as Sepsis Onset Time (Time Zero), that shall denote when a patient is suspected of having become Septic. This supports the Sepsis Bundle Compliance report.

Sepsis Time Zero is identified as follows:

- Sepsis Diagnosed Condition onset date, if present
- If the Sepsis Diagnosed Condition onset date is not present, the earliest of the following dates is used:
    - Sepsis Diagnosed Condition first appearance of system last modified date
    - The latest date among the Sepsis Criteria that identified the condition
        - Suspicion of Infection indicated by any of the following:
            - A Suspicion of infection Diagnosed Condition (onset date when present, otherwise first appearance of system last modified date)
            - A Suspicion of infection Observation (effective start date when present, otherwise issued date)
            - Medication Request administered for an infection (authored date when present, otherwise system last modified date)
            - Medication Administration for an infection (effective start date when present, otherwise system last modified date)
        - Observation effective date (or issued date if effective date is not present) of the last Observation that identified Severe Sepsis presence

Context Sepsis Time Zero will be used in determining the time frame for both Sepsis and Severe Sepsis bundle compliance.

Sepsis Criteria, identified as follows:

- Sepsis Condition Diagnosed
- OR, all of the below documented within 6 hours of each other.
    - Suspicion of Infection indicated by any of the following:
        - A Suspicion of infection Diagnosed Condition (onset date when present, otherwise first appearance of system last modified date)
        - A Suspicion of infection Observation (effective start date when present, otherwise issued date)
        - Medication Request administered for an infection (authored date when present, otherwise system last modified date)
        - Medication Administration for an infection (effective start date when present, otherwise system last modified date)
    - Two SIRS criteria met within three hours of each other, where the later date falls within the 6 hour time period for identification (Observation effective date, or issued date if effective date is not present):
        - Temperature > 38 or < 36 degrees Celsius
        - Heart rate > 90 beats per minute
        - Respiratory Rate > 20 breaths per minute or PACO2 < 32 mmHg
        - White Blood Cell count > 12,000 or < 4000 mm3 or Bands > 10%
    - Organ dysfunction evidenced by any one of the following Observations (observation effective date, or issued date if effective date is not present):
        - Systolic blood pressure < 90 mmHg
        - NIBP_MAP < 65 mmHg
        - Creatinine > 2.0 mg/dL
        - Total bilirubin > 2mg/dL
        - Platelet count < 100,000 mm3
        - INR > 1.5
        - PTT > 60 seconds
        - Lactate > 2.0 mmol/L

Medication Requested or Administered for an infection could include, but is not limited to, broad-spectrum antibiotic or crystalloid fluid.

Note: The values above can be nested values within an observation such as a blood pressure panel containing a systolic or diastolic pressure, or an acid panel containing a lactate reading.

Septic Shock Onset Time Criteria

The Reporting system uses the following criteria to define a time, referred to as Septic Shock Onset Time (also known as Time Zero), that denotes when a patient is suspected of having Septic Shock, to support Sepsis bundle compliance reporting.

Septic Shock Time Zero is identified as follows:

- Septic Shock Diagnosed Condition onset date, if present.
- If the Septic Shock Diagnosed Condition onset date is not present, the earliest of the following dates is used:
    - Septic Shock Diagnosed Condition first appearance using the system last modified date.
    - The latest date among the Septic Shock Criteria that identified the condition (only identified when the Lactate occurred, up to 6 hours before Severe Sepsis Time Zero, or anytime afterward in the active encounter).
        - Severe Sepsis Time Zero (refer to the previous section, Sepsis Onset Time Criteria.
        - Lactate greater than or equal to 4.0 mmol/L (observation effective date, or issued date if effective date is not present).

Note: A patient without a Septic Shock diagnosis could have a lactate level greater than or equal to 4 every 4 hours for a 12 hour period without having satisfied the Severe Sepsis criteria. This patient would not be considered to be in Septic Shock. If the patient satisfies the Severe Sepsis Criteria at hour 10, then the lactate reading at hour 8 (the second reading) should be used to determine Septic Shock Time Zero.

Sepsis Bundle Compliance Criteria

The Reporting system uses the following Sepsis bundle tasks to determine Sepsis bundle compliance, in order to support Sepsis bundle compliance reporting.

Sepsis 3-Hour Bundle Compliance

- Initial lactate measured within 6 hours prior to Sepsis Onset time to 3 hours after the Sepsis Onset Time.
- Blood cultures obtained prior to antibiotic administration up to 48 hours prior or 3 hours after Sepsis Onset Time.

- Broad-spectrum antibiotic administration started up to 24 hours prior or 3 hours after Sepsis Onset Time.
- Initial crystalloid fluid administration started within 3 hours of Septic Shock Onset Time.

Sepsis 6-Hour Bundle Compliance

- Compliance with the 3-Hour bundle compliance activities.
- Repeated Lactate Acid measurement if initial lactate level was elevated (greater than 2.0 mmol/L) after initial measurement and within 6 hours of Sepsis Onset Time.
    - If the lactate acid measurement is not elevated, then re-evaluation is not required and is indicated as compliant.

Standard Reports

This section provides a description of all available reports.

Standard Reports with PHI

Standard reports that include protected health information (PHI) are described in this section.

The standard reports with PHI contain a very detailed level of data, often specific to a particular patient or device. While some data is aggregated within these reports, often the lowest level of detail is available (for example, every Alert sent, every Heart Rate observed). Many of the elements included within these reports (such as tables) need to auto-expand to accommodate a variable amount of data. To best meet these needs, the technology chosen for implementation of these reports is Power BI Paginated Reports.

Power BI Paginated Reports are designed to be "pixel perfect", printing and exporting in a user-friendly and aesthetically pleasing manner. These reports use a live data connection to the underlying data source (Azure Synapse Analytics) to return the required information in real time when the report is run.

Click one of the report names below for more information:

Contact Free Continuous Monitoring - Patient View Report (on page 90)

Contact Free Continuous Monitoring - Sensor Expiration Report (on page 102)

Contact Free Continuous Monitoring - Alerts Report (on page 104)

Early Warning Scores Insights Report (on page 106)

Early Warning Scores - Patient View Report (on page 110)

Contact Free Continuous Monitoring Insights Report (on page 116)

Contact Free Continuous Monitoring - Patient View Report

The Contact Free Continuous Monitoring - Patient View report includes metrics and alerts sent from Contact Free Continuous Monitoring devices. This report also contains an Alert Detail Table that displays the number of alerts for each alert type.

The Contact Free Continuous Monitoring - Patient View report includes metrics and alerts sent from Contact Free Continuous Monitoring devices. This report also contains an Alert Detail table that displays the number of alerts for each alert type.

Report Details

Individual alerts are displayed in a tabular format, sorted by the alert Start Date/Time and include the following details:

Alert Detail			
Start Date/Time	**End Date/Time**	**Type**	**Value**
1/17/2022 8:11:01 PM	1/17/2022 8:12:01 PM	RespiratoryRateHigh	44 /min
1/17/2022 9:48:34 PM	1/17/2022 10:24:41 PM	RespiratoryRateHigh	44 /min
1/18/2022 12:12:21 AM	1/18/2022 12:13:22 AM	RespiratoryRateHigh	44 /min
1/18/2022 12:34:22 AM	1/18/2022 12:35:05 AM	RespiratoryRateHigh	44 /min
1/18/2022 12:35:19 AM	1/18/2022 12:46:15 AM	RespiratoryRateHigh	45 /min
1/18/2022 1:03:11 AM	1/18/2022 2:10:22 AM	RespiratoryRateHigh	44 /min
1/19/2022 10:19:21 AM	1/19/2022 10:20:38 AM	RespiratoryRateHigh	45 /min
1/19/2022 10:50:29 AM	1/19/2022 11:08:11 AM	RespiratoryRateHigh	44 /min
1/19/2022 11:30:56 AM	1/19/2022 11:39:16 AM	RespiratoryRateHigh	44 /min
1/20/2022 3:53:04 AM	1/20/2022 3:58:10 AM	RespiratoryRateHigh	48 /min
1/22/2022 8:37:57 AM	1/22/2022 8:38:37 AM	VitalsNoMotion	
1/25/2022 2:04:43 AM	1/25/2022 2:06:15 AM	RespiratoryRateHigh	44 /min
1/25/2022 11:47:21 PM	1/28/2022 12:02:52 PM	RespiratoryRateHigh	45 /min

The following metrics for the selected time period within the selected encounter are displayed in this report:

- Daily average +/- standard deviation of patient heart rate and respiratory rate
- Hourly average +/- standard deviation of patient heart rate and respiratory rate

In addition, the Contact Free Continuous Monitoring - Patient View report includes patient demographic data, admission details, patient location history, and observed vital signs (including heart rate values and respiratory rate, with optional moving average matching configured using the Moving Avg # Periods parameter). More information about these report details can be found in the following section, Navigating the Contact Free Continuous Monitoring - Patient View Report (on page 96).

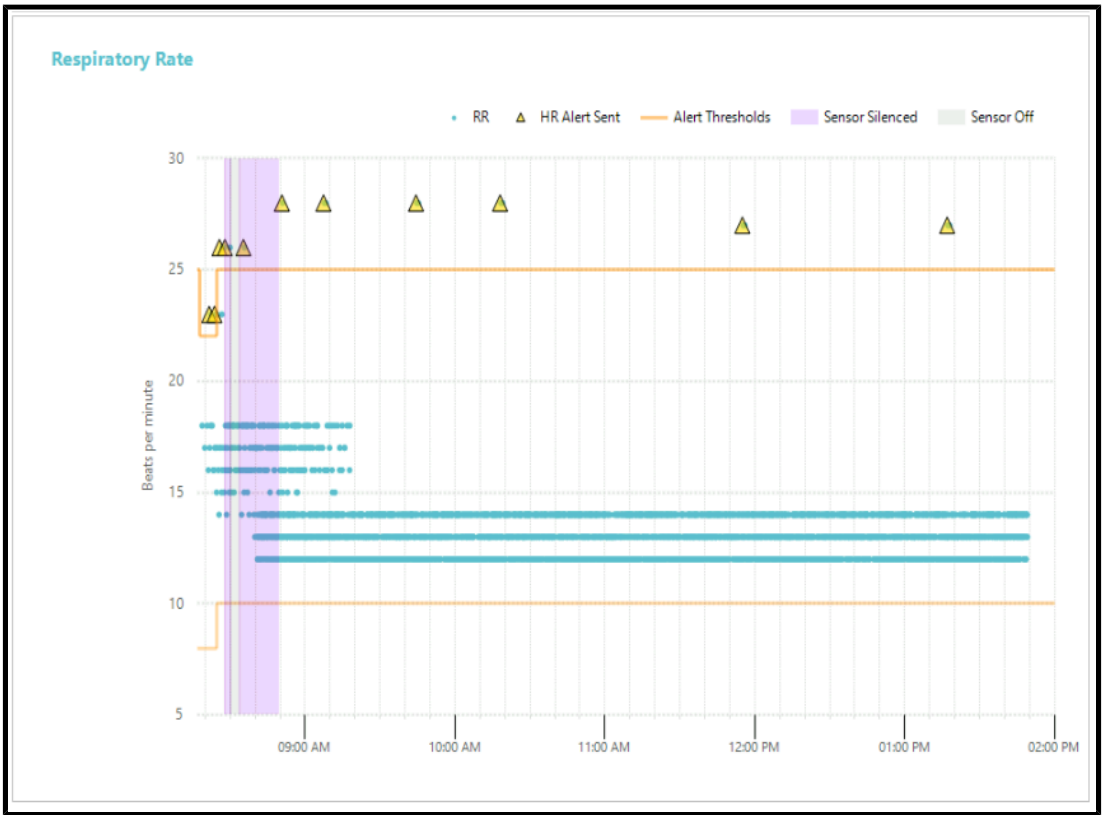
Report Parameters

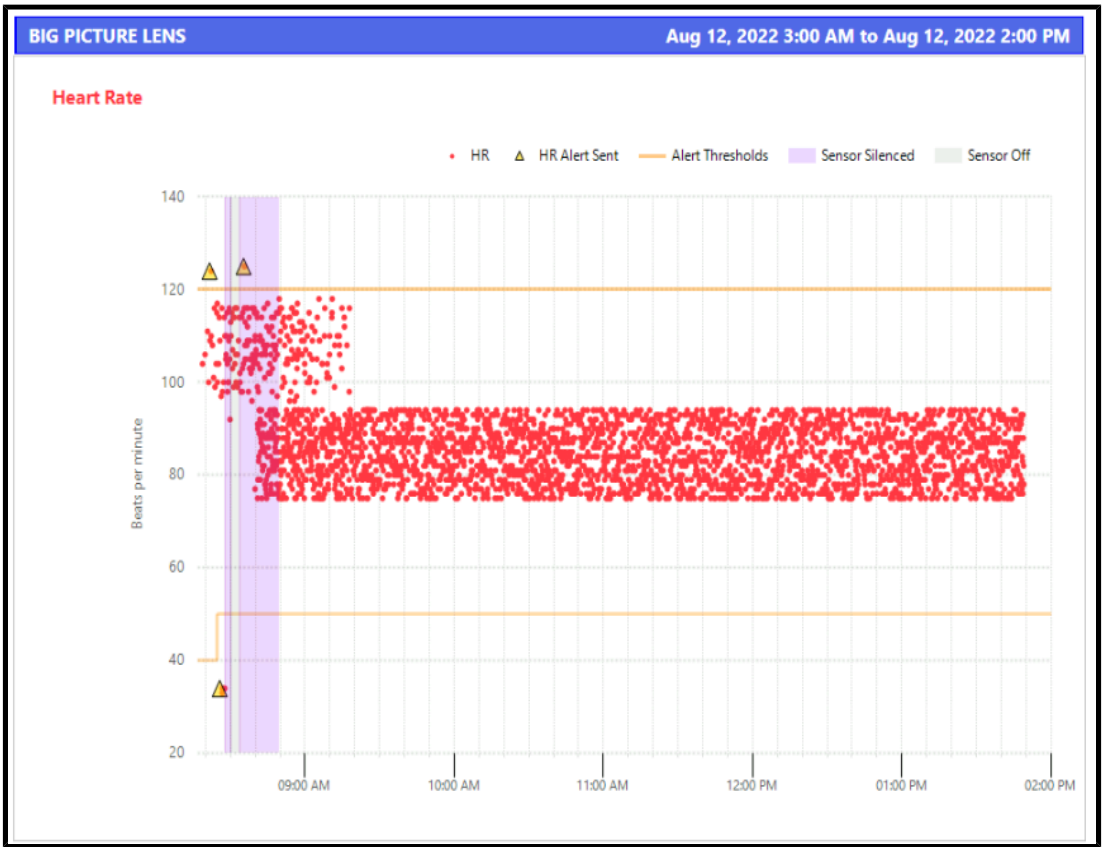
The report parameters can be used to narrow down the time period of the report. The parameters for the Contact Free Continuous Monitoring - Patient View report are as follows:

Facility	Select the Facility to filter the report by.
Patient MRN	Select the patient MRN for whom you want to view the report.
Encounter	Select the encounter for which you want to view the report.
Report Start Date	Use to select the start date for the beginning of the report. The date of the selected en-

	counter is filled in by default. You can click  to select a different start date from the calendar.
Report End Date	Use to select the end date for the report. Click  to select an end date from the calendar.
Report Start Time	Select the time for the beginning of the report. The default value is the hour in which the selected encounter began (for example, 8:00 AM if the encounter started at 8:13 AM).
Report End Time	Select the time for the end of the report. The default value is the hour after the selected encounter ended (for example, 2:00 PM if the encounter ended at 1:45 PM). Note: If the encounter is still active, the hour corresponding to the last time the data was extracted from the Clinical Data Repository (CDR) for the selected Facility is used instead.
Zoom Lens Date	Select the Zoom Lens Date. The default value is the Report End Date.
Zoom Lens Time	Select half hour increments from 12:00AM to 11:30PM; defaults to hour of Report End Time.
Zoom Lens Coverage	Select from 1, 2, 3, 4, 6, 8, or 12 hours. Default is 1 hour. The Zoom Lens focuses on the selected coverage period leading up to the selected Zoom Date and Time.
Moving Avg # Periods	Select one of the following values: 15, 30, 60, 120.
View	Use to select the display of the report. Select Graphical to display the report information using graphical charts. Select Tabular to display report data in a table with rows and columns. Using tabular view better enables you to export the report data into Microsoft Excel. Examples of both views are displayed below.

Figure 1. Report Data in Graphical Format


Respiratory Rate
RR
HR Alert Sent
Alert Thresholds
Sensor Silenced
Sensor Off
30
25
20
15
10
5
Beats per minute
09:00 AM
10:00 AM
11:00 AM
12:00 PM
01:00 PM
02:00 PM


BIG PICTURE LENS
Aug 12, 2022 3:00 AM to Aug 12, 2022 2:00 PM
Heart Rate
HR
HR Alert Sent
Alert Thresholds
Sensor Silenced
Sensor Off
Beats per minute
140
120
100
80
60
40
20
09:00 AM
10:00 AM
11:00 AM
12:00 PM
01:00 PM
02:00 PM

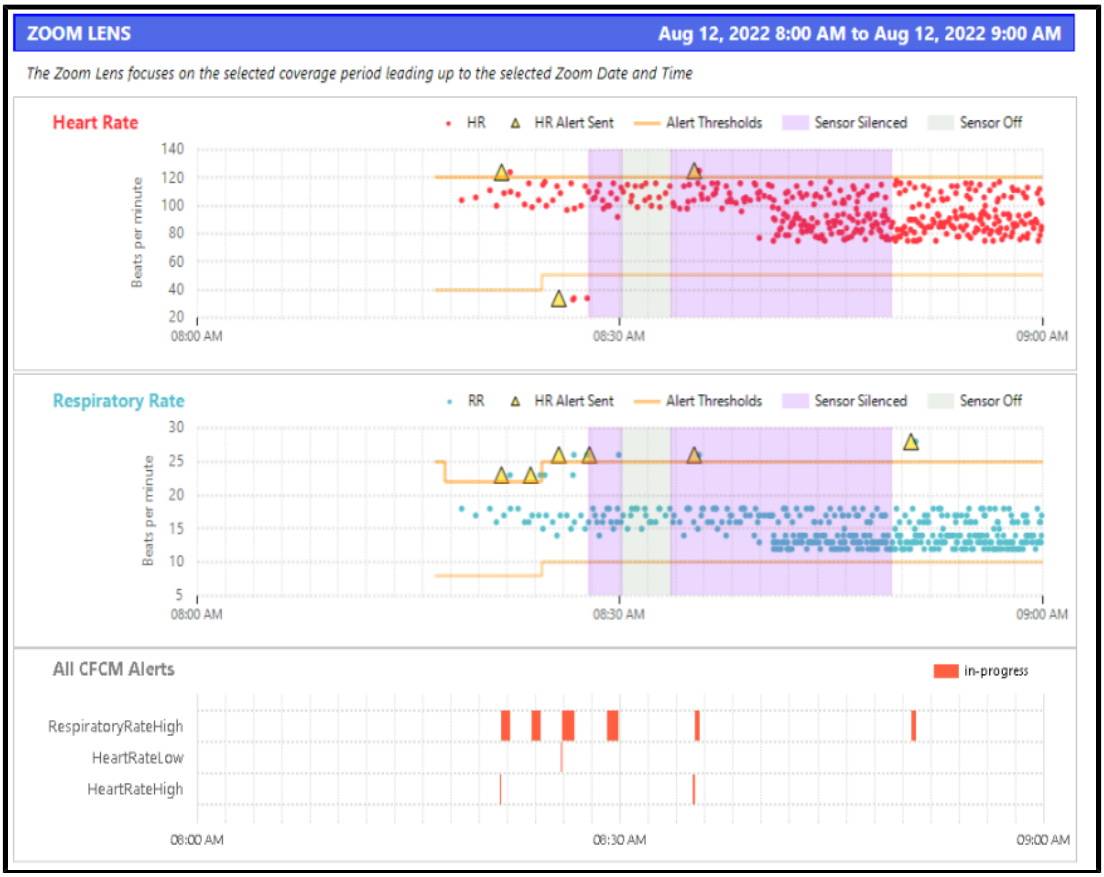
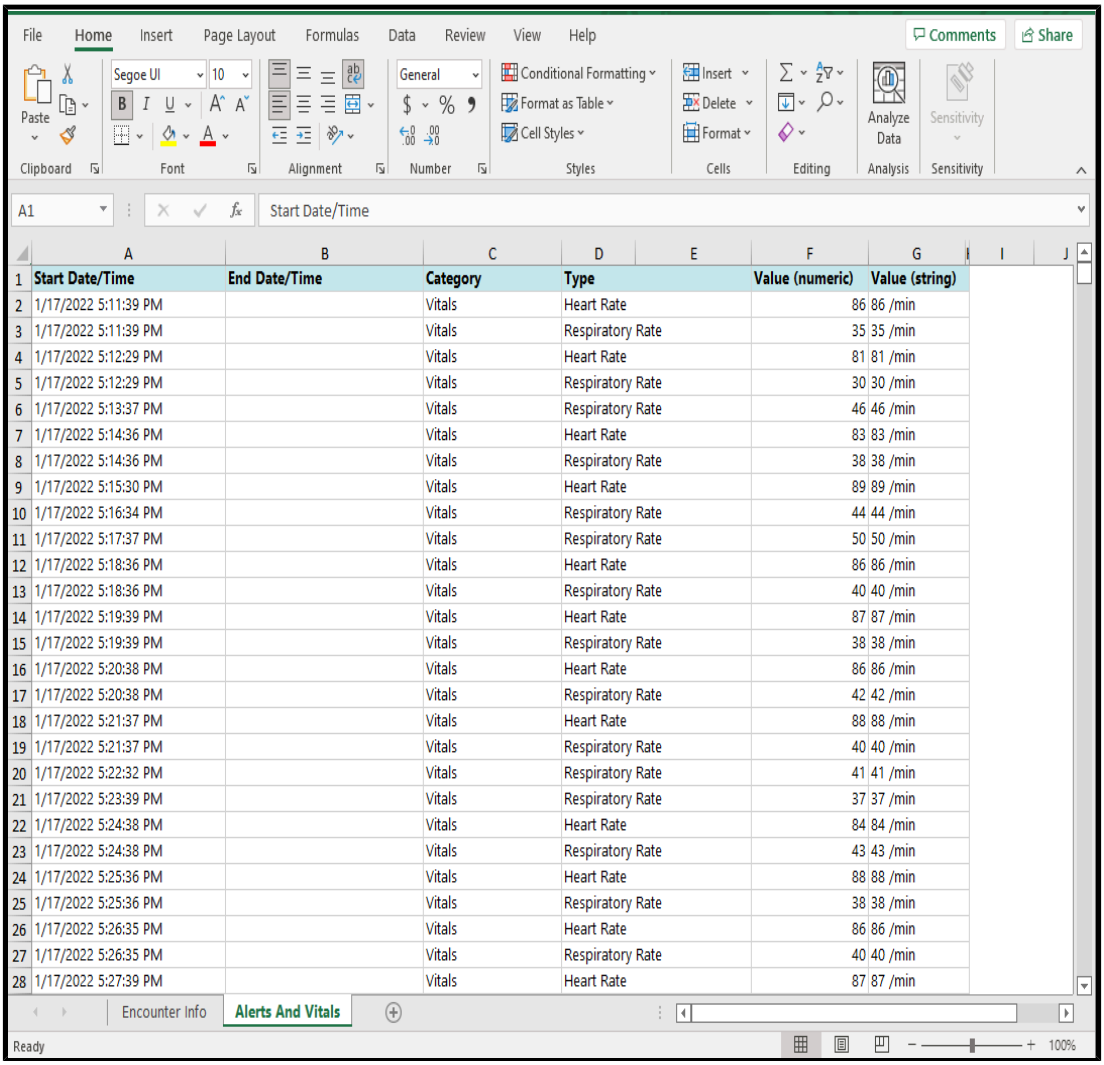


Figure 2. Report Data in Tabular Format



	Start Date/Time	End Date/Time	Category	Type	Value (numeric)	Value (string)
2	1/17/2022 5:11:39 PM		Vitals	Heart Rate	86	86 /min
3	1/17/2022 5:11:39 PM		Vitals	Respiratory Rate	35	35 /min
4	1/17/2022 5:12:29 PM		Vitals	Heart Rate	81	81 /min
5	1/17/2022 5:12:29 PM		Vitals	Respiratory Rate	30	30 /min
6	1/17/2022 5:13:37 PM		Vitals	Respiratory Rate	46	46 /min
7	1/17/2022 5:14:36 PM		Vitals	Heart Rate	83	83 /min
8	1/17/2022 5:14:36 PM		Vitals	Respiratory Rate	38	38 /min
9	1/17/2022 5:15:30 PM		Vitals	Heart Rate	89	89 /min
10	1/17/2022 5:16:34 PM		Vitals	Respiratory Rate	44	44 /min
11	1/17/2022 5:17:37 PM		Vitals	Respiratory Rate	50	50 /min
12	1/17/2022 5:18:36 PM		Vitals	Heart Rate	86	86 /min
13	1/17/2022 5:18:36 PM		Vitals	Respiratory Rate	40	40 /min
14	1/17/2022 5:19:39 PM		Vitals	Heart Rate	87	87 /min
15	1/17/2022 5:19:39 PM		Vitals	Respiratory Rate	38	38 /min
16	1/17/2022 5:20:38 PM		Vitals	Heart Rate	86	86 /min
17	1/17/2022 5:20:38 PM		Vitals	Respiratory Rate	42	42 /min
18	1/17/2022 5:21:37 PM		Vitals	Heart Rate	88	88 /min
19	1/17/2022 5:21:37 PM		Vitals	Respiratory Rate	40	40 /min
20	1/17/2022 5:22:32 PM		Vitals	Respiratory Rate	41	41 /min
21	1/17/2022 5:23:39 PM		Vitals	Respiratory Rate	37	37 /min
22	1/17/2022 5:24:38 PM		Vitals	Heart Rate	84	84 /min
23	1/17/2022 5:24:38 PM		Vitals	Respiratory Rate	43	43 /min
24	1/17/2022 5:25:36 PM		Vitals	Heart Rate	88	88 /min
25	1/17/2022 5:25:36 PM		Vitals	Respiratory Rate	38	38 /min
26	1/17/2022 5:26:35 PM		Vitals	Heart Rate	86	86 /min
27	1/17/2022 5:26:35 PM		Vitals	Respiratory Rate	40	40 /min
28	1/17/2022 5:27:39 PM		Vitals	Heart Rate	87	87 /min

Navigating the Contact Free Continuous Monitoring - Patient View Report

After you select the report parameters and click View Report, the following data is displayed.

Note: The number of vital sign values and alerts displayed in the Contact Free Continuous Monitoring - Patient View Report is limited to the following:

- Vital signs - Most recent 10,000 rows
- Vitals alerts - Most recent 1,000 rows

Limiting the number of displayed values allows the report to generate more quickly.

If you run the report and your results exceed the number of rows/values listed above, a message is displayed asking you to narrow your time frame (Report Start Date and Report End Date) to display all the data returned.

After you select the report parameters and click View Report, the following data is displayed.

Patient Demographics

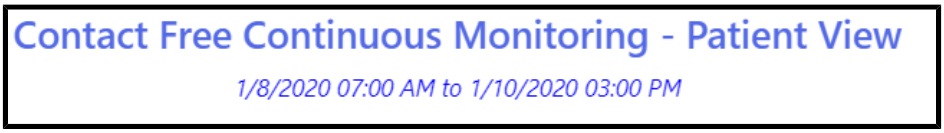
Displays all the details for the patient on which the report is based. This includes Patient Name, MRN, Date of Birth, Age, Gender, and so forth.

Admission Details

Displays the Admission Date/Time and the Discharge Date/Time.

The date and time at which the encounter started and ended are displayed under Admission Details, regardless of any selections the user makes for the Report Start Time and Report End Time parameters. In other words, modifying the default parameter dates affects the time frame for the report, but does not impact what is displayed in Admission Details.

The italic text under the report title indicates the time frame for the report content, such as vitals and alerts.



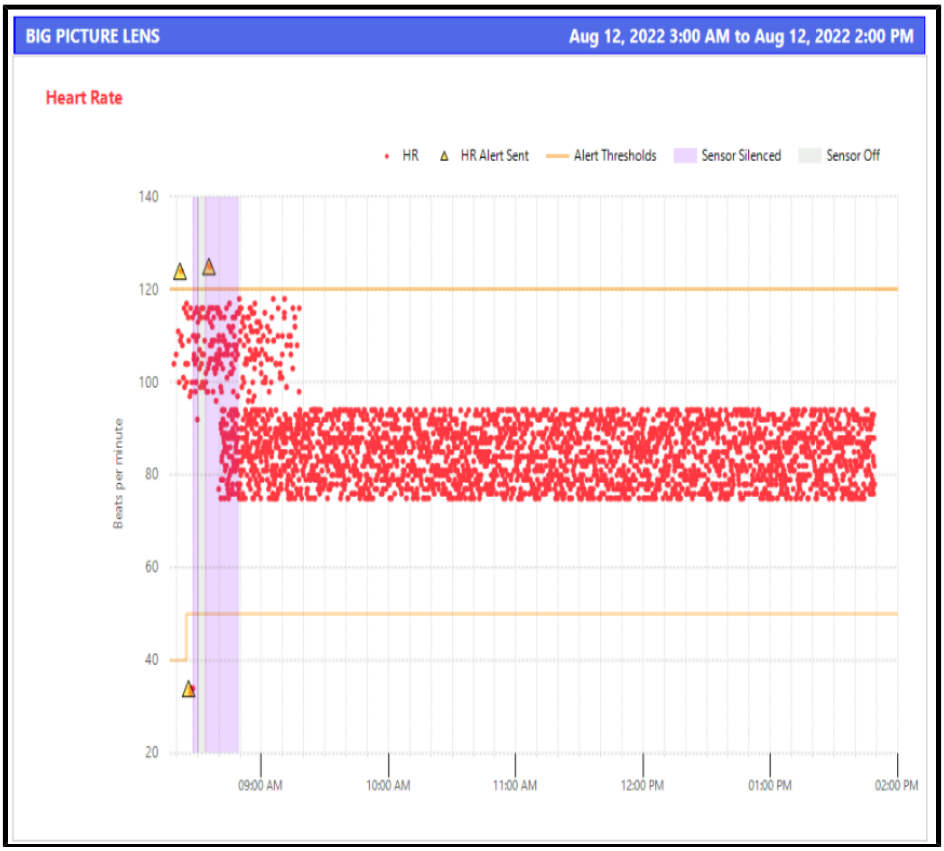
Location History

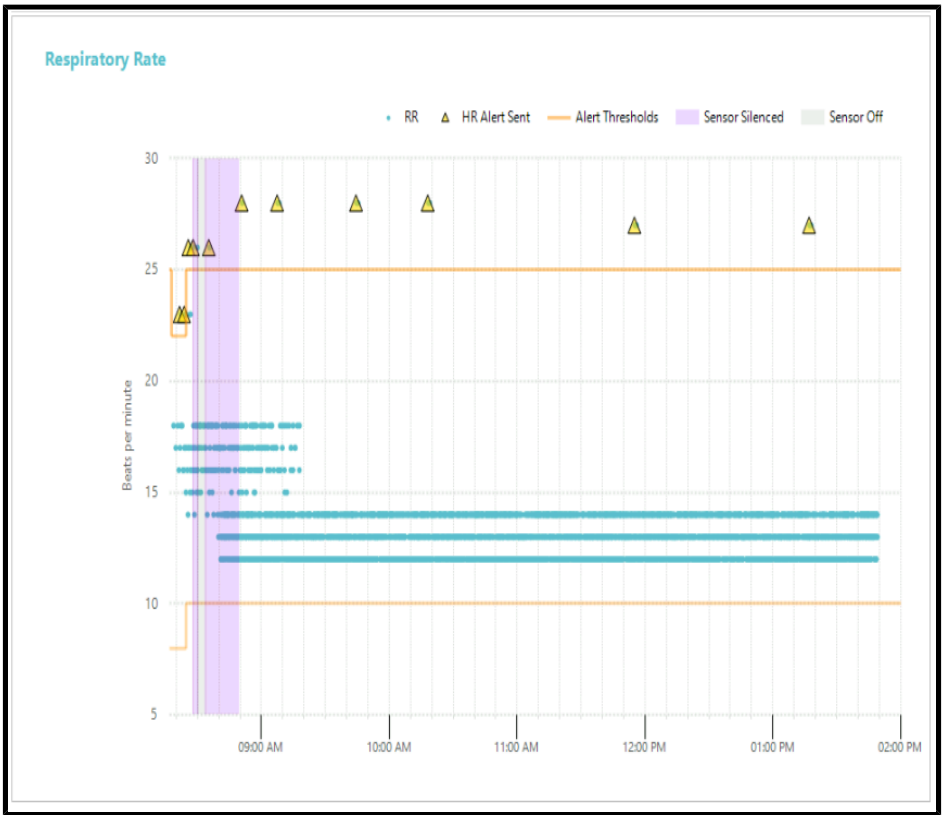
Displays the patient location history details for the selected encounter. These details are displayed in hierarchical format. For example General Hospital → Main → Radiology → Room 101 → Bed A.

The Start Date/Time (the time at which the patient was first brought to the location) and the Location End Date/Time (the time at which the patient left the location) are also displayed.

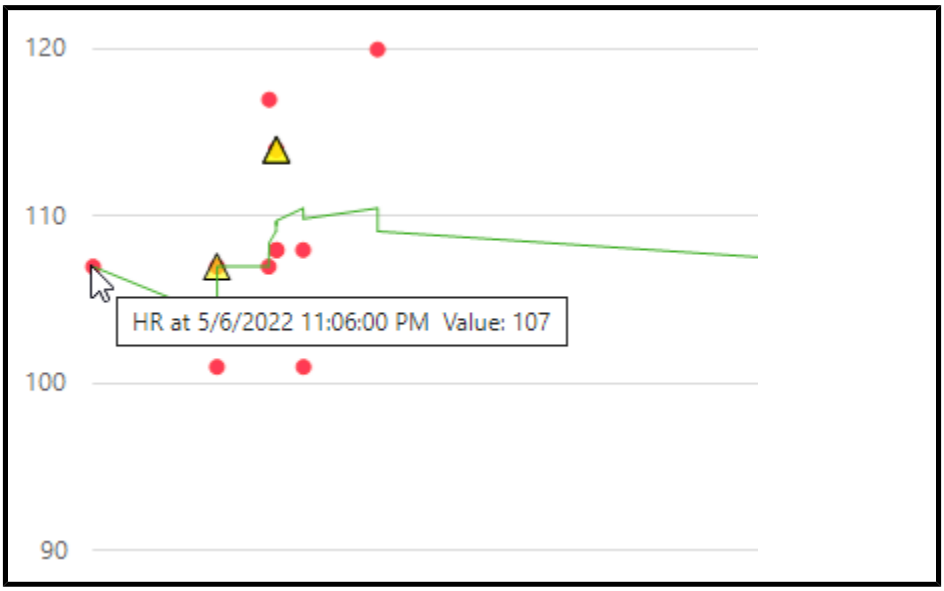
Heart / Respiratory Rate Values and Alerts

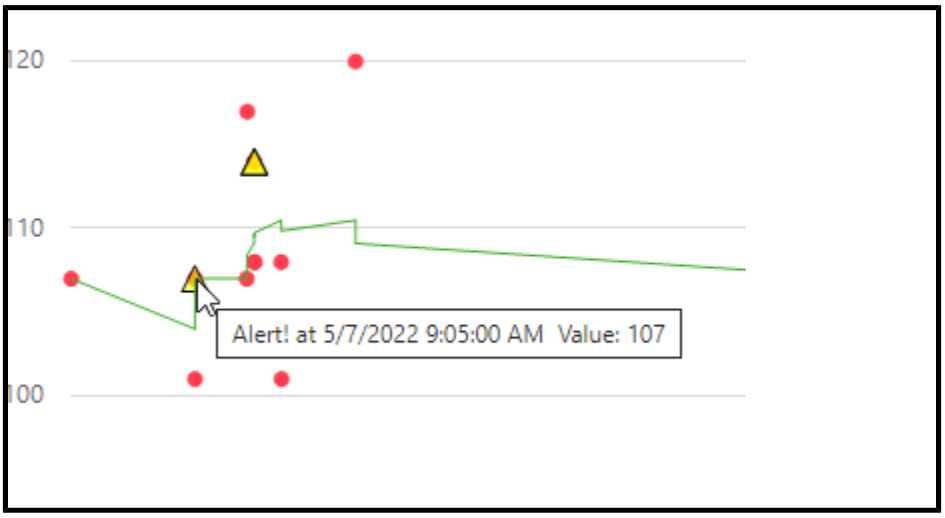
Displays observed heart rate and respiratory rate values for the patient, with optional moving average matching configured using the Moving Avg # Periods report parameter. Alerts are noted by yellow triangles on top of the heart rate and respiratory rate charts.


BIG PICTURE LENS
Aug 12, 2022 3:00 AM to Aug 12, 2022 2:00 PM
Heart Rate
HR
HR Alert Sent
Alert Thresholds
Sensor Silenced
Sensor Off
140
120
100
80
60
40
20
Beats per minute
09:00 AM
10:00 AM
11:00 AM
12:00 PM
01:00 PM
02:00 PM


Respiratory Rate
RR
HR Alert Sent
Alert Thresholds
Sensor Silenced
Sensor Off
Beats per minute
30
25
20
15
10
5
09:00 AM
10:00 AM
11:00 AM
12:00 PM
01:00 PM
02:00 PM

Users can hover over individual data points and alerts on these charts to view the date, time, and numerical value for the heart/respiratory rate for that point.



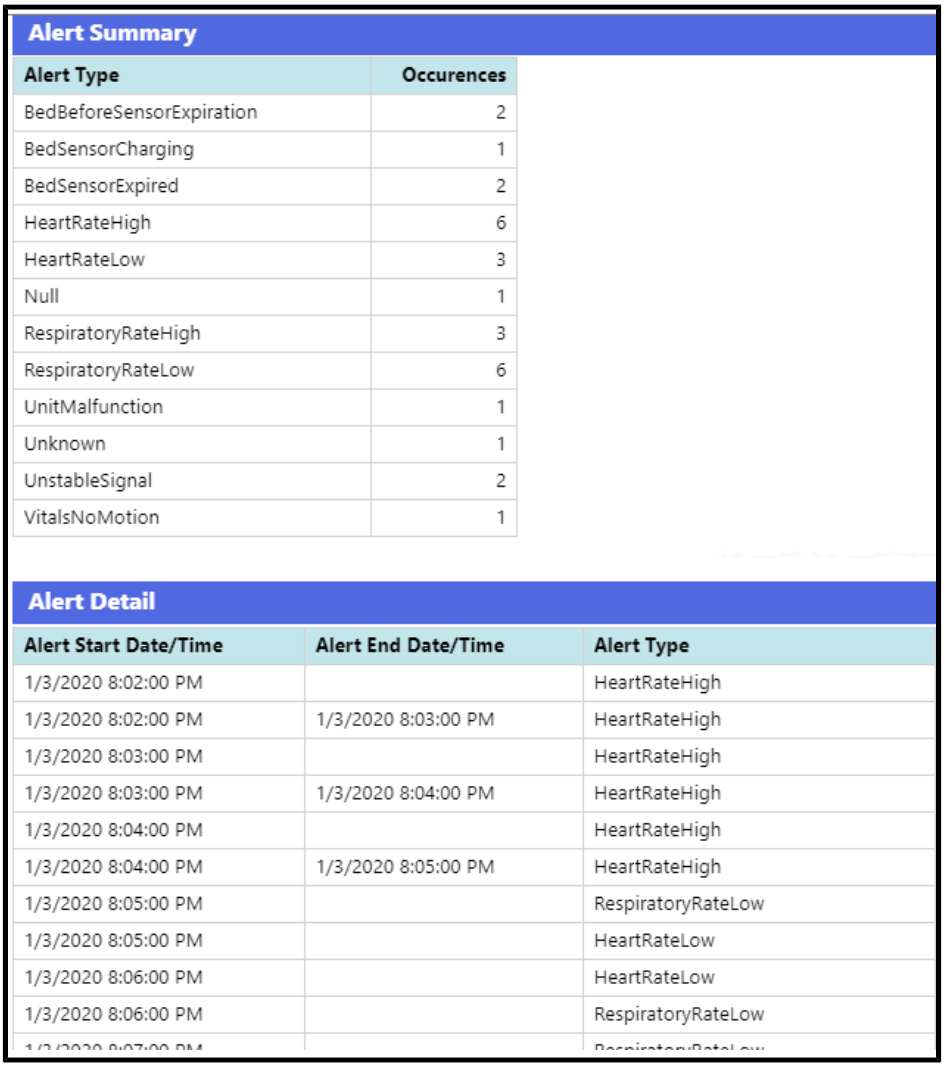


Alert Summary

This table displays the number of occurrences for each alert type.

Alert Detail

This table displays individual alerts and includes the Alert Start Date/Time, the Alert End Date/Time, and the Alert Type.



Alert Summary

Alert Type	Occurences
BedBeforeSensorExpiration	2
BedSensorCharging	1
BedSensorExpired	2
HeartRateHigh	6
HeartRateLow	3
Null	1
RespiratoryRateHigh	3
RespiratoryRateLow	6
UnitMalfunction	1
Unknown	1
UnstableSignal	2
VitalsNoMotion	1

Alert Detail

Alert Start Date/Time	Alert End Date/Time	Alert Type
1/3/2020 8:02:00 PM		HeartRateHigh
1/3/2020 8:02:00 PM	1/3/2020 8:03:00 PM	HeartRateHigh
1/3/2020 8:03:00 PM		HeartRateHigh
1/3/2020 8:03:00 PM	1/3/2020 8:04:00 PM	HeartRateHigh
1/3/2020 8:04:00 PM		HeartRateHigh
1/3/2020 8:04:00 PM	1/3/2020 8:05:00 PM	HeartRateHigh
1/3/2020 8:05:00 PM		RespiratoryRateLow
1/3/2020 8:05:00 PM		HeartRateLow
1/3/2020 8:06:00 PM		HeartRateLow
1/3/2020 8:06:00 PM		RespiratoryRateLow

Contact Free Continuous Monitoring - Device View Report

The Contact Free Continuous Monitoring - Device View report displays a table that depicts each sensor, including the device model name, model number, and serial number, that has expired or will expire within the next 6 months.

The sensors in the table are grouped into the following categories:

- Expired
- Expiring within 7 days
- Expiring within 6 months

The Contact Free Continuous Monitoring - Sensor Expiration report includes alerts sent from a Contact Free Continuous Monitoring device identified with a device type value of `Bed`.

Report Parameters

Parameter	Description
Authorized Facilities	Enter a comma separated list of 4-character identifiers representing the Facilities that the currently logged in user should be able to see in this report.
Entity Type	Use to select the Entity type and Level for the report. For example, Facility and 4.
Entity	Select the Entity on which to run the report.
Start Date	Select the report start date.
End Date	Select the report end date.
Device	Select a device from the drop-down list on which to run the report.
Alert Types	Select the CFCM alert types on which to run the report from the drop-down list.
View	Select graphical or tabular view from the drop-down list.
Alert Granularity	Select the Default or Full Workflow drop-down options.

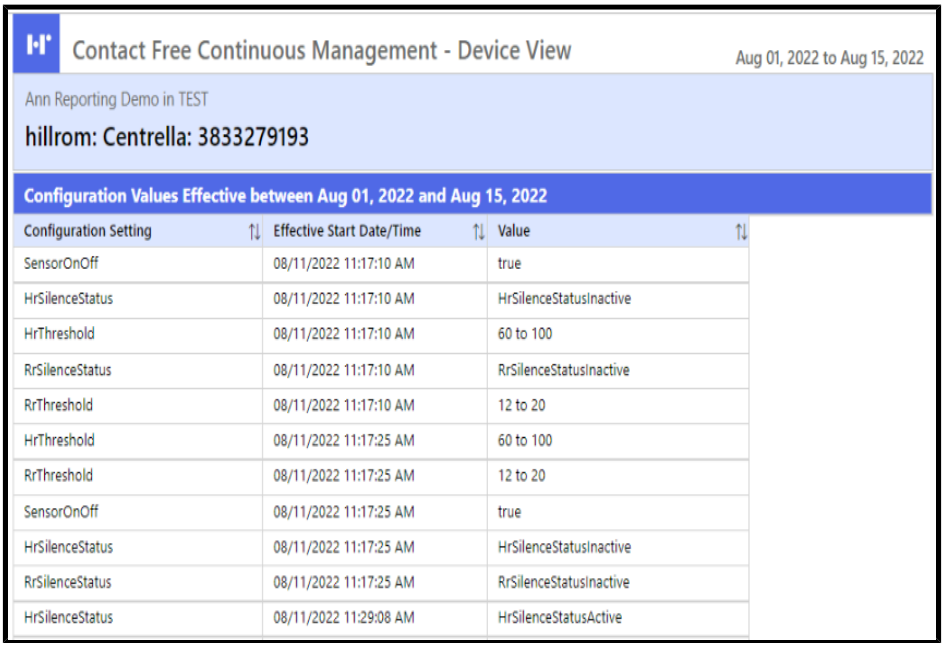
Navigating the Contact Free Continuous Monitoring - Device View Report

The Contact Free Continuous Monitoring - Device View report includes the following data elements.

Expiring Sensors

Displays each sensor, including the device model name, model number, and serial number, that has expired, or will expire within the next 6 months. The sensors displayed in this table are grouped into the following categories: Expired, Expiring Within 7 Days, and Expiring Within 6 Months.

The Hours Remaining column displays the number of hours remaining until the sensor expires.



Contact Free Continuous Management - Device View

Aug 01, 2022 to Aug 15, 2022

Ann Reporting Demo in TEST

hillrom: Centrella: 3833279193

Configuration Values Effective between Aug 01, 2022 and Aug 15, 2022

Configuration Setting	Effective Start Date/Time	Value
SensorOnOff	08/11/2022 11:17:10 AM	true
HrSilenceStatus	08/11/2022 11:17:10 AM	HrSilenceStatusInactive
HrThreshold	08/11/2022 11:17:10 AM	60 to 100
RrSilenceStatus	08/11/2022 11:17:10 AM	RrSilenceStatusInactive
RrThreshold	08/11/2022 11:17:10 AM	12 to 20
HrThreshold	08/11/2022 11:17:25 AM	60 to 100
RrThreshold	08/11/2022 11:17:25 AM	12 to 20
SensorOnOff	08/11/2022 11:17:25 AM	true
HrSilenceStatus	08/11/2022 11:17:25 AM	HrSilenceStatusInactive
RrSilenceStatus	08/11/2022 11:17:25 AM	RrSilenceStatusInactive
HrSilenceStatus	08/11/2022 11:29:08 AM	HrSilenceStatusActive

Contact Free Continuous Monitoring - Alerts Report

The Contact Free Continuous Monitoring - Alerts report displays a summary of the number of alerts by type. Each individual alert, whether a vitals or technical alert, is time stamped and displayed with the device manufacturer, model, and serial number.

Report Parameters

Parameter	Description
Entity Type	Use to select the Entity type for the report. For example, Enterprise or Facility.
Entity	Select the entity on which to run the report. Only entities that match the Entity Type you selected are available in the list.
Device	Select the contact-free continuous monitoring device on which to run the report.
Alert Types	Select the types of alerts that you want to view that occurred during the specified time period. You can include all alerts associated with the selected Device, or specific types, such as High HR, Low RR, or Unit Malfunction.
Report Start Date	Select the start date for the report.
Report End Date	Select the end date for the report.
Alert Display	Use to show or hide the following reporting elements, including alerts.

Parameter	Description
	• Summary - A Summary table of alerts that displays Alert Type and Number of Occurrences, sorted by Alert Type. • Chart - A line chart showing the number of alerts for each Alert Type over a year and month. • Details - A list of each individual alert, including the alert type, start date and time, end date and time, and specific device.

Navigating the Contact Free Continuous Monitoring - Alerts Report

The Contact Free Continuous Monitoring - Alerts report includes the following data elements.

Alert Summary

This table displays a summary of alerts for the selected entity, including the Alert Type and Number of Occurrences for each alert.

Note: Only the most recent 5,000 alert rows are displayed. If more alerts are available, a message is displayed, telling you to narrow your search parameters (Report Start Date, Report End Date, and selected Alert Types).

Alert Summary

Alert Type	Occurences
BedBeforeSensorExpiration	2
BedSensorCharging	1
BedSensorExpired	2
HeartRateHigh	6
HeartRateLow	3
Null	1
RespiratoryRateHigh	3
RespiratoryRateLow	6
UnitMalfunction	1
Unknown	1
UnstableSignal	2
VitalsNoMotion	1

Alert Detail

Displays a list of each alert, including the , Alert Start Date/Time, Alert End Date/Time, Alert Type, and Device.

Alert Detail			
Start Date/Time	**End Date/Time**	**Type**	**Value**
1/17/2022 8:11:01 PM	1/17/2022 8:12:01 PM	RespiratoryRateHigh	44 /min
1/17/2022 9:48:34 PM	1/17/2022 10:24:41 PM	RespiratoryRateHigh	44 /min
1/18/2022 12:12:21 AM	1/18/2022 12:13:22 AM	RespiratoryRateHigh	44 /min
1/18/2022 12:34:22 AM	1/18/2022 12:35:05 AM	RespiratoryRateHigh	44 /min
1/18/2022 12:35:19 AM	1/18/2022 12:46:15 AM	RespiratoryRateHigh	45 /min
1/18/2022 1:03:11 AM	1/18/2022 2:10:22 AM	RespiratoryRateHigh	44 /min
1/19/2022 10:19:21 AM	1/19/2022 10:20:38 AM	RespiratoryRateHigh	45 /min
1/19/2022 10:50:29 AM	1/19/2022 11:08:11 AM	RespiratoryRateHigh	44 /min
1/19/2022 11:30:56 AM	1/19/2022 11:39:16 AM	RespiratoryRateHigh	44 /min
1/20/2022 3:53:04 AM	1/20/2022 3:58:10 AM	RespiratoryRateHigh	48 /min
1/22/2022 8:37:57 AM	1/22/2022 8:38:37 AM	VitalsNoMotion	
1/25/2022 2:04:43 AM	1/25/2022 2:06:15 AM	RespiratoryRateHigh	44 /min
1/25/2022 11:47:21 PM	1/28/2022 12:02:52 PM	RespiratoryRateHigh	45 /min

Note: The number of alerts displayed for the Contact Free Continuous Monitoring - Alerts report is limited to the most recent 5,000 rows. Limiting the number of rows displayed reduces the time required to generate the report.

To display all data returned by the report, narrow the report parameters (for example, reduce the number of days between the start and end dates).

Early Warning Scores Insights Report

Report Details

The Early Warning Scores Insights report includes deterioration metrics, score statistics, score comparisons, score influencers, and sepsis risk factors for the selected entity, location, and/or patient in the selected time period.

Report Filters

Use the following filters to control the information displayed for the Early Warning Scores Insights report.

Entity

Use to select the hierarchy for the report (Enterprise, Region, Organization, Facility).

Location

Select the customer location hierarchy where an event, such as a score or observation, occurred.

Time Period

Select a specific time period of information to display. Please note that reporting times are displayed in Coordinated Universal Time (UTC), not local time.

Scoring Model

Select MEWS or SIRS to display information for either scoring model.

Risk Level

Select to display the risk level associated with a given score (Low Risk, Moderate Risk or High Risk).

Parameter Status

Select to display the status of a clinical parameter within a score (In Range, Out of Range, Not Available). Note that Not Available is the same as missing. Anything with a contribution of 0 points is considered In Range. Anything with a contribution less than 0 points is considered Out of Range and adds points to the overall score.

Parameter Presence

Select to display the presence (or timeliness) of a clinical parameter within a score (Timely, Stale, or Not Available). Please note that Timely is the same as Normal and Not Available is the same as Missing.

Parameter Type

Select the parameter type to display for a score. For example, Heart Rate, Temperature, or AVPU Score.

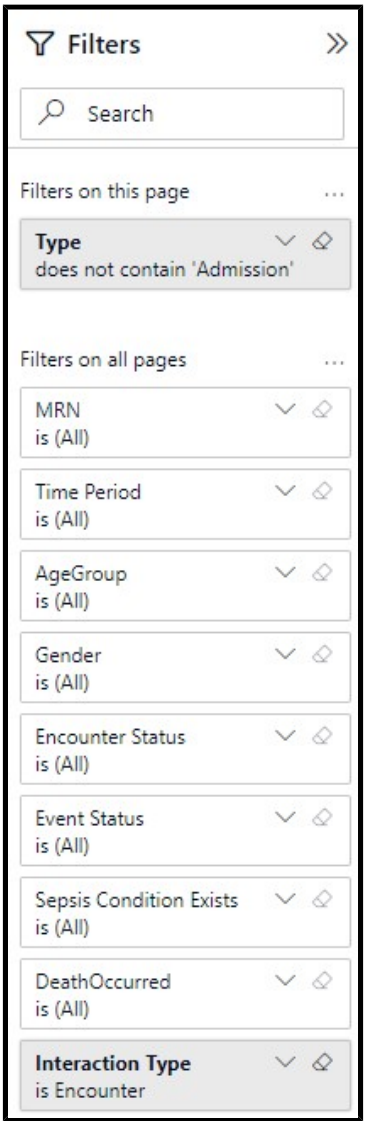
Device Type

Select a specific device type associated with an event. For example, Bed or Vital Signs Monitor.

Deterioration

Select to display a specific indicator or event found within the report data. Available options include Death, Discharge, Septic Shock, Severe Sepsis, and Transfer.

Additional filters are available in the Filters pane on the right side of the page. Click Filters to expand this pane. You can then filter the report based on patient MRN, age group, gender, encounter status, event status, and so forth.



Navigating the Early Warning Scores Insights report

The Early Warning Scores Insights report has three separate pages of data. After you select the report parameters and click View Report, the following data is displayed.

Deterioration Metrics page

Single item cards are displayed for each of the following items on the Deterioration Metrics page:

#Admits

The number of encounter admission records.

#High Risk

The number of patients with one or more high risk scores.

#Sepsis

The number of patients with either a Severe Sepsis Time Zero or a Septic Shock Time Zero identified.

#Transfers

The number of patients with one or more transfers, indicated by a chance in location during their encounter.

#Deaths

The number of patients with a diagnosed condition of death.

The following data elements are also displayed on the Deterioration Metrics page:

- A gauge indicating the Average Score, with minimum and maximum values displayed.
- The #Scores Over time with Average Score clustered bar chart, which displays the number of scores over time, with a line indicating the average score over time.
- The Clinical Parameter Average Contribution to Scores Over Time ribbon chart, which indicates the average contribution of each clinical parameter to the score over time. Note that each clinical parameter can contribute a minimum of 0 points and maximum of 3 points to a given score.

Deterioration Trends page

The Deterioration Trends page displays a stacked chart that indicates the number of patients over time who experienced one or more of the included deterioration events (the deterioration events included in the chart are the ones the user selects using the Deterioration parameter and are displayed in the legend at the top of the chart).

Score Statistics page

The Score Statistics page includes the following data elements:

Clinical Parameter Status (#)

A stacked column chart displaying the number of observations for each clinical Parameter Status.

Clinical Parameter Status (%)

A 100% column chart displaying the percentage of observations for each clinical Parameter Status.

Clinical Parameter Presence (#)

A stacked column chart displaying the number of observations for each clinical Parameter Type.

Clinical Parameter Presence (%)

A 100% column chart displaying the percentage of each clinical Parameter Presence.

Score Comparisons page

The Score Comparisons page includes the following data elements:

#Scores and Average Score Per Location

A bar/line chart that displays the count of scores by Risk Level and the average score value (line) for different locations.

Clinical Parameter Timeliness Per Location

A bar/line chart that displays the count of clinical Parameter Presence and the number of patients (line) for locations.

Sepsis Risk Factors page

The Sepsis Risk Factors page includes the following data:

#Patients With Sepsis Risk Factors

A stacked bar chart that indicates the number of patients in which a score was observed with a given Risk Level with a given Sepsis Risk Factor.

Score Influencers page

The Score Influencers page includes an analysis of different score influencers. Select an option from the What influences Average Score to drop-down list to understand how the selected factor drives early warning scores.

Early Warning Scores - Patient View Report

Report Details

The Early Warning Scores - Patient View report includes metrics related to a selected patient's early warning scores during a selected time period during a selected encounter. This report also includes Sepsis risk factors, Sepsis specific details, and the time line of events observed during the reporting period for the selected encounter associated with a patient's scores.

Facility 1

Early Warning Scores - Patient View

4/1/2022 01:00 PM to 4/4/2022 01:00 PM

Executed On: 5/25/2022 3:27:47 PM

Patient Demographics	
Patient Name:	Lopes, Peyton
MRN:	S01000v
Date of Birth:	May 8, 1937
Age:	85
Gender:	male
Is Deceased:	False

Admission Details	
Admission Date/Time:	4/1/2022 1:50:00 PM
Discharge Date/Time:	4/4/2022 12:02:00 PM

Location History	Start Date/Time	End Date/Time
Bed MS_101_A-->Room 101-->Med_Surg-->Floor 1-->Building 1-->Facility 1	4/1/2022 1:50:00 PM	4/1/2022 3:30:00 PM
Bed OR_302_B-->Room 302-->OR-->Floor 1-->Building 1-->Facility 1	4/1/2022 3:30:00 PM	4/1/2022 7:00:00 PM
Bed PACU_404_A-->Room 404-->PACU-->Floor 1-->Building 1-->Facility 1	4/1/2022 7:00:00 PM	4/1/2022 11:00:00 PM
Bed MS_121_A-->Room 121-->Med_Surg-->Floor 1-->Building 1-->Facility 1	4/1/2022 11:00:00 PM	4/4/2022 12:02:00 PM

Care Team Assignments

Care Team 1/3/2020 7:20:18 PM to 1/13/2020 8:00:18 AM:

The metrics included in the report are:

- Average Modified Early Warning Score (MEWS)
- Average Systemic Inflammatory Response Score (SIRS)
- Score trends for MEWS
- Clinical parameter average contribution to MEWS over time
- Clinical parameter average contribution to SIRS over time
- MEWS average score trends
- MEWS average score and clinical parameter observation trends
- Sepsis identification criteria and time
- Septic shock identification criteria and time
- Sepsis bundle tasks
- SIRS average score trends
- SIRS average clinical parameter value over time (month/day/hour) showing contribution to score
- Timeline of events

In addition, the Early Warning Scores - Patient View report includes patient demographic information, admission details, location history, and care team assignments.

Report Parameters

Facility	Select the Facility for the report.
Patient MRN	Select the MRN for the patient for whom you want to run the report.
Encounter	Select the patient encounter on which you want to run the report.
Report Start Date	Defaults to the selected encounter's start date. Select a different start date for the report, if necessary.
Report Start Time	Select the start time for the report.
Report End Date	Defaults to the selected encounter's end date. Select a different end date for the report, if necessary.
Report End Time	Select the end time for the report.
Zoom Lens Date	Select the Zoom Lens Date. The default value is the Report End Date.
Zoom Lens Time	Select half hour increments from 12:00AM to 11:30PM; defaults to hour of Report End Time.
Zoom Lens Coverage	Select from 1, 2, 3, 4, 6, 8, or 12 hours. Default is 1 hour. The Zoom Lens focuses on the selected coverage period leading up to the selected Zoom Date and Time.
Risk Score	Select the type of early warning score to display in the report, either SIRS or MEWS.
Event Types	Select the types of encounter events to include in the report, if desired. For example, Alert, Admission, Medication Administration, **CFCM On/Off**, **CFCM Threshold** and so forth.

Navigating the Early Warning Scores - Patient View report

After you select the report parameters and click View Report, the following data is displayed.

Note: The number of clinical parameters and scores displayed in this report is limited to 3,000 rows. Limiting the number of displayed values allows the report to generate more quickly.

If you run this report and your results exceed the number of rows/values listed above, a message is displayed asking you to narrow your time frame (Report Start Date and Report End Date) to display all the data returned.

Report actions

File

Click to display the Print option, enabling you to print the report.

View

Click to display the viewing options for the report, which include Default (landscape) and Page View, which displays a print preview of the report.

Export

Displays various options for exporting the report, including Microsoft Excel, PDF, Microsoft PowerPoint, and XML.

Parameters

Click to hide the report parameters and view more of the report area. Click again to display the parameters.

Print Now

Opens the report in the Print page, enabling you to print it as quickly as possible.

Patient information

Patient Demographics

Displays all the details for the patient on which the report is based. This includes Patient Name, MRN, Date of Birth, Age, Gender, and so forth.

Admission Details

Displays the Admission Date/Time and the Discharge Date/Time.

The date and time at which the encounter started and ended are displayed under Admission Details, regardless of any selections the user makes for the Report Start Time and Report End Time parameters. In other words, modifying the default parameter dates affects the time frame for the report, but does not impact what is displayed in Admission Details.

The italic text under the report title indicates the time frame for the report content, such as vitals and alerts.

Location History

Displays the patient location history details for the selected encounter. These details are displayed in hierarchical format. For example General Hospital → Main → Radiology → Room 101 → Bed A.

The Start Date/Time (the time at which the patient was first brought to the location) and the Location End Date/Time (the time at which the patient left the location) are also displayed.

Care Team Assignments

Displays the care team assignments associated with a patient during the selected encounter. The Start Date, End Date, and Member(s) of each care team are displayed. The full name of each care team member is displayed when available, otherwise the last name is displayed.

SIRS Sepsis Risk Factors

Lists all SIRS Sepsis risk factors associated with the selected patient for the selected time period.

Score Trends

This chart displays the average MEWS and SIRS for the patient over time.

Clinical Parameter Average Contribution to MEWS Score Over Time

Displays the clinical parameters and their average contribution to the patient's MEWS score over time.

Clinical Parameter Average Contribution to SIRS Score Over Time

Displays the clinical parameters and their average contribution to the patient's SIRS score over time.

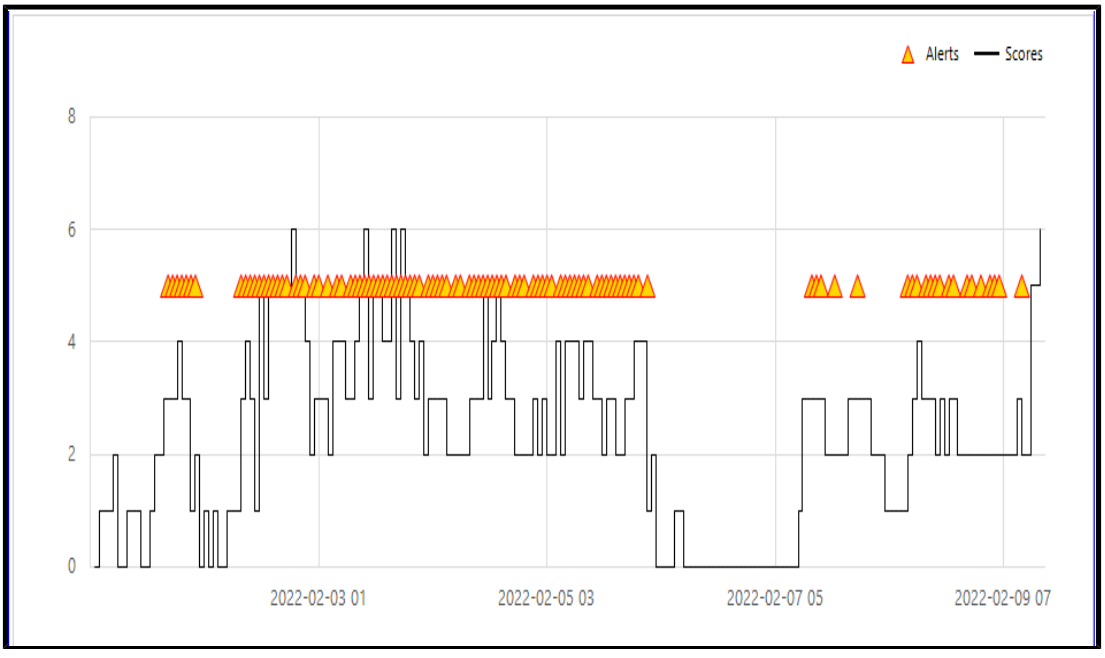
MEWS Scores, Alerts and Clinical Parameter Observation Trends

Displays the patient's MEWS scores in a step chart with each alert overlaid on top.

SIRS Scores, Alerts and Clinical Parameter Observation Trends

Displays the patient's SIRS scores in a step chart with each patient alert overlaid on top.

Figure 3. Example of MEWS / SIRS Scores, Alerts and Clinical Parameter Observation Trends display



Sepsis-Specific Details

If the patient's encounter includes a Sepsis Time Zero, the Sepsis-Specific Details section is available. This section includes the following information.

Sepsis Identification Criteria and Time

This table displays the details of each event that contributed to Sepsis identification in the patient, as well as the event start date and time. The events are sorted by the date and time at which they occurred and include the Severe Sepsis Time Zero event.

Septic Shock Identification Criteria and Time

This table displays the details of each event that contributed to the identification of Septic Shock in the patient, including the start date and time of each. The events are sorted by the date and time at which they occurred and include the Septic Shock Time Zero event.

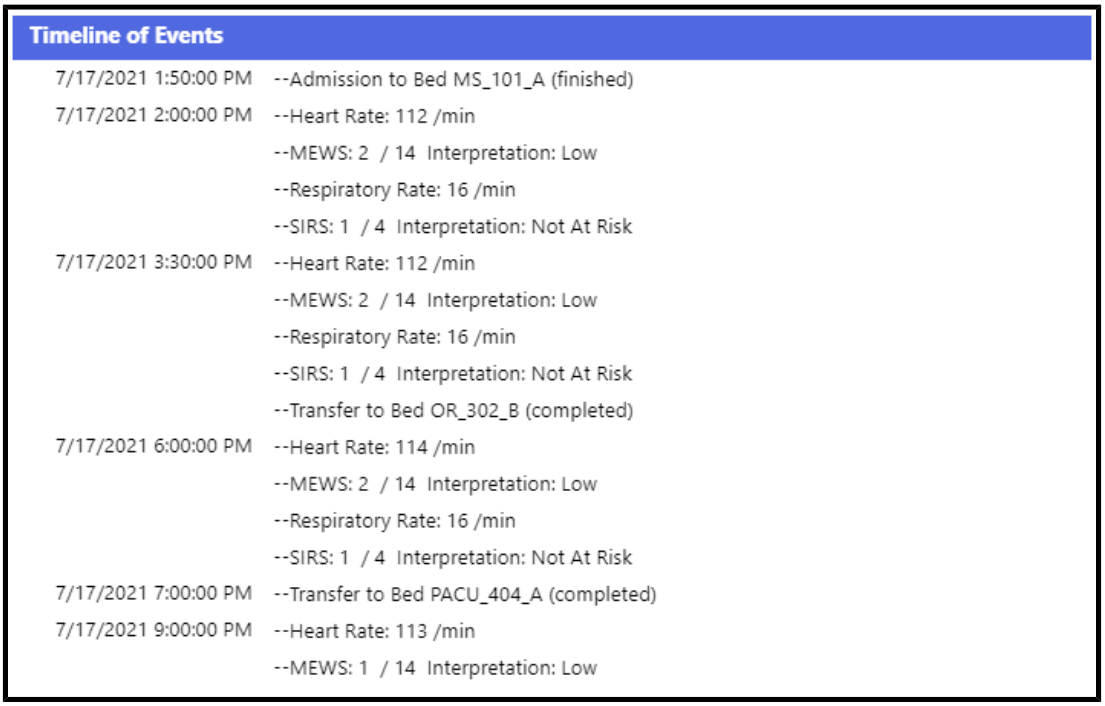
Sepsis Bundle Tasks

This table displays each task in the applicable bundle. Tasks are grouped by Sepsis severity (Severe Sepsis or Septic Shock) and by Bundle (3hr or 6hr). The task name is displayed (for example, 3hr: Initial Lactate), as well as the Time Zero Offset in hours, rounded to two digits, that passed between Time Zero and the task (for example, 1.33). The task Compliance is also displayed and can be one of the following:

- Compliant when completed within the specified time for bundle compliance.
- Non-Compliant: Absent when the task was not completed within or after the specified time for bundle compliance.
- Non-Compliant: Late when the task was found after the specified time for bundle compliance.

Timeline of Events

Displays a time line of events during the patient's encounter. This time line includes the events you selected from the Event Types list in the report parameters. Events listed include the event details, the event start date and time, and the event actors (if present).



Timeline of Events	
7/17/2021 1:50:00 PM	--Admission to Bed MS_101_A (finished)
7/17/2021 2:00:00 PM	--Heart Rate: 112 /min
	--MEWS: 2 / 14 Interpretation: Low
	--Respiratory Rate: 16 /min
	--SIRS: 1 / 4 Interpretation: Not At Risk
7/17/2021 3:30:00 PM	--Heart Rate: 112 /min
	--MEWS: 2 / 14 Interpretation: Low
	--Respiratory Rate: 16 /min
	--SIRS: 1 / 4 Interpretation: Not At Risk
	--Transfer to Bed OR_302_B (completed)
7/17/2021 6:00:00 PM	--Heart Rate: 114 /min
	--MEWS: 2 / 14 Interpretation: Low
	--Respiratory Rate: 16 /min
	--SIRS: 1 / 4 Interpretation: Not At Risk
7/17/2021 7:00:00 PM	--Transfer to Bed PACU_404_A (completed)
7/17/2021 9:00:00 PM	--Heart Rate: 113 /min
	--MEWS: 1 / 14 Interpretation: Low

The Timeline of Events section will display the most recent 10,000 rows of data. If more than 10,000 rows is available, a message is displayed asking you to narrow your report parameter selections (Report Start Date, Report End Date, Event Types) in order to display all data returned.

Contact Free Continuous Monitoring Insights Report

The Contact Free Continuous Monitoring Insights report displays information for contact free continuous monitoring devices within the selected entity.

Report Filters

Entity

Use to select the hierarchy for the report (Enterprise, Region, Organization, Facility).

Location

Select the customer location hierarchy where an event, such as a score or observation, occurred.

Time Period

Select a specific time period of observation information to display.

Observation

Select the type of observation to include in the report, either Heart rate or Respiratory rate.

Status

Select the status of the observations to include in the report.

Navigating the Contact Free Continuous Monitoring Insights report

The Contact Free Continuous Monitoring Insights report includes the following data elements.

Device Metrics page

The Device Metrics page includes a multiple-row card, which displays the following information for each device type (for example, Bed or Vital Signs Monitor).

- Observations: Displays the number of observations recorded by the device.
- Average: The average observed value.
- Minimum: The minimum observed value.
- Maximum: The maximum observed value.
- Std Dev: The standard deviation of the observed value.
- Avg Minutes To Next Value: The time between two observed values for the same patient and location.
- Average Change:

The Device Metrics page also includes:

Observation Boxplot

A box plot of observed values, categorized by device type.

Observation Distribution

The number of observations, organized by the value observed and categorized by device type.

Deltas and Timing page

The Deltas and Timing page of the Contact Free Continuous Monitoring report includes:

Boxplot for Average Minutes between Observations

Indicates the distribution of minutes between observations over time for each device type.

Boxplot for Average Change between Observations

Indicates the distribution of the delta value between observations over time for each device type.

Falls Investigation - Patient View Report

The Falls Investigation - Patient View report contains the patient bed settings, status data, and alerts that enables you to investigate patient falls and compliance with your facility's falls protocol.

Bed settings displayed in this report include, but are not limited to:

- Patient Detected
- Falls Risk
- Bed Exit settings and alerts
- Brakes Status
- Bed Height
- Head Rail Status
- Foot Rail Status

Report Details

The Falls Investigation - Patient View report displays information about the selected patient and incident at the top of the page, including patient demographics, and the fall being investigated.

Report Parameters

Parameter	Description
Facility	Select the facility on which to run the report.
Patient MRN	Select the medical record number (MRN) for the patient for whom you want to run the report.
Date of Incident	Click the calendar icon () to select the date on which the fall or other incident occurred.
Hour of Incident	Use to select the hour in which the incident occurred.
Minute of Incident	Use to select the minute in which the incident occurred. For example, if the incident occurred at 5:02 AM, you would select 5 AM for Hour of Incident and 02 for Minute of Incident.
Hours to Show Prior to Incident	Select the number of hours to display prior to the incident. This can help you determine the factors that led up to the incident. Available values are 1 through 6.
Minutes to Show After Incident	Select the number of minutes to show after the incident. Available options are 15, 30, 45, and 60.
View	Use to select the display of the report. Select Graphical to display the report information using graphical charts. Select Tabular to display report data in a table with rows and columns. Using tabular view better enables you to export the report data into Microsoft Excel. Examples of both views are displayed below.

Navigating the Falls Investigation - Patient View Report

When you run the Falls Investigation - Patient View report in Graphical View, the following information is displayed:

Patient Demographics

Displays the patient's full name, medical record number (MRN), date of birth, age, gender, Is Deceased flag, and Deceased Date, if applicable.

Admission Details

Displays the patient's admission details, including the date and time of admission to the facility and the date and time of discharge.

Falls Investigation

Displays the date and time of the incident for which you ran the report.

Room Assignments

Displays a chart with the details of each location to which the patient was assigned during the time period you selected using the report parameters. These details include the location name, the date and time at which the patient was assigned to the location, the date and time at which the patient was unassigned from the location, and the duration the location was active.

Patient Detected

This chart shows when the patient was detected in their assigned bed (True), as well as periods of time when they were not detected, or were out of bed (False).

Falls Risk

The Falls Risk chart shows the patient's Falls Risk Assignment during the selected time period. This includes the assignment value (At Risk, Not at Risk, or Unknown), the effective start date and time, effective end date and time, and the duration that the Falls Risk Assignment was active.

Bed Exit

The Bed Exit chart displays the duration of active bed exit settings and alerts during the selected time period. For bed exit, this can include when the bed was in OutofBedMode or ExitingMode, when the Bed Exit setting was turned off, and when there was a bed exit alert.

Bed Brake

The Bed Brake chart displays the duration of active bed brake settings and alerts. For example, amount of time the bed brake was active during the selected time period.

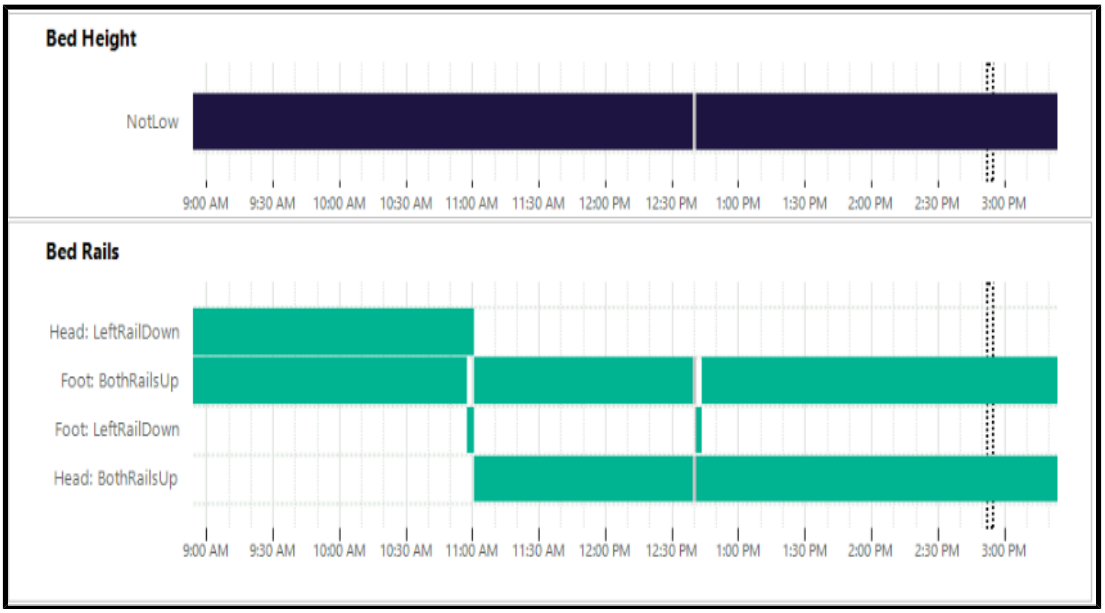
Bed Height

The Bed Height chart displays the duration of each active bed height setting and alert.

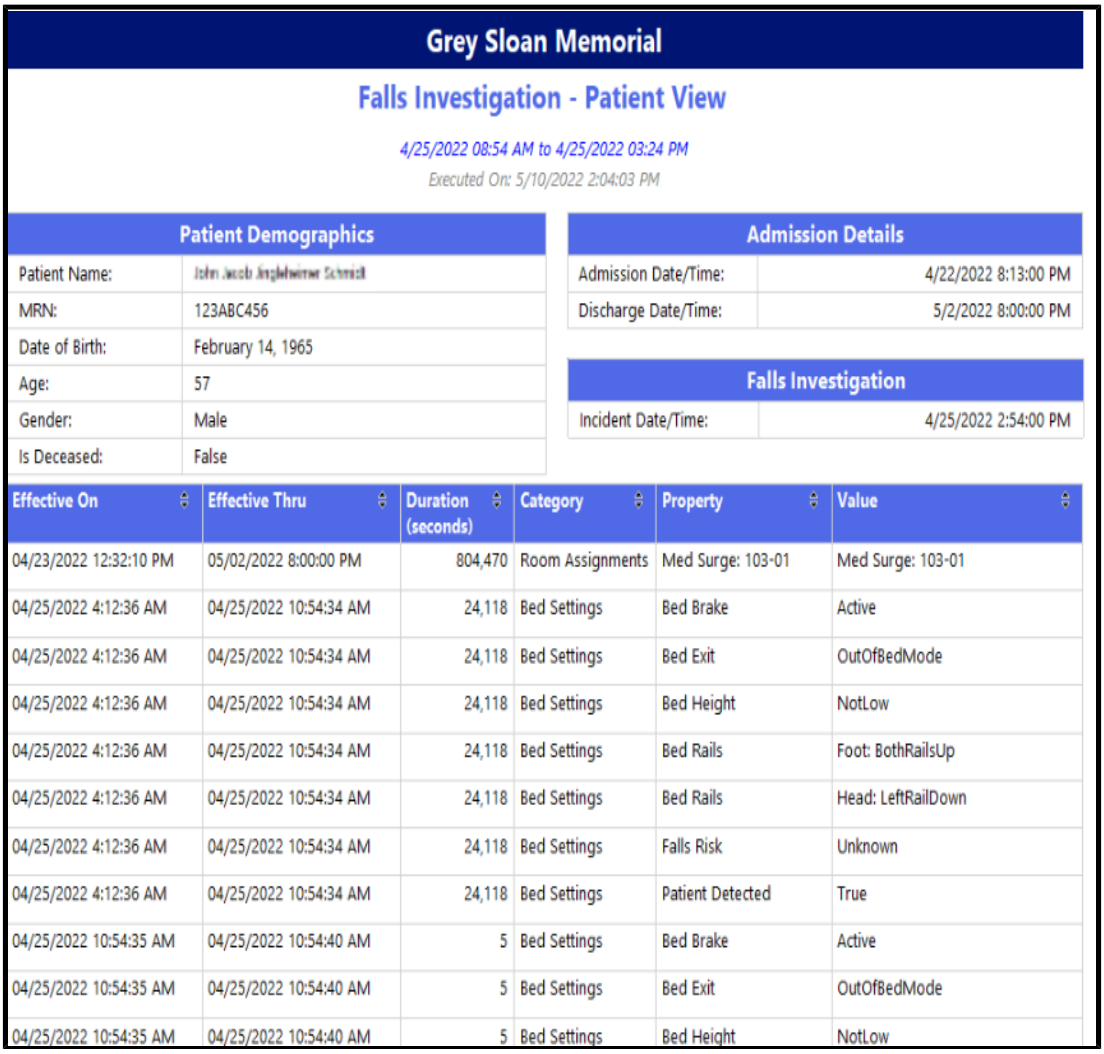
Bed Rails

The Bed Rails chart displays the duration of each active bed rail setting and alert. For example, the amount of time the head and foot rails were up or down.

Figure 4. Falls Investigation - Patient View report in Graphical View



When you run the report in Tabular view, a table is displayed with the following information:



Grey Sloan Memorial

Falls Investigation - Patient View

4/25/2022 08:54 AM to 4/25/2022 03:24 PM

Executed On: 5/10/2022 2:04:03 PM

Patient Demographics	
Patient Name:	[redacted]
MRN:	123ABC456
Date of Birth:	February 14, 1965
Age:	57
Gender:	Male
Is Deceased:	False

Admission Details	
Admission Date/Time:	4/22/2022 8:13:00 PM
Discharge Date/Time:	5/2/2022 8:00:00 PM

Falls Investigation	
Incident Date/Time:	4/25/2022 2:54:00 PM

Effective On	Effective Thru	Duration (seconds)	Category	Property	Value
04/23/2022 12:32:10 PM	05/02/2022 8:00:00 PM	804,470	Room Assignments	Med Surge: 103-01	Med Surge: 103-01
04/25/2022 4:12:36 AM	04/25/2022 10:54:34 AM	24,118	Bed Settings	Bed Brake	Active
04/25/2022 4:12:36 AM	04/25/2022 10:54:34 AM	24,118	Bed Settings	Bed Exit	OutOfBedMode
04/25/2022 4:12:36 AM	04/25/2022 10:54:34 AM	24,118	Bed Settings	Bed Height	NotLow
04/25/2022 4:12:36 AM	04/25/2022 10:54:34 AM	24,118	Bed Settings	Bed Rails	Foot: BothRailsUp
04/25/2022 4:12:36 AM	04/25/2022 10:54:34 AM	24,118	Bed Settings	Bed Rails	Head: LeftRailDown
04/25/2022 4:12:36 AM	04/25/2022 10:54:34 AM	24,118	Bed Settings	Falls Risk	Unknown
04/25/2022 4:12:36 AM	04/25/2022 10:54:34 AM	24,118	Bed Settings	Patient Detected	True
04/25/2022 10:54:35 AM	04/25/2022 10:54:40 AM	5	Bed Settings	Bed Brake	Active
04/25/2022 10:54:35 AM	04/25/2022 10:54:40 AM	5	Bed Settings	Bed Exit	OutOfBedMode
04/25/2022 10:54:35 AM	04/25/2022 10:54:40 AM	5	Bed Settings	Bed Height	NotLow

MRN Lookup Report

The MRN Lookup report includes a table that lists all patient/room assignments that were active for any part of the specified time period in the specified room. All beds belonging to the specified room are included.

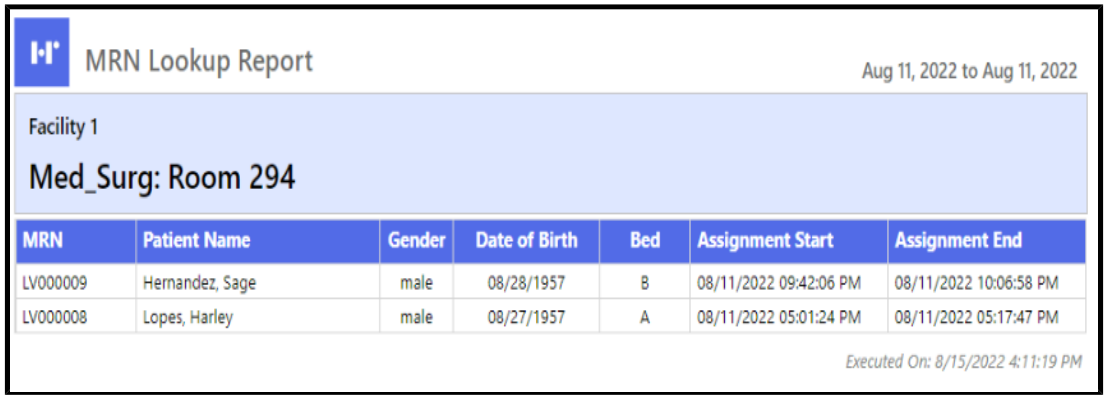
The MRN Lookup report includes the following fields:

- MRN
- Patient Name
- Gender
- Date of Birth
- Bed
- Assignment Start/End

If no data is found, a message displays indicating that no assignments are found for the specified time period.

Report Parameters

Parameter	Description
Authorized Facilities	Enter a comma separated list of 4-character identifiers representing the Facilities that the currently logged in user should be able to see in this report.
Facility	Select the Facility for the report from the drop-down list.
Unit	Select the Unit for the report from the drop-down list.
Room	Select the Room for the report from the drop-down list.
Assignment Start	Click  to select an assignment start date from the calendar.
Assignment End	Click  to select an assignment end date from the calendar.



MRN Lookup Report

Aug 11, 2022 to Aug 11, 2022

Facility 1

Med_Surg: Room 294

MRN	Patient Name	Gender	Date of Birth	Bed	Assignment Start	Assignment End
LV000009	Hernandez, Sage	male	08/28/1957	B	08/11/2022 09:42:06 PM	08/11/2022 10:06:58 PM
LV000008	Lopes, Harley	male	08/27/1957	A	08/11/2022 05:01:24 PM	08/11/2022 05:17:47 PM

Executed On: 8/15/2022 4:11:19 PM

Standard Reports without PHI

The standard reports that do not include protected health information (PHI) are described in this section.

The Standard Reports without PHI contain aggregate data that is summarized at the year/month level and is intended to provide insights into patterns, trends and outliers observed in the data. The aggregate data model does not contain PHI and for that reason users authorized with the Reporting 'Read' privilege are eligible to view these reports.

The technology chosen for these reports is Power BI Standard/Analytical Reports. This technology is intended to promote a highly interactive reporting experience with a relatively short authoring period. However, this tool is not as "pixel perfect" and customizable as the Power BI Paginated reports used for the standard reports with PHI. When printing and exporting for example, Power BI Standard/Analytical reports provide a "what you see is what you get" result. This means that if

there is a scrollbar on a reporting element on the screen, the report will be printed and exported with the scrollbar rather than automatically expanding the element. With this in mind, the reports were designed to avoid the need to auto-grow.

Reports in this category all utilize Power BI import mode, meaning that the reporting data is physically imported into Power BI on a scheduled basis. The data is de-identified and aggregated on import as it is extracted from the rpt and model schema database elements and it is subject to the data retention defined for each customer (for example, 365 days for Patient Risk Surveillance, 90 days otherwise).

Click one of the non-PHI report names below for more information.

Sepsis Insights Report (on page 124)

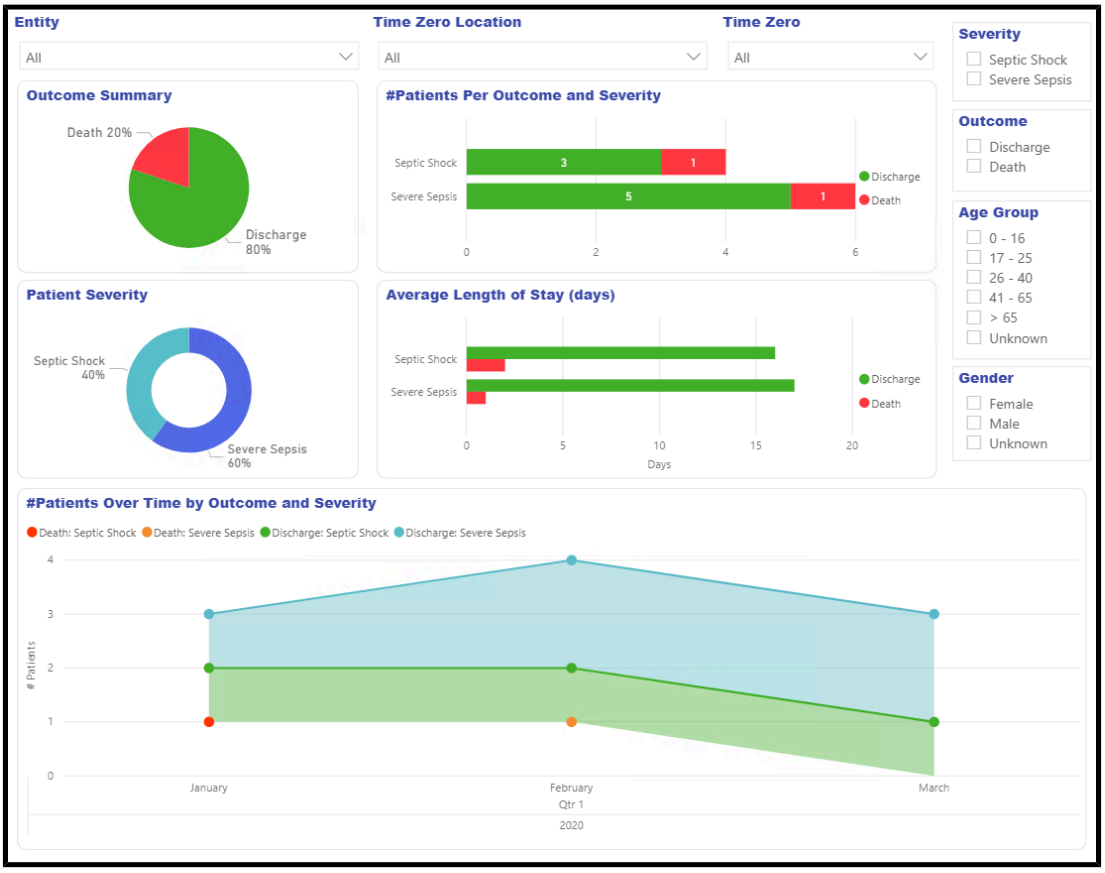
Sepsis Bundle Compliance Report (on page 128)

Sepsis Insights Report

Report Details

The Sepsis Insights report displays sepsis severity and outcome trends for patients. This report also includes additional pages where you can view data about pathogens detected in patient blood cultures, antibiotics that were administered, and age and gender demographic information for sepsis patients.

Figure 5. Sepsis Insights reports Home page



Report Filters

Use the following filters to control the display of data on all pages of the Sepsis Insights report.

Entity

Select the entity level for which to view the report data (Enterprise, Region, Organization and/or Facility).

Time Zero Location

Select the location where the Time Zero, or time of sepsis presentation, occurred.

Time Zero

Select the Time Zero year, quarter, and/or month for which to display the report.

Severity

Select the level of sepsis severity to display (either Severe Sepsis or Septic Shock). If a patient had both levels, the higher severity level is displayed.

Severity

Select the outcome to display, either Discharge or Death.

Age Group

Select the age group for the report.

Gender

Select the patient gender for the report.

Navigating the Sepsis Insights Report

Home page

The Home page of the report includes:

Outcome Summary

Illustrates the percentage of each patient Outcome (discharge or death) for the selected entity.

#Patients Per Outcome and Severity

Displays the number of patients per outcome (discharge or death) and severity (septic shock or severe sepsis) within the selected entity.

Patient Severity

Displays the percentages of each type of patient severity (septic shock and severe sepsis) within the selected entity.

Average Length of Stay (days)

Displays the average length of stay, in days, for each outcome and each severity type.

#Patients Over Time by Outcome and Severity

Displays the number of patients over time for each severity and outcome type.

Gender Demographics page

The Gender Demographics page of the report includes:

Outcomes and Severity by Gender

This bar chart illustrates sepsis severity and outcome of both male and female patients.

Patient Gender

Displays the percentage of male and female patients within the selected entity.

Patient Age Group and Gender

Displays the number of male and female patients, separated by age group.

Avg Length of Stay by Gender (days)

Displays the average length of stay, in days, for male versus female patients.

Patients Over Time by Gender

Displays the number of patients of each gender over time.

Age Demographics page

The Age Demographics page of the report includes:

Outcomes and Severity by Age Group

Displays the number of patients in each age group that share the same sepsis severity and outcome.

Patient Age Group

Illustrates the percentage of patients within each age group for the selected entity.

Patient Gender and Age Group

Displays the number of male and female sepsis patients separated by their age group.

Avg Length of Stay by Age Group (days)

Displays the average length of stay for sepsis patients, separated by age group.

Patients Over Time by Age Group

Displays the number of sepsis patients within each age group over time.

Pathogens page

The Pathogens page displays two elements for reporting on pathogens detected in patient blood cultures.

The Pathogens Detected stacked bar chart illustrates the number of patients for whom each pathogen was detected.

The Pathogens Detected link chart displays pathogens detected over time for each type of pathogen. This metric is the number of patients where the pathogen was detected via a blood culture.

Antibiotics page

The Antibiotics page includes two data elements that report on the antibiotics that were administered to sepsis patients.

The Antibiotics Administered stacked bar chart displays the number of patients that were given each type of antibiotic, as well as the outcomes for those patients.

The Antibiotics Administered line chart displays each type of antibiotic administered over time. This metric is the number of patients who received the antibiotic.

Trends page

The Trends page includes:

Outcome Summary

This pie chart displays the percentages for each patient outcome.

#Patients Per Outcome and Severity

Displays the number of patients with each severity level and outcome.

Patient Severity

Displays the percentages for each patient outcome.

Average Length of Stay (days)

Displays the average number of days that each patient's encounter lasted, broken down by severity and outcome.

#Patients Over Time by Outcome and Severity

Displays the number of patients over time with each outcome and severity level.

Comparisons page

The Comparisons page includes:

Patient Outcomes and Severity by Unit

A clustered column chart that displays the number of patients per Facility/Unit, broken down by outcome and severity.

Patients Per Unit

A tree map that displays the number of sepsis patients per Unit.

Sepsis Bundle Compliance Report

Sepsis bundle elements must be implemented when there is a Time Zero instance (a case of Severe Sepsis or Septic Shock). These bundle elements are time-based and are considered complete when all the tasks associated with them are complete. Overall compliance is only achieved when all of the tasks are completed on time.

Report Details

The Sepsis Bundle Compliance report contains bundle compliance metrics to enable you to complete bundle elements on time. The elements of this report include graphic representations of the following:

- The percentage of each result category for all bundle tasks.
- The percentage of bundle tasks completed and the subset of those tasks that were completed on time (compliant).
- The percentage compliance for each task over time (based on Time Zero).
- Percentage compliance for each task across the customer location hierarchy, tied to the location that was active at the time of the task assignment.
- The percentage of bundles that were compliant.
- The number of cases, the percentage of bundles completed on time (compliant), and the percentage of all bundles completed for each severity level or bundle combination.
- Percentage of bundle compliance over time.
- Percentage of bundle compliance across your (the customer's) location hierarchy, based on the location of the Time Zero.
- The average time to completion from Time Zero for each bundle task.

Report Filters

The following filters can be used to control the display of data on all pages of the Sepsis Bundle Compliance report.

Entity

Use to select the tenant hierarchy (Enterprise, Region, Organization, Facility) for which the report is displayed.

Time Zero Location

Select the location of the Time Zero.

Bundle Task Location

Select the location that was active when a bundle task was generated.

Time Zero

Select the year, quarter, and/or month of the Time Zero date.

Bundle

Select the Sepsis severity option and bundle option for the report.

Task

This filter can be found within the Filters pane on the right side of the page. Use to select the type of bundle compliance task for which the report is displayed.

Navigating the Sepsis Bundle Compliance report

After you select the report parameters and click View Report, the following data is displayed.

Home page

The Home page of the Sepsis Bundle Compliance report includes:

Bundle Compliance

This gauge indicates the percentage of bundles that were compliant.

Bundle Compliance table

Displays the number of sepsis cases of each type, the percentage of all bundles completed on time (compliant), and the percentage of all bundles completed for each severity and bundle combination.

Bundle Task Compliance Results

This pie chart indicates the percentage of each result category for all sepsis bundle tasks.

Hours to Completion From Time Zero

Displays the average time to completion from Time Zero for each bundle task. Users can hover over each bar on this chart to display a tool tip that includes the details for each bundle task, including time values converted to minutes.

Bundle Task Completion

Displays the percentage of bundle tasks completed, as well as the subset of those tasks that were completed on time (compliant).

Trends page

The Trends page

Bundle Compliance Trends

This clustered column chart displays the percentage of bundle compliance over time.

On Time Bundle Task Completion Trends

Illustrates the percentage compliance for each task over time (based on Time Zero).

Comparisons page

The Comparisons page includes:

Bundle Compliance Comparisons

Displays the percent bundle compliance across the customer location hierarchy, based on the Time Zero location.

On Time Bundle Task Completion Comparisons

Displays the percentage compliance for each bundle task across the customer location hierarchy, based on the location that was active at the time of the task assignment.

Falls Protocol Compliance Insights Report

Use the Falls Protocol Compliance Insights report to view relevant bed settings over a selected time period and ensure your facility is complying with standard falls risk protocols.

The Falls Protocol Compliance Insights report does not contain protected health information. It displays only de-identified data, enabling you to identify trends between bed settings and patient falls at your facility.

Bed settings that are relevant to falls and are included in this report include:

- Patient positioning alarm setting (also referred to as Bed Exit)
- Bed height
- Brake switch status
- Bed rails (including the number of combined head and foot rails and whether they are up or down)

Report filters

Filters are displayed at the top of the page and include the following:

Entity

Use to select the enterprise, region, or organization for which you want to view the report.

Location

Use to select the location within the chosen hierarchy for which you want to view the report.

Time Period

Use to select the time period for the report. For example, select Last, enter a 6 in the text field, and then select Months to view

Falls Risk selector

Use to view only beds that contain falls risk patients (At Risk), beds that contain patients who are not at risk for falls (Not at Risk), or patients whose falls risk status is unknown (Unknown).

Compliance Settings

Use to select the compliance settings to view in the report. Press and hold the CTRL key to select multiple items from the same category.

Figure 6. Report filters

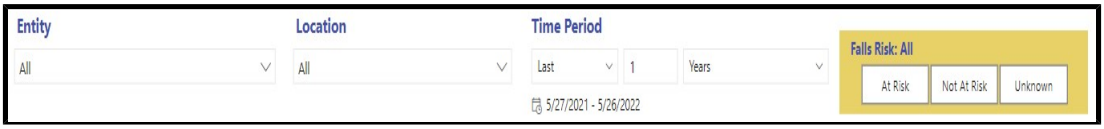


Figure 7. Compliance Settings

Navigating the Falls Protocol Compliance Insights Report

The Falls Protocol Compliance Insights report includes several tabs, which you an use to view different bed setting and compliance information.

Overview

Displays the chosen location's percent of compliance over the selected time period.

Location Comparison

Use to compare the compliance percentage levels for different locations within an entity.

Bed Exit

Displays a chart showing the percentage of time each bed exit mode was used within the specified time period.

Brake Switch

Displays a chart showing the percentage of time each brake switch setting was used within the specified time period.

Bed Height

Displays a chart showing the percentage of time each bed height setting was used within the specified time period.

Bed Rails

Displays a chart showing the percentage of time each bed rail was up or down during the specified time period.

About Voalte Family Administration

The Voalte Family Administration portal within the Digital Health Platform enables you to configure Voalte Family™ Messaging.

Users with Voalte Family Administrator privileges can:

- Add locations to a healthcare facility that is using the Voalte Family™ Messaging application.
- Configure settings for Voalte Family™ Messaging.

If you do not have Voalte Family Administrator privileges, you will not see the Voalte Family Administration tile when you log into the Digital Health Portal.

For more detailed information, see the Voalte Family™ Solution Voalte Family Admin Instructions for Use

About the Virtual Care Solution

Attention: The Virtual Care Solution is not currently released. The documentation in this Help Center is to be used for testing purposes only.

The Virtual Care Solution product provides the ability to perform voice and video collaboration between Virtual Care Requestors and Remote Providers. The Virtual Care Solution also provides access to near real-time clinical data from the patient's electronic medical record (EMR) and the Patient Risk Surveillance product via Smart Device Connectivity.

See the Hillrom Virtual Care Solution R1.0.000 Help Center (on page) for more detailed information.

Intended Use

The Virtual Care Solution is intended to support video consultation services among the clinical team, regarding a patient's condition and to provide access to a patient's near real-time clinical data.

Virtual Care Solution is intended for use in hospitals where intensive and critical care are provided with 24-hour medical supervision, constant monitoring is required, and the provision of life support systems and equipment are used in medical procedures that are essential to maintain or improve the vital function of the patient.

Virtual Care Solution is intended for use in hospitals and other medical facilities that provide acute care, where medical supervision and monitoring are required, and medical equipment used in medical procedures is often provided to maintain or improve the condition of the patient.

Intended Users

Virtual Care Solution is intended for the following types of users:

Virtual Care Requestors

Those requesting a virtual care consultation. Includes Registered Nurses (RN), Care Managers, Care Coordinators, Licensed Practical Nurses (LPN), Nursing Assistants (CNA, PCT, PCA), and Hospital Unit Coordinators.

Remote Providers

Providers outside the organization who respond to requests created by Virtual Care Requestors. These can include Physician Assistants (PA), Nurse Practitioners, and Physicians with specialties such as Neurologists, Psychiatrists, Intensivists, and so forth.

Hospital Administrators

Includes Registered Nurses (RN), Care Managers, Care Coordinators, Licensed Practical Nurses (LPN), Nursing Assistants, (CNA, PCT, PCA), Physicians, Respiratory, Physical, and Occupational Therapists, and Imaging and Laboratory Technicians.

Non-Clinical Hospital Staff

Includes Biomeds, Clinical Informaticists, Hospital Information Technology personnel, Hospital Information Technology Security Officers, and so forth.

Hillrom Technical Service Personnel

Includes Service Technicians, Service Managers, Technical Support, and so forth.

Third Parties

These can include Hillrom partners and analytics vendors.

Data Security and Privacy

Data Security

The Hillrom Digital Health Platform (DHP) enables connectivity to a variety of devices and applications in the healthcare environment. These can include medical devices (for example, beds, nurse communication equipment, and vitals monitors), computers, smart devices (like phones and tablets), and customer infrastructure such as an EMR or ADT system. While these systems may all connect in different ways, the security of the connection and the data is of utmost importance.

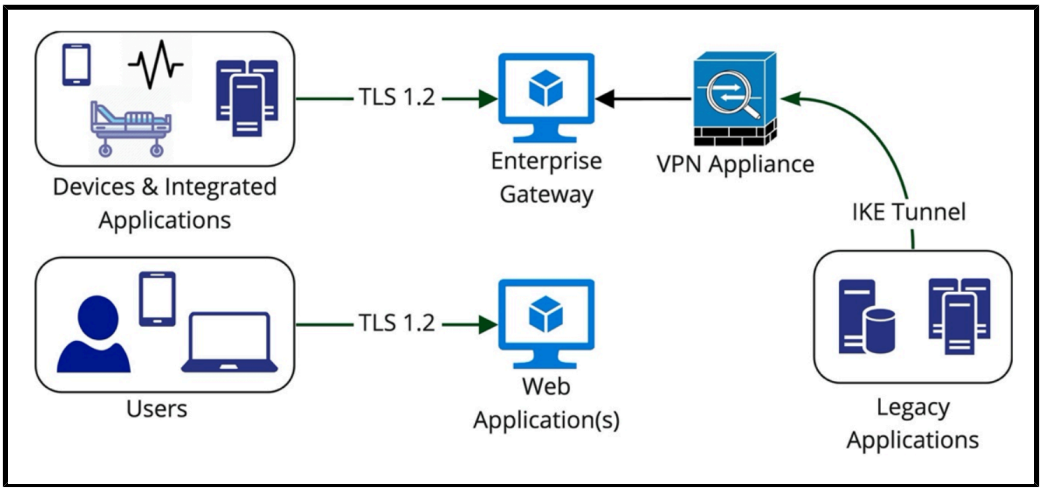
To ensure the security and confidentiality of the data, all data contained within the Hillrom DHP is encrypted while at rest. Hillrom uses three data storage types depending on how the data is formatted or will be used: blob storage, relational databases, and document databases. The Microsoft Azure platform provides AES-256 encryption for data at rest for each of these components, using service managed encryption keys which undergo periodic rotation.

Data Encryption

The Hillrom DHP also enforces the encryption of all data in transit, both incoming and outgoing. Depending on how the DHP resources are accessed, this data encryption can be enforced in two different ways.

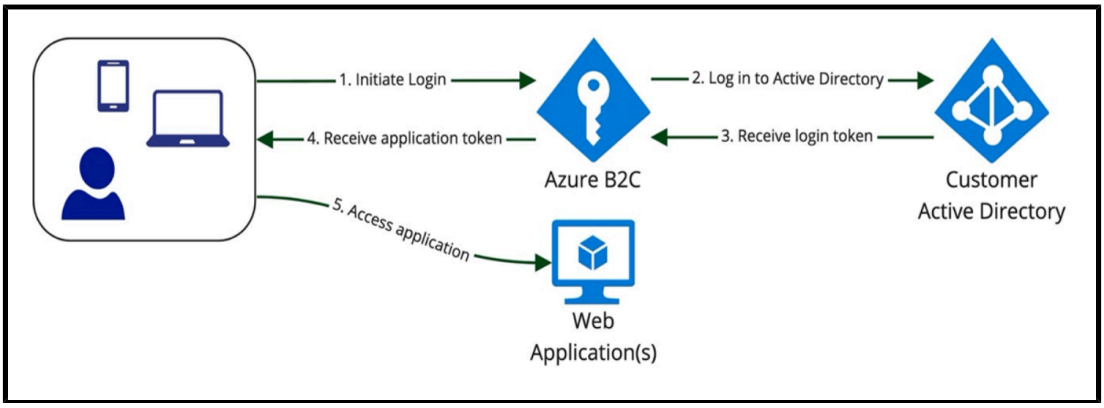
For resources that are assigned direction over the public Internet (such as web applications and device connectivity), Hillrom requires a minimum of TLS 1.2 for all connections. The specific ciphers will be negotiated during the establishment of the connection, but compatible systems can negotiate up to AES256 encryption, with SHA384 hashing.

In some deployments, especially when you are connecting legacy systems that may not support robust encryption protocols, a Virtual Private Network (VPN) can be used to secure traffic between the healthcare environment and the DHP servers. In these instances, the specific protocols can be selected based on the desired hardware and security policies of the customer. Hillrom's default is to use an IKEv1 tunnel, with AES256 encryption and Perfect Forward Secrecy (PFS) enabled.



Authentication and Authorization

Authentication to interactive components of the DHP is handled by Single Sign-On (SSO) federation to the customer's own Active Directory Federation Services, or Azure Active Directory. This ensures that credentials are never seen or handled by Hillrom, local security policies are enforced (for example, account lock-outs, 2-factor authentication, or password complexity), and that the customer maintains audit logs of all attempted logins. The DHP uses Microsoft Azure's B2C service to implement multi-tenant federation.



To ensure control over user authorization, Hillrom provides the ability to map customer Active Directory groups to roles and responsibilities inside the DHP. This enables customers to maintain full control over the privileges of their users without having to manually modify users or groups within a separate web application.

For non-interactive areas of the DHP (for example, applications or devices that send and receive data from the platform), purpose-specific user accounts can be provisioned (or removed) from within the Enterprise Configuration Portal. These accounts have strong randomly-generated passwords and their access rights are restricted to only the locations and data types required to perform their functions.

Security Compliance

As part of our ongoing commitment to the security of our customers' data, the Hillrom DHP maintains SOC 2 Type 2 compliance. The System and Organizational Controls (SOC) reports are independent, third-party evaluations that describe how Hillrom implements compliance controls. The SOC 2 Type 2 report specifically evaluates the effectiveness of organizational controls related to the security, availability, confidentiality, and privacy of customer data. This report is available upon request.

In addition to maintaining our own SOC 2 report, the DHP components are hosted on Microsoft Azure's cloud platform. Microsoft maintains their own set of security compliance certifications (including SOC 2), which can be viewed at their Service Trust portal: https://servicetrust.microsoft.com/.

Data Privacy

Smart Device Connectivity conforms to all physical, network, and process security measures set forth in the Health Insurance Portability and Accountability Act (HIPAA) standards. The application includes secure procedures to authenticate users, terminate sessions after inactivity, and encrypt all sensitive data—both in transit and at rest—to prevent unauthorized access to data. The Smart Device Connectivity solution conforms to HIPAA standards listed in HIPAA 164.312 Technical Safeguards.

All received data, including vital signs and risk scores, associated with a patient encounter is stored in the Clinical Data Repository, which hosted in the MS Azure Cloud.

Data Retention Rules

Data is retained in the CDR for 90 days post patient discharge ADT message, by default. This configuration can be changed to retain the data for only 24 hours post patient discharge ADT message. Patient data will be removed upon written request.

Hillrom Patient Risk Surveillance R1.0.4 Help Center

Start here to view information about Patient Risk Surveillance.

Select one of the topics below for more information.

About Patient Risk Surveillance (on page 138)

Documentation (on page 138)

Before You Begin (on page 139)

About Patient Risk Surveillance

Product Description

The Hillrom Patient Risk Surveillance product will analyze near real-time clinical data from point-of-care devices to help identify patient deterioration and sepsis risks. The Hillrom Patient Risk Surveillance product will also communicate hospital-defined interventions based on common scoring systems to output devices via the Hillrom Smart Device Connectivity Medical Device Data System (MDDS) software.

Intended Use Statement

The Patient Risk Surveillance solution will receive near real-time clinical data that will be used to calculate risk scores that assist in implementing hospital-defined patient risk assessment protocols. The Patient Risk Surveillance solution will also communicate potential changes in patient risk status to the clinical team.

Sources for calculations will be provided to the end-product user for independent verification of the results. The Patient Risk Surveillance solution is not meant to be the sole basis for risk assessment recommendations.

Documentation

Select one of the following topics for more information:

LAB01457 Digital Health Gateway HL7 Interface Specification

LAB01420 Digital Health Platform Product Compatibility Matrix

Technical Specifications

Voalte Nurse Call Server Specifications

Voalte Nurse Call Hardware Specifications

LAB01485 Voalte Platform Server Specifications

Welch Allyn Wireless Best Practices

Welch Allyn Connex Spot Monitor Spec

Welch Allyn Connex Devices Spec

Centrella Smart Bed Spec

Before You Begin

Click one of the topics below for more information.

About Terminology Services (on page 139)

Clinical Content Review Process (on page 141)

About Terminology Services

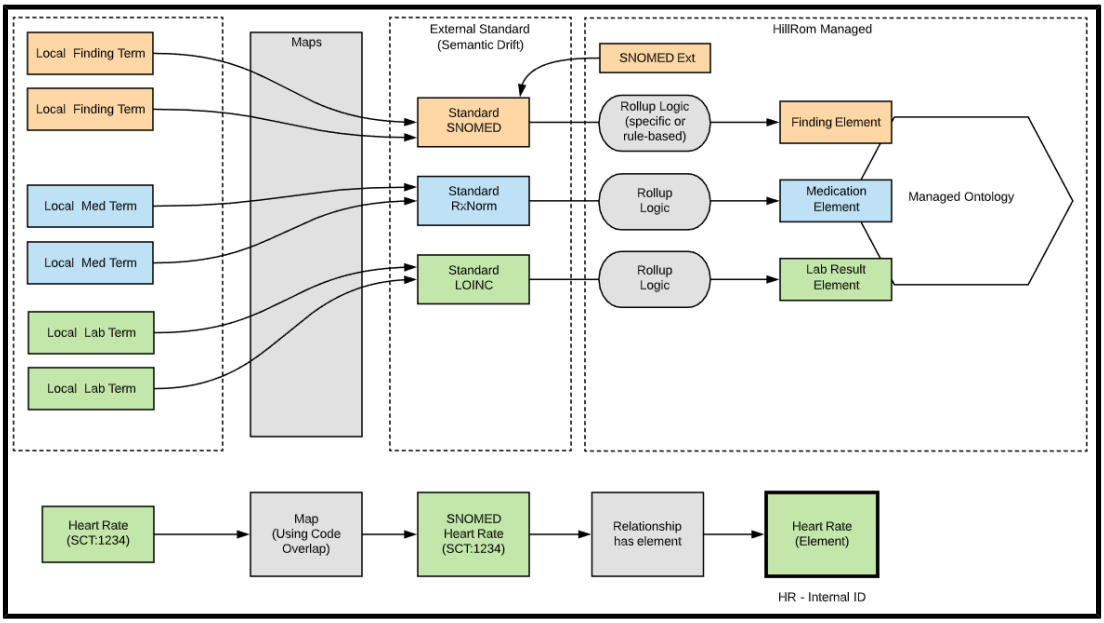
Terminology services handle all terminology mappings and concept definitions, and provide Hillrom Digital Health with the following benefits:

- One source of truth for all terminologies used throughout the system.
- An easy-to-use interface for authoring items such as local hospital and bed codes, as well as other codes that don't exist in Hillrom's standard catalogs (for example, group and map terminologies) that involve:
    - Defining, creating, and managing relationships between concepts, and
    - Creation of value sets that define specific concepts (for example, immune compromised)
- Run-time API calls that perform mappings as data is received into the system, with the benefit that Hillrom does not need to maintain mapping tables in our code.
- Automatic updates to standard catalogs, where codes are added and deprecated in regular cadences by their governing bodies. Hillrom does not have to query, diff, or account for changes in these massive mapping files on a weekly, monthly, or biannual basis.
- An easy-to-use workflow for clinicians to approve changes to clinical content prior to publishing to production and propagating throughout the system.

Codes, concepts and terminologies must be normalized since simple translation tables and human-powered manual mapping cannot keep up with rapidly evolving standard and local terminologies. Terminology services offer the following advantages:

Goal of Interoperability - HIT systems working together to advance the effective delivery of healthcare and to break down existing silos.

How do we do that? Through a process whereby data is normalized into a standard format to ensure that it means the same thing to all components and systems that interface with each other—for both incoming and outgoing data. The figure below illustrates how terminology services are currently used by Hillrom today:



As shown in the diagram above, external terms from different Electronic Medical Record (EMR) applications can be represented in a variety of standard code systems (for example, ICD-10-CM, ICD-9-CM, SNOMED CT, LOINC, RxNorm) as well as non-standard, proprietary, or local terms. Terminology services enable mappings of these terms to standard reference terminology targets to achieve semantic normalization. Terminology services also facilitate a transparent rule-based approach to defining element sets (for example, collections of terms that define a clinical concept) and an efficient incremental update process, as reference terminologies evolve over time. In the above diagram, EMR terms from a variety of code systems might be ingested into Hillrom, understood as standard reference terminologies, and rolled up to a clinical concept that can be used for decision support or analytics.

Glossary of terms

Term - A term is the lowest level data point used in terminology services. Each term contains a unique identifier (or description).

Catalog - A catalog is a *group of terms* collected under one name and usually grouped together by one of six domain types.

Element - An element (which can also be called a *value set*) is a collection of terms that define a clinical concept. An element then becomes a published set of codes that roll up to a clinical concept.

Element Set - An element set is a collection of related elements that are grouped together and then managed, published, and distributed as related content. For example, the Hillrom Patient Risk Surveillance element set contains all risk context and risk factors.

Map - A map defines a cross-reference relationship that converts a set of terms from a source catalog to equivalent terms in a target catalog.

Medical Coding Standards used Today

- **ICD-10 -** Diagnostic codes (of which there are 68,000+ codes)
- **CPT -** Procedures
- **LOINC -** Labs, results, and observation values (for example, vitals)
- **SNOMED -** Broad coverage of most medical concepts
- **MDC -** Medical devices
- **CVX/MVX -** Vaccines
- **RxNorm -** Specific medication codes, down to dose/strength
- **NDC -** Packaging-level codes for medications
- **Local Codes -** Hospital specific

Clinical Content Review Process

Hillrom Smart Device Connectivity and Patient Risk Surveillance utilize terminology services for the management of clinical terminology, medical codes, and associated attributes associated. All clinical terms are rolled up into Elements, which are clinical concepts that the system utilizes to trigger logic.

Note: An element is a group of terms that all equate to the same clinical concept. For example, cancer as an "Element" and melanoma, leukemia, sarcoma, and so forth, as the group of terms that would roll up to the broader clinical concept.

The following two sections of clinical content must be reviewed internally by Hillrom clinicians:

1. A one-time review must be performed prior to release of all elements that are created in the Hillrom Patient Risk Surveillance Element Set, which is maintained in **Element Set Manager**. In this Element set, there is a list of elements.

    a. All clinical content—including Element Set creation, Element roll up, and mappings —should be authored and created by a licensed clinician who is familiar with medical terminology and coding standards related to the content for release.

    b. Once content creation has been completed, it must be reviewed by a separate, non-authoring clinical team. The clinical team will review the Element Set for the following criteria:

        - **Accuracy of Element definition:** Do the terms rolled up into this Element make sense (i.e., are they the correct terms)?
        - **Completion of Element definition:** Is the Element inclusive of all content in that specific category (i.e., is there any content that is missing)?

2. Clinical terminology mapping must be reviewed by a clinical team prior to release, as well as on an ongoing basis. Clinical terminology mapping can be found in the terminology services' **Map Manager**.

   Terminology services' APIs have been configured so that they will automap new terminology coming into the system if the system is able to understand the code and display. However, if the system cannot automap the new terminology, a notification is generated and sent to the clinical team. The clinical team will then use the WayPoint website to review and approve the unmapped clinical terminology.

   Mappings will be displayed in groups per tenant; therefore, there may be multiple maps that the clinicians will need to review for a given Domain Catalog. A clinical analyst must be in place on a regular review basis once a client goes live. The clinical analyst will review maps for local terminology that the system is not able to automatically map to a standard (or defined) local term. WayPoint will allow a clinician to search for—and select—the appropriate clinical terminology for manually mapping a term.

   Once the manual map is completed, a non-authoring clinician must be assigned to review the content. Once reviewed and approved, the map will be marked "Production Ready," and can be published and distributed for use in the appropriate environment.

   Note: Please see instructions in Help Center for the following topics: Creating an Element Set, Creating an Element within an Element Set, Uploading Terms/Codes to Source Catalogs in Symedical, Mapping Terms, Publishing and Distributing Content, and User Management.

Using Symedical Waypoint

Intended Use

Symedical Waypoint provides a secure method for providing review and feedback of Symedical mappings based on an authenticated user's role. Clinical content reviewers will have limited access to create, change, or delete maps. However, Map Viewers will have the access required to ensure clinical content accuracy.

Glossary of Terms

1. **Flag Set**: A flag set is a group of symbols used to prioritize and identify catalog, map, and content model terms for clinical attention in the workflow.

   Tip: **Content Flag Set for a Clinical Approval workflow:**

- **Red** - Review (Immediate)
- **Yellow** - Review (1-2 days)
- **Blue** - Review (1-5 days)
- **Green** - Verify

In terms of Symedical Waypoint, a map defines a cross-reference relationship that converts a set of terms from a source catalog to equivalent terms in a target catalog.

2. **Source Term**: A source term is the description (or display) of an original source code.
3. **Source Code**: A source code is the primary key (or identifier) for a term in a catalog, which is usually the medical code (for purposes of this project).
4. **Target Term**: A target term is the description (or display) that the source term and code are mapped to, via the Symedical application.
5. **Target Code**: A target code is the primary key (or identifier) for the target term in a catalog, which is usually the medical code (for purposes of this project).

   In Symedical, a Term is the lowest level data point used. Each Term contains a unique identifier (or description) consisting of a group of characters that represents a concept in a terminology. In a catalog, this is a member of the catalog that has a unique identifier and is rolled up into maps.

Next Up:

Map Review and Approval (on page 143)

Map Review and Approval

As a user with Map Viewer access, you can review and approve terminology services mappings to ensure clinical content accuracy.

1. First, go to terminology services for Hillrom Digital Health in production.
2. Log in with authenticated Map Viewer credentials.

   Note: By default, the dashboard displays all maps available to the logged in user.

3. Click Assigned Only to view only those maps that you are assigned for review.
4. Click Map Manager to navigate to a specific map.
5. Select the applicable source term in the Source Term window.
6. Right-click the target term in the Candidates window and select View Term Comparison.

7. To review a term, use Term Comparison to compare what is on both sides of the map.

   Note: This feature assists with mapping a decision by displaying the source and target term details side-by-side for review. The clinician may have to manually look up both terms to ensure that they are accurate and mean what the system intends them to mean.

8. After verifying that the map is correct, set the green Verify Flag to signify that the map is ready for production.
9. Once the map has been reviewed, assign the map back to the Hillrom Clinical Specialist, who will publish the map as appropriate.
10. If you have a question for a clinician, use the Annotation function to enter notes or comments for assignment to the intended clinical team member.

Patient Risk Surveillance Troubleshooting Guide

This section identifies issues that may arise during use of the Rules Manager interface and Patient Risk Surveillance product as a whole, along with suggested mitigations/workarounds and corrective actions. Issues with the Rules Manager interface and corresponding troubleshooting steps are addressed first, followed by other issues that could arise using the system in tabular format. For more technical issues, please see Technical Issues and Workarounds (on page 155).

If any questions remain unanswered after viewing this information, please contact Hillrom's Technical Support Department at 1#800-445-3720.

BASIC TROUBLESHOOTING

Choose a topic from the list below.

I am unable to:

Access Rules Manager (on page 145)

Approve (or enable) a rule (on page 148)

Assign (or unassign) rules (on page 152)

Change (or update) a rule configuration (on page 154)

Configure rules (or perform other actions in Rules Manager) (on page 146)

Create a new rule (on page 147)

Create a new rule based on an existing risk score template (on page 147)

Delete a rule (on page 149)

Edit a risk context (on page 151)

Edit a risk score (on page 150)

Edit a risk stratification (on page 150)

Edit a rule (on page 147)

Edit a rule response (on page 150)

Edit risk factor stale times (on page 151)

Pause (or resume) a rule (on page 152)

Print out rules (on page 153)

View rules, assigned entities, or other content in Rule Manager (on page 153)

Access Rules Manager

Note: Rules Manager is only accessible to authorized users via the Enterprise Configuration Portal.

To access Rules Manager, the "Patient Risk Surveillance" connection must first be configured in the Enterprise Configuration Portal. Once configured, a manage rules  icon is displayed at the Enterprise level of the configured tenant hierarchy in Enterprise Configuration Portal.

Clicking on this icon will open Rules Manager in a separate tab. If clicking the  icon does not launch Rules Manager, disable any pop-up blocker installed on the machine—or at least allow access to Enterprise Configuration Portal/Rules Manager. If clicking the icon *still* does not launch Rules Manager, try performing the following steps: 1) log out of Enterprise Configuration Portal, 2) close the browser, 3) log back into the Enterprise Configuration Portal, and 4) click the icon. If the Rules Manager tab still doesn't open, contact Hillrom Technical Support.

1. Click  to open the Rules Manager in a separate tab.

   Note: If clicking the icon does not launch the Rules Manager, disable any pop-up blocker installed on the machine, or at least allow access to the Enterprise Configuration Portal/Rules Manager. If clicking the icon *still* does not launch the Rules Manager, log out of the Enterprise Configuration Portal, close the browser, log back in to ECP, and click the icon again.

If the Rules Manager tab still doesn't open, contact Hillrom Technical Support at 1-800-445-3720.

Configure rules (or perform other actions in Rules Manager)

Note: Customer access to the Rules Manager is view-only; customers do not have the ability to directly configure rules, risk scores, risk context, clinical tasks, risk-based notifications, or to perform any other functions within the Rule Manager while logged in with a customer account. If any changes to the existing configurations are desired, please contact Hillrom Technical Support at 1-800-445-3720.

Rules Manager permissions depend on the role being used to access Rule Manager. First, make sure that the desired function is enabled for your role. The table below is a guide to the permissions provided for each role in Rules Manager:

Permissions Table

Role	Create / Edit / Delete Rules, Risk Scores, Risk Context, Clinical Tasks, Notification Settings, etc.	Enable / Disable Rules	Approve Rules*	Pause / Resume Rules
Hillrom Admin	Yes	Yes	View Only	Yes
Hillrom Clinical Specialist	Yes	Yes	View Only	Yes
Hillrom Technical Support	View Only	View Only	View Only	View Only
Hillrom Read-Only	View Only	View Only	View Only	View Only
Customer Admin	View Only	View Only	View Only	View Only
Customer Rule Approver	View Only	No	View Only	No
Customer Clinical Informatics Specialist	View Only	View Only	View Only	View Only
Customer Read-Only	View Only	View Only	View Only	View Only

Note: *No official rule-approval permissions are implemented within the Rules Manager. Instead, official rule approval is performed via a manual process, where the Customer signs a printout of the rules from the Rules Manager. Rules can then be approved and enabled within Rules Manager via check box selections.

If any changes to the existing configurations are desired, please contact Hillrom Technical Support at 1-800-445-3720.

Create a rule

There are two ways to create a new rule:

- If no rules have been created yet, refer to **Step 1** below.
- If a rule using the desired risk score template has already been created, refer to **Step 2**.

1. In Rules Manager, click the "hamburger"  menu icon (upper left corner) to access the Main Menu.
2. Under Rule Configuration, click **New Rule**.

   Note: If **New Rule** button is not displayed, you will need to obtain the proper permissions. Refer to the Permissions Table (on page 146) for guidance.

3. Select one of the risk score templates provided.
4. Name the rule
5. Click **Continue**.

   The risk score configuration template for that rule will be displayed.

6. To edit the risk score configuration, click **Edit**.

   Note: To edit the response (or "notification") settings, select the **Response Configuration** tab. For a SIRS score, there will also be a **Risk Context** tab for editing a rule's risk context.

If you are unable to create a rule after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Create a new rule based on an existing risk score template

1. Click **Save As** on the **Score Configuration** tab of the risk score template.
2. When a prompt is displayed, name the rule and then click **Save**. The rule will then be editable.

Edit a rule

There are two ways to edit a rule:

- From the **Score Configuration**, **Response Configuration**, or **Risk Context** tabs, refer to **Step 1** below.
- From the **Rule Inventory** screen, use **Step 2**.

1. In one of the tabs listed above, click **Edit**. Then, make the desired changes to the rule via the configuration options provided.
2. Access the **Main Menu** by clicking the "hamburger"  menu icon (upper left corner of the screen), then select **Rule Inventory** to view the created rules. Next, click **View/Edit** on the desired rule to display the **Rule Configuration** screen with the **Score Configuration**, **Response Configuration**, and **Risk Context** tabs (as applicable).

   Attention: Editing a rule will affect all Units assigned to that rule.

3. Click **Done Editing** when finished.

If you are unable to edit a rule after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Approve (or enable) a rule

A rule can be approved and enabled in Rules Manager by checking the box next to **Rule is Approved and Enabled** on the **Score Configuration** tab of the rule. However, in order for a risk score (or risk stratification) configuration to be accepted, the values entered must be valid. If a validation error is displayed when configuring a risk score (or risk stratification), make sure that all configurations conform to the following requirements:

- All values must be in a range of 1-99.
- No special characters are allowed except for Level Of Consciousness.
- For the Level of Consciousness risk factor, only values indicated in the score configuration legend (below) for **A**, **V**, **P**, and **U** may be entered. Also, only **one** *HRXXXX value should be entered per score column in the score configuration table*.

  All parameter (or risk factor) ranges and thresholds must be continuous to the level of resolution of the specific risk factor, and *must not overlap*.

- ◦ For example, a heart rate range of 51-100 beats/min. could be assigned a point value of 0 and a heart rate range of 101110 beats/min. could be assigned a point value of 1, since the difference between the top of the lower range (100) and the bottom of the upper range (101) is within 1 beat/min., the resolution of heart rate

measurements. However, ranges of 5199 beats/min. and 101110 beats/min. would be invalid.

- Similarly, a temperature range of 35.0°38.4°C could be assigned a point value of 0 and a temperature range of ≥ 38.5°C could be assigned a point value of 1, since the difference between the top of the lower range (38.4°C) and the bottom of the upper range (38.5°C) is within 0.1°C, the resolution of temperature measurements. However, ranges of 35.0°38.4°C and ≥ 38.6°C would be invalid.

- All risk stratification ranges and thresholds must be continuous and must not overlap.
  - For example, a Medium risk stratification could be defined as a MEWS score of 59, and a High risk stratification could be defined as a MEWS score of ≥ 10. However, ranges of 58 and ≥ 10 would be invalid because there is a gap (i.e., a MEWS score of 9 with no associated risk stratification).
  - Likewise, a Low risk stratification could be defined as a MEWS score of ≤ 4 and a Medium risk stratification could be defined as a MEWS score of 59. However, ranges of ≤4 and 49 would be invalid because there is an overlap (a MEWS score of 4 with both Low and Medium risk stratifications).
  - Rules that have not passed the minimum validation requirement cannot exit out of Edit mode, as listed above. The area of the score configuration that does not meet requirements (highlighted in pink) must be changed to meet validation before the rule can exit Edit mode.

If you are unable to approve or enable a rule within the Rules Manager by following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Delete a rule

Note: Rules that are enabled cannot be deleted; the Delete button will display as greyed out.

1. Access the **Main Menu** by clicking the "hamburger"  menu icon (upper left corner of the screen).
2. Select **Rule Configuration** to view rules that have already been created.
3. Click **Delete** on the desired rule to remove it.

If you are unable to delete a rule after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Edit a risk score

1. To edit a *risk score*, click **Edit** on the **Score Configuration** tab of a rule.
2. To edit a *point* value assigned to specific values of the risk factors comprising the risk score, select the point value in the first row of the risk score configuration table and enter the desired value.
3. To edit the *range* of values for a risk factor that will generate a given point value, select the range and enter the desired range, making sure to conform to the risk score validation requirements. The following legend should be used as displayed in the UI for calculations in score configuration:

Equal == X	Less Than or Equal To <= X
Less Than < X	Range > X < Y; >= X <= Y
Greater Than > X	Not Between <X > Y; <= X >= Y
Greater Than or Equal To >= X	Y is larger than X

4. Click **Done Editing** when finished.

If you are unable to edit a risk score after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Edit a risk stratification

1. Click **Edit** on the **Score Configuration** tab of a rule.
2. Select—and enter—the desired ranges for the provided risk stratifications for the risk score, making sure to conform to the risk stratification validation requirements.
3. Click **Done Editing** when finished.

If you are unable to edit a risk stratification after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Edit a rule response

To edit the system response (i.e., clinical decision support) for a rule:

1. Click **Edit** on the **Response Configuration** tab of a rule. This allows:

    - Risk-based notifications to be enabled (or disabled) by risk stratification (unless locked)
    - Risk-based notification text to be entered for each risk stratification
    - Notification fatigue settings to be specified, and
    - Clinical tasks to be entered (or removed) for each risk stratification

2. Click **Add** to add clinical tasks (or **Delete** to remove them) after selecting the associated checkbox.
3. Click **Done Editing** when finished.

If you are unable to edit a rule response after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Edit a risk context

1. Click **Edit** on the **Risk Context** tab of a rule (*for SIRS only*).

    Note: This allows risk context groups and individual risk context elements to be selected for display on supported clinical interfaces.

2. Use the dropdown elements to display the individual risk context elements within each group.

    Note: All risk context elements within a group can be selected by checking the box next to that group (or just the desired *individual* risk context elements can be selected via their associated checkboxes.

3. Click **Done Editing** when finished.

If you are unable to edit risk context after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Edit risk factor stale times

To edit stale times of risk factors that comprise a risk score:

1. Access the **Main Menu** by clicking the "hamburger"  menu icon (upper left corner of the screen).
2. Select the rule you want to edit the stale times for under the **Rule Configuration** tab.

   Note: This will display the stale time for each risk factor in separate boxes for days, hours, and minutes.

3. Enter the desired value in each box—*up to a maximum of 7 days*.

If you are unable to edit risk factor stale times after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Assign (or unassign) rules

To assign (or unassign) rules to child entities:

1. Click **Assign Rule** on one of the **Rule Configuration** tabs to display a slide-over control with the tenant hierarchy (i.e., Region, Organization, Facility, and Unit) under the Enterprise.
2. Use the **Select All** check box to select all entities at a given level of the tenant hierarchy (or click the drop-down arrow at a given level of the hierarchy to display all the entities at that level and select each entity individually via its associated check box).

   Note: Similarly, a rule can be unassigned from an entity by de-selecting the associated checkbox.

If you are unable to assign (or unassign) rules after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Pause (or resume) a rule

Pause a rule

1. Access the **Main Menu** by clicking the "hamburger"  menu icon (upper left corner of the screen).
2. Select **Rule Inventory** to view rules that have already been created.
3. Click Pause on the desired rule to pause it.

Resume a rule

1. Perform Steps 1 and 2, above.
2. Click Resume on the rule.

If you are unable to pause (or resume) a rule after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Print out rules

To print out a specific rule:

1. Click **Print This Rule** on the **Score Configuration** tab of the risk score template.

To print out *all* rules configured for a Unit:

1. Click **Print All Rules** on the **Rule Inventory** screen.

Note: Both screens can be accessed via the **Main Menu** by clicking the "hamburger"  menu icon (upper left corner of the screen).

Note: A specific entity can be chosen via the **Current Entity** dropdown at the top of the screen.

If you are unable to print out rules after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

View rules, assigned entities, or other content in Rules Manager

Note: The same roles that have permissions to create, edit, and delete rules also have the permissions needed to assign (or unassign) rules and view entities.

View assigned rules

The assigned rules for a Unit can be viewed on the **Rule Inventory** page, accessible from the **Main Menu** by clicking the "hamburger"  icon (upper left corner of the screen). Once on the **Rule Inventory** page:

1. Select a Facility and a Unit from the two dropdown boxes, respectively.
2. Click **View** (right side of the rule).

Note: This will then display a list of all rules for that Unit. Clicking **View** (on the *right* side of the rule) will display the risk score configuration for the rule in a new page.

Also, from within the **Rule Score Configuration** page, the response (notification) configuration and risk context configuration (as applicable) can be viewed by selecting the corresponding tabs.

View assigned entities

The assigned entities for a rule can be viewed, as follows:

1. Click **Assign Rule** on the **Rule Configuration** tab.

Note: A control will be displayed with checkboxes corresponding to all entities within the tenant hierarchy to which the rule is assigned.

If the **Rule Inventory** or **Rule Configuration** pages do not populate with content, try performing the following steps:

1. Close the browser window.
2. Navigate back to the Enterprise Configuration Portal.
3. Select that same level of hierarchy again.

If you are unable to view rules, assigned entities, or other content in the Rules Manager after following these steps, contact Hillrom Technical Support at 1-800-445-3720.

Change (or update) a rule configurations

Note: Customer access to the Rules Manager is view-only; customers do not have the ability to directly configure rules, risk scores, risk context, clinical tasks, risk-based notifications, or to perform any other functions within the Rules Manager while logged in with a customer account.

To make a change in any rule configuration, rule assignment, or other rule-related setting in the Rules Manager, please contact Hillrom Technical Support at 1-800-445-3720.

Additional troubleshooting can be found in the Gateway Internal Troubleshooting Guide.

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TECHNICAL ISSUES AND WORKAROUNDS

Choose a topic from the list of subjects below.

I am having trouble with:

ADT/EMR

Data from the hospital's ADT system is not being processed by the system. (on page 156)

Data is not being properly processed by the system. (on page 159)

Notifications are not being transmitted to Voalte mobile devices. (on page 159)

Bed/integrated contact-free continuous monitoring device

Incorrect display of data on supported clinical interfaces because another person has gotten into a patient's bed. (on page 162)

Incorrect display of data on supported clinical interfaces because the previous patient is still assigned to the bed. (on page 162)

No display of data on supported clinical interfaces because another person has gotten into bed with the patient. (on page 163)

No display of data on supported clinical interfaces due to a late ADT admission. (on page 162)

Unavailable. (on page 159)

Caregiver

Alert fatigue. (on page 161)

Mapping

Incorrect/incomplete mapping of clinical data elements to codes (value sets) has occurred. (on page 160)

Patient data

Is associated to the wrong tenant. (on page 157)

Is corrupted. (on page 157)

From vitals monitors is not properly being processed by the system. (on page 156)

Measurement units of incoming data result in erroneous risk score, risk stratification, risk factor, risk context, risk-based notification, and/or clinical task transmission to clinical interfaces. (on page 165)

Miscalculation of incoming data causes erroneous risk monitoring, clinical decision support, and data transmission to clinical interfaces. (on page 161)

Risk-based notification(s)

Incorrect notification was generated because another person has gotten into the bed. (on page 164)

Incorrect notification was generated because the previous patient is still assigned to the bed. (on page 164)

Not created or processed correctly. (on page 161)

Not generated because another person has gotten into bed with the patient. (on page 164)

Not generated because of a late ADT admission. (on page 163)

Not generated because the previous patient is still assigned to the bed. (on page 163)

Not sent to alert the communication manager. (on page 160)

Risk monitoring

Does not respond to resume command, which prevents system notifications. (on page 161)

Status Board

Unable to display patient/bed data. (on page 160)

System failure due to

Configuration change during system operation. (on page 158)

Incompatible software versions. (on page 159)

Loss of power. (on page 157)

Network outage. (on page 158)

Software update. (on page 158)

Voalte Mobile

Unable to display patient/bed data. (on page 160)

Patient data from vitals monitors is not properly being processed by the system.

Suggested workarounds:

- Failed communication will generate a visual indication on CSM/CVSM, indicating that data was not successfully transferred and providing suggested troubleshooting actions.
- Patient vitals and risk scores may still be available if manually charted in EMR.
- Caregivers will still be able to assess a patient's condition based on other EMR data, and respond per the facility's protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Data from the hospital's ADT system that is not being processed by the system.

Suggested workarounds:

- CSM/CVSM will indicate failed patient queries and provide suggested troubleshooting actions.
- Status Board will indicate if an ADT admit/discharge for a patient wasn't received.
- Voalte mobile will indicate if an ADT admit/discharge for a patient wasn't received.
- Alternative interfaces and the charge nurse may be available for tracking admits, discharges, and transfers.
- Caregivers will still be able to assess a patient's condition based on vital signs and EMR data, and respond per the facility's protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

A system fault due to loss of power.

Suggested workarounds:

- CSM/CVSM will indicate loss of network connectivity and provide suggested troubleshooting actions.
- Status Board will indicate a power outage via lack of data displayed for a patient and/or bed.
- Voalte mobile will indicate a power outage via lack of data displayed for a patient and/or bed.
- Hospitals should use backup generators to restore power in the event of an outage.

Action: FIRST, restore power. Then, if the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Corrupted Patient data.

Suggested workarounds:

- CSM/CVSM will indicate when data transmission to EMR fails and provide suggested troubleshooting actions.
- Caregivers will still be able to assess a patient's condition based on vital signs and EMR data, and respond per the facility's protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Association of patient data to the wrong tenant.

Suggested workarounds:

- The system deployment is certified prior to clinical use.
- Only patient data from vital signs monitor will be impacted; notifications based on orders/ lab values/meds will not be affected.
- Erroneous data may be detected by comparing displayed data on vitals monitor to data in hospital ADT and EMR systems.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

System failure due to software update.

Suggested workarounds:

- Single, clustered servers will be taken offline for software updates without affecting other servers.
- The system deployment is certified prior to clinical use.
- System may be rolled back to a prior software release in the event of a system failure.
- Software updates are validated at the system level prior to deployment.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

System failure due to network outage.

Suggested workarounds:

- Status Board will indicate a network outage via lack of data displayed for a patient and/ or bed.
- Voalte mobile will indicate a network outage via lack of data displayed for a patient and/ or bed.
- CSM/CVSM will indicate loss of network connectivity and provide suggested troubleshooting actions.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

System failure due to configuration change during system operation.

Suggested workaround:

- The system deployment is re-certified after configuration changes.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

System failure due to incompatible software versions.

Suggested workarounds:

- Software updates are validated at the system level prior to deployment.
- Failed communication will generate a visual indication on CSM/CVSM, indicating that data was not successfully transferred.
- Status Board will indicate failed communication via lack of data displayed for a patient and/or bed.
- Voalte mobile will indicate failed communication via lack of data displayed for a patient and/or bed.
- System may be rolled back to a prior software release in the event of a system failure.
- Patient vitals and risk scores will still be available if manually charted in EMR.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

ADT/EMR data is not being properly processed by the system.

Suggested workarounds:

- Caregivers will still be able to assess a patient's condition based on vital signs data and respond per facility protocol.
- Caregivers will still have access to ADT to view patient admissions/discharges/transfers, and EMR to view charted data.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

ADT/EMR-based notifications not being transmitted to Voalte mobile devices.

Suggested workarounds:

- Caregivers will still be able to assess a patient's condition based on vital signs data and respond per facility protocol.
- Caregivers will still have access to ADT to view patient admissions/discharges/transfers, and EMR to view charted data.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Bed/integrated contact-free continuous monitoring because it is unavailable.

Suggested workarounds:

- Status Board and Voalte mobile will visually indicate when bed/integrated contact-free continuous monitoring data is unavailable.
- Patient weight, vitals, and bed status will still be available if manually charted in the EMR.
- Caregivers may still assess a patient's condition based on vital signs and EMR data, and respond per facility protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Incorrect/incomplete mapping of clinical data elements to codes (value sets) has occurred.

Suggested workarounds:

- The system is not intended to diagnose patients or replace clinical judgment.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Status Board is unable to display patient/bed data.

Suggested workarounds:

- Status Board will visually indicate when data is not available.
- Patient vitals/risk score data will still be displayed on supported vital signs monitors, the EMR, and other supported clinical interfaces, such as Voalte mobile.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Voalte mobile is unable to display patient/bed data.

Suggested workarounds:

- Voalte mobile will visually indicate when data is not available.
- Patient vitals/risk score data will still be displayed on supported vital signs monitors, the EMR, and other supported clinical interfaces, such as Status Board.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Notifications were not sent to alert the communication manager.

Suggested workarounds:

- Vital signs, risk scores, risk stratifications, and risk context will still be viewable on supported clinical interfaces.
- Caregivers will still be able to assess a patient's condition based on vital signs/risk score data, and respond per facility protocol.
- Caregivers will still have access to the EMR to view charted data.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Caregiver alert fatigue.

Suggested workarounds:

- Vitals alert thresholds may be configured per patient to minimize false alerts.
- CSM/CVSM vitals alerts may be filtered and/or delayed, as necessary.
- Escalation procedures configured in alert communication manager will ensure ignored notifications are sent to multiple back-up caregivers.
- Alert manager settings can be configured to minimize vitals alert fatigue, as desired.

Action: Contact assigned Clinical Specialist for assistance in configuring risk-based notification settings, as necessary.

Notification not created or processed correctly.

Suggested workarounds:

- Caregivers will still be able to assess a patient's condition based on bed, vital signs, and EMR data, and respond per facility protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Risk monitoring does not respond to resume command, which prevents system notifications.

Suggested workarounds:

- Caregivers will still be able to assess a patient's condition based on bed, vital signs, and EMR data, and respond per facility protocol.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

Miscalculation of incoming data causes erroneous risk monitoring, clinical decision support, and data transmission to clinical interfaces.

Suggested workarounds:

- Erroneous data may be detected by comparing displayed data on connected clinical interfaces with data on supported vital signs monitors (e.g., vital signs, risk scores), beds (e.g., patient weight, vitals, and bed safety status), and in the EMR.

Action: If the problem persists, contact Hillrom Technical Support at 1-800-445-3720.

No display of bed/integrated contact-free continuous monitoring data on supported clinical interfaces due to a late ADT admission.

Suggested workarounds:

- Late ADT admission is indicated on Status Board as a row without any patient identifier in the default "Patient" column, but with the patient icon colored green in the default "Rails" column of the Bed Status indicators.
- Late ADT admission is indicated on Voalte mobile as a patient not being available to a given room, and no patient data being available.
- Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.

Action: Admit patient via ADT system.

Incorrect display of bed/integrated contact-free continuous monitoring device data on supported clinical interfaces because the previous patient is still assigned to the bed.

Suggested workarounds:

- Status Board will display the previous patient assigned to the bed in that room.
- Voalte mobile will display the previous patient assigned to the bed in that room.
- Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.
- Incorrect data display for a patient should prompt caregiver to contact appropriate hospital personnel to rectify the admit record.

Action: Correct patient admit record via ADT system.

Incorrect display of bed/integrated contact-free continuous monitoring data on supported clinical interfaces because another person has gotten into a patient's bed.

Suggested workarounds:

- Bed exit alarm will trigger, when set, due to a patient bed exit or sufficient weight change.
- The bed displays a message that only the patient should be placed in the bed, after a patient reset is performed on the bed.

Action: Remove other person from bed and ensure patient is returned to bed.

No display of bed/integrated contact-free continuous monitoring device data on supported clinical interfaces because another person has gotten into bed with the patient.

Suggested workarounds:

- Bed exit alarm will trigger, when set, due to a sufficient weight change.
- The bed displays a message that only the patient should be placed in the bed, after a patient reset is performed on the bed.
- EarlySense will generate an "Unstable Signal" alert if EarlySense vitals cannot be measured/ interpreted.

Action: Remove other person from bed.

No risk-based notification was generated because of a late ADT admission.

Suggested workarounds:

- Late ADT admission is indicated on Status Board as a row without any patient identifier in the default "Patient" column, but with the patient icon colored green in the default "Rails" column of the Bed Status indicators.
- Late ADT admission is indicated on Voalte mobile as a patient not being available to a given room, and no patient data being available.
- Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.

Action: Admit patient via ADT system.

No risk-based notification was generated because the previous patient is still assigned to the bed.

Suggested workarounds:

- Status Board will display the previous patient assigned to the bed in that room.
- Voalte mobile will display the previous patient assigned to the bed in that room.
- Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.

Action: Correct patient admit record via ADT system.

Incorrect risk-based notification that was generated because the previous patient is still assigned to the bed.

Suggested workarounds:

- Status Board will display the previous patient assigned to the bed in that room.
- Voalte mobile will display the previous patient assigned to the bed in that room.
- Proper nursing practice includes assessment and charting of patient vitals upon placing a patient in the bed.
- Incorrect notifications for a patient should prompt caregiver to contact appropriate hospital personnel to rectify the admit record.

Action: Correct patient admit record via ADT system.

Incorrect risk-based notification that was generated because another person has gotten into the bed.

Suggested workarounds:

- Bed exit alarm will trigger, when set, due to a patient bed exit or sufficient weight change.
- The bed displays a message that only the patient should be placed in the bed, after a patient reset is performed on the bed.

Action: Remove other person from bed and ensure patient is returned to bed.

No risk-based notification was generated because another person has gotten into bed with the patient.

Suggested workarounds:

- Bed exit alarm will trigger, when set, due to a patient bed exit or sufficient weight change.
- The bed displays a message that only the patient should be placed in the bed, after a patient reset is performed on the bed.
- EarlySense will generate an "Unstable Signal" alert if EarlySense vitals cannot be measured/ interpreted.

Action: Remove the other person from the bed.

Measurement units of incoming data result in erroneous risk score, risk stratification, risk factor, risk context, risk-based notification, and/or clinical task transmission to clinical interfaces.

Suggested workarounds:

- The system is not intended to diagnose patients or replace clinical judgment.

Action: Contact Hillrom Technical Support at 1-800-445-3720.

Additional Resources

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Copyright Information

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Related topics:

Hazard Statements (on page 167)

Hazard Statements

The following hazard statements apply specifically to the Patient Risk Surveillance product.

Important: Please also review the hazard statements for Smart Device Connectivity.

CAUTION: Ensure that the risk scoring, risk stratification, and risk-based notification rules configured in the Rules Manager are properly defined in accordance with hospital guidelines prior to system deployment. This includes defining the risk factor (risk score components) stale times, displayed risk context, and recommended clinical tasks per Facility policy. If adjustments need to be made, contact the assigned Hillrom Clinical Specialist or Hillrom Technical Services at (800) 445-3730.

CAUTION: Ensure that the configured risk stratification rules are assigned to the proper child entities (e.g., Facilities, Units) prior to system deployment. Configured rules must be explicitly assigned in order to be active at child entity levels. If adjustments need to be made, contact the assigned Hillrom Clinical Specialist or Hillrom Technical Services at (800) 445-3730.

CAUTION: Ensure that the configured risk stratification rules are enabled, paused, or disabled, as desired, prior to system deployment. Rule status can be viewed on the Rule Inventory section of the Rules Manager. It is especially important to ensure that only a single rule is configured and enabled for a given risk score to avoid any conflicts or unexpected system behavior. If adjustments need to be made, contact the assigned Hillrom Clinical Specialist or Hillrom Technical Services at (800) 445-3730.

CAUTION: Ensure with hospital administration that the PRS system and all integrated components have been certified by Hillrom prior to room occupation by patients.

CAUTION: The PRS system must be recertified and validated after configuration changes.

CAUTION: In the event of outages, other connectivity disruptions, or system failure, follow your hospital's manual processes to complete all patient and caregiver workflows. For example:

- In the event of a system failure to process risk-based notifications, a patient's condition should be assessed based on vital signs and EMR data.
- System deployment will be certified prior to clinical use and after any configuration changes.
- System software updates are validated by Hillrom at the system level prior to clinical deployment. Software updates should not disrupt clinical operation of

the system, as single clustered servers can be taken offline for software updates without affecting online servers.

- In the event of a system failure, the system can be rolled back to a prior software release to maintain operations while troubleshooting occurs.

CAUTION: Hospital network connectivity is necessary for risk-based notifications to be sent to alert managers and caregiver Voalte mobile devices. An indication of loss of network connectivity on Hillrom vitals monitors and caregivers' Voalte mobile devices mitigates the risk of a hospital network outage and is consistent with industry standards. Standard hospital procedures should be followed to prevent possible delays in treatment. A patient must be manually checked and vitals signs monitor data confirmed by a caregiver at the patient's bedside before treatment decisions are made.

CAUTION: The hospital should perform periodic testing of the PRS system to ensure the system is working properly, including after any PRS system upgrades or component device upgrades, connections, disconnections, or resets. The system must be recertified and validated after configuration changes. For more information, contact Hillrom Technical Services at (800) 445-3730.

CAUTION: Hillrom recommends that multiple levels of escalation should be in place for risk-based notifications.

CAUTION: Clinical decision support systems such as PRS are not meant to take the place of provider or caregiver interactions and knowledge or judgement. This system is meant to augment their clinical knowledge and assist in more timely and patient-specific care. Caregivers should not view this system as a replacement for their current clinical practice.

Release Notes

Hillrom Patient Risk Surveillance 1.0.300 Product Release Notes

Contact Information

If additional assistance is needed, please contact Hillrom's Technical Services at (800) 445-3720 or email hrccwssupport@hillrom.com.

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