Glucommander®

Version 3.5.4.0

User Manual

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Confidential and Proprietary

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Device Description

The Glucommander System is a software algorithm device intended to evaluate the current as well as cumulative patient blood glucose values and, based on the aggregate of those measurements, whether one or many, recommend a dosage of insulin, glucose, or saline in order to direct the blood glucose level towards a predetermined target range. Once that target blood glucose range has been reached, the system's function is to recommend a titration of insulin, glucose, and saline for the purpose of maintaining the patient's blood glucose level in that target range. The system is programmed to provide intravenous dosing of glucose, saline, and insulin, as well as subcutaneous dosing of insulin for both pediatric (ages 2-17 years) and adult patients.

Users can identify the installed version of Glucommander by locating the Unique Device Identifier (UDI) displayed at the bottom of each screen. The UDI is formatted as: (01)00860057000305(10)x.x.x.x, where the "x.x.x.x" represents the software version of Glucommander.

Indications for Use

The Glucommander System is a glycemic management tool intended to evaluate current as well as cumulative patient blood glucose values coupled with patient information including age, weight and height, and, based on the aggregate of these measurement parameters, whether one or many, recommend an IV dosage of insulin, glucose or saline or a subcutaneous basal and bolus insulin dosing recommendation to adjust and maintain the blood glucose level towards a configurable physician-determined target range.

The Glucommander System is indicated for use in adult and pediatric (ages 2–17 years) patients.

The G+ System logic is not a substitute for, but rather an adjunct to clinical reasoning. The measurements and calculations generated are intended to be used by qualified and trained medical personnel in evaluating patient conditions in conjunction with clinical history, symptoms, and other diagnostic measurements, as well as the medical professional's clinical judgment. No medical decision should be based solely on the recommended guidance provided by this software program.

User Qualifications

Glucommander is a prescription-use device intended for clinical application by qualified and trained healthcare professionals. As an FDA-cleared device, Glytec is required to provide training materials to users. Proper use of Glucommander necessitates thorough training and a complete understanding of the user manual and any accompanying

documentation, including EHR integration specifications, if applicable. Healthcare providers must review and understand these materials prior to use.

Contraindications, Warnings, and Precautions

Contraindications

Terminal patients: Glucommander is not appropriate for use with patients having a life expectancy less than 48 hours.

Organ preservation: Glucommander is not intended for use in the preservation of donor-after-brain-death (DBD) organs.

Severe Insulin Resistance: Patients receiving insulin at more than 500 units/hr are assumed to be extremely insulin resistant by the system. Glucommander will flash a warning message indicating possible severe insulin resistance, instructing the healthcare professional to contact the attending provider for treatment of insulin resistance before resuming the program.

Patients with a known insulin allergy: do not use.

Pediatric patients less than 2 years of age: do not use.

Warnings and Precautions

Glucommander is a dosage calculator that compares glucose values to provider-selected values and provides an alert if values are out of the range or if the rate of change of these values exceeds parameters.

Glucommander is not an active monitoring device.

Glucommander does not consider if the patient has type 1 diabetes, type 2 diabetes, or situational hyperglycemia. The device allows the provider to set up a range of insulin choices and dosing combinations and generates questions/recommendations that may not be appropriate for all patients with diabetes.

The Glucommander software is designed to assist professionals in assessing the possibility of adverse patient outcomes occurring during treatment.

1. Hypoglycemia can occur when the patient has received too much insulin or too little nutritional intake. The onset of hypoglycemia may differ depending on various sources but strictly defined, hypoglycemia occurs when the body's counter-regulatory hormones are stimulated in response to low blood glucose levels. At this stage the body responds in an attempt to send additional glucose to the brain in order to preserve its viability and function. In short, too little glucose can cause temporary or permanent brain damage when hypoglycemia is severe (e.g., blood glucose < 25 mg/dL).

2. Changes in nutritional status, physical activity, patient condition and medications: Glucommander will adjust insulin dosing recommendations toward the goal of achieving and maintaining blood glucose levels within target range. It is important to recognize the importance that changing variables like nutrition, stress (caused by infection or sepsis, the emotional and physical stress of surgery, etc.) and medication play in the glycemic management of the patient. Changing certain medications like steroids may impact blood glucose as well.

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Key to Symbols

Please review this section before reading the rest of this manual. It contains important information related to patient safety and the proper use of Glucommander. Make sure you observe all the precautions and warnings listed in this manual.

Symbol	Explanation
	Consult instructions for use - This information provides tips or other important material that can help you understand Glucommander or actions you need to perform for its effective use.
	Caution - This information alerts you to unsafe practices. This includes the special care necessary for the safe and effective use of Glucommander and the care necessary to avoid serious adverse reactions that could result in death or serious injury.

Glucommander® Overview

Glucommander® ("Glucommander") offers clinicians a comprehensive view of a patient's data, providing clinical, realistic, and relevant measures of quality. Glytec's analytics are aimed at tracking glycemic relationships, through Glucommander's interaction with healthcare systems. Glucommander takes into account pertinent patient information such as demographics and previous results. Individual care guidelines result in improved patient outcomes and more efficient use of healthcare resources. The system also provides a reporting platform for patient outcomes that providers can view. See *Reports*.

Glucommander features:

- Intravenous (IV) and subcutaneous (SubQ) insulin dose calculations
- Hypoglycemic treatment calculations
- IV meal bolus dose calculations
- Patient safety alerts
- Pause IV
- GlucoSurveillance®
- SmartClick® EMR integration

Getting Started

This user manual describes the core functionality and operating instructions for Glucommander. Clinicians can refer to this manual for all information needed for the proper operation of this software product.

If at any point you need assistance, the toll-free 24/7 Glytec Helpline is available for your use. Please call Glytec at 888-458-2683.

Logging in to Glucommander Using EMR

Glucommander enables a hospital to extend its electronic medical record (EMR) technology to include glycemic management capabilities. By clicking a button in the EMR interface, users can access Glucommander to perform various functions.

SmartClick® provides authentication independent of the Glucommander log in process. Functionality can vary depending on EMR vendor.

To log in to Glucommander using the URL, see *Logging in to Glucommander using URL*.

Initiating Intravenous (IV) Therapy

Complete IV Order Set Initiated in EMR

If Order Set Integration is enabled, Glucommander will receive order set parameters through the interface with the EMR. The Start Order Set page (shown below) displays the parameters received from the EMR in a read-only format.

If Order Set Integration is disabled, Glucommander will not receive order set parameters through the interface with the EMR. See *Verify IV Order Set Manually (Order Set Integration Disabled)*.

The Start Order Set page also displays a unique order set identifier provided by your hospital in the **Order ID** field and the order set transaction date and time in the **Order Date** field. The most recent order set for IV treatment is displayed, based on transaction date/time. A yellow box containing a warning message may also display. For a list of warnings, go to *Order Set Integration warnings.*

When all required fields are complete, the order set is considered complete and ready to use in Glucommander:

1. Click **Save**.
2. Follow the prompts for entering a BG in *Enter IV BG Value*.

Clicking **Clear Form** will remove the parameters received through the interface. Complete the order set manually by making selections for the required fields to start Glucommander treatment. To display the parameters received through the interface again, click **Reset Form**.

When order set parameters are not received for any of the required fields, the field value displays as blank and the order set is considered incomplete. In the example below, the **Target Range** was not received, and the field value is displayed as blank.

To complete the order set in Glucommander:

1. Make manual selections per the provider order and then click **Save**.

IV order set field	Description
Initial Multiplier	**Required.** Initial IV multiplier selected for the patient. The Glucommander algorithm uses the multiplier to approximate a patient's insulin sensitivity. For adults aged 18 and above, the standard multiplier recommendation is 0.02, although 0.01 is typically recommended for patients who may be at risk for complications arising from DKA, renal issues, or hypoglycemia. The provider may order higher multipliers for patients with special needs. For example, a post-operative CABG patient might typically receive a multiplier of 0.05. The Glucommander algorithm adjusts the multiplier based on subsequent blood glucose (BG) entries. When pediatric patients, ages 2–17 years, are started, Glucommander automatically calculates the initial multiplier using the patient's weight. The Glucommander initial multiplier is a recommendation that can be overridden by provider order. Select one of the listed values. If you select Custom, also specify a custom multiplier in the provided textbox. **Note:** When [blank] is specified as the default, you cannot save the order set without specifying a non-blank value.

IV order set field	Description
Target Range	**Required.** Desired target range for patient's BG readings on IV treatment. Select one of the listed ranges. **Note:** When [blank] is specified as the default, you cannot save the order set without selecting a non-blank value.

2. Follow the prompts for entering a BG in *Enter IV BG Value*.

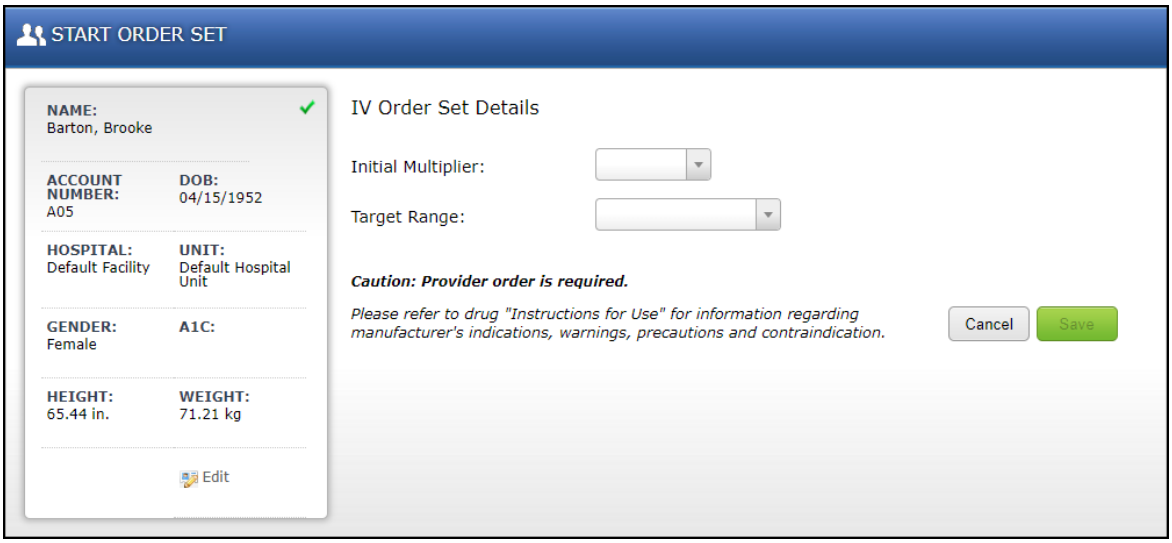
Verify IV Order Set Manually (Order Set Integration Disabled)

After obtaining orders to initiate a patient on IV therapy:

1. Verify that all the parameters match the provider's order and complete all fields for the IV order set.

   The IV order set page is prepopulated with default settings for your hospital unit.

   For IV order set fields and descriptions, see *Complete IV Order Set Initiated in EMR*.



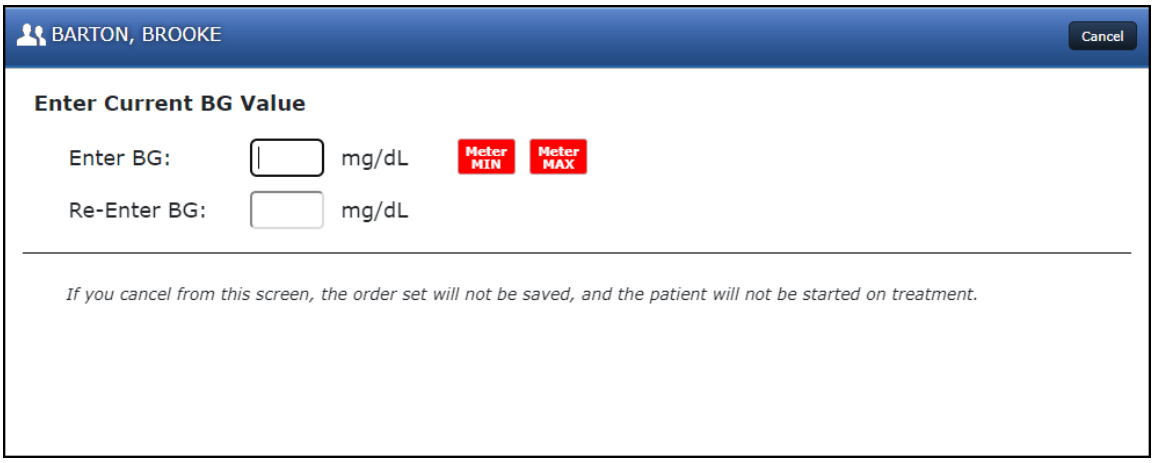
   Changes to fields in the IV order set require a provider's order.

2. Click **Save**.
3. Proceed to *Enter IV BG Value* below.

Enter IV BG Value

After verifying and completing the intravenous (IV) order set:

1. Enter the current BG value for the patient in the **Enter BG** and **Re-Enter BG** fields.



If a BG value greater than your facility's preconfigured meter maximum is entered, a yellow notification box displays with this message, "Entry cannot be above *configured Meter MAX value*. Select Meter MAX button to proceed." For more information, see *Enter Minimum/Maximum BG Value*.

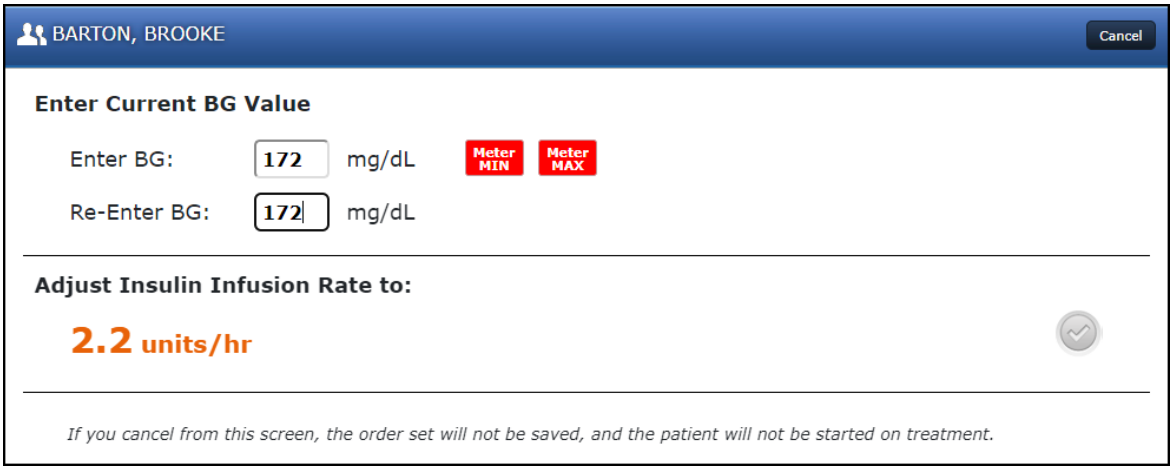
If you click **Cancel** on the Enter Current BG Value page while you are in the process of starting a patient on treatment, the page closes without saving the order set, thus not starting the patient on treatment.

After the patient has started on treatment, if you click **Cancel** on the Enter Current BG Value page, the page closes and the patient detail page opens.

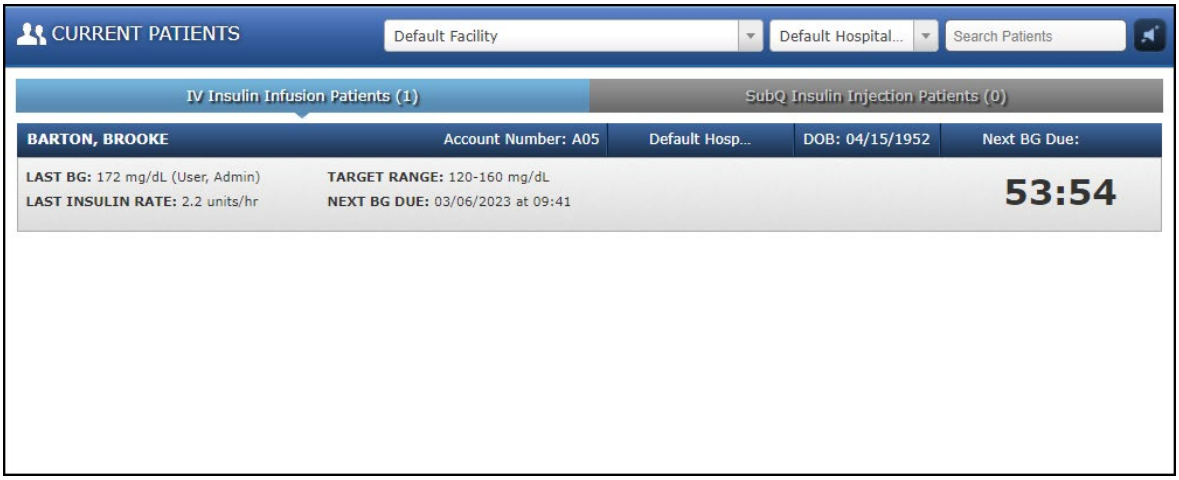
After the BG value is entered twice, the display expands below the **Re-Enter BG** field to show the recommended insulin infusion rate. If this is the patient's first or a new recommendation, the section titled, "*Adjust Insulin Infusion Rate to"* displays.

If the insulin infusion rate is unchanged from the previous rate, the section titled, "*Continue Current Insulin Infusion Rate at"* displays.

2. Administer the recommended insulin dose, confirm by selecting the check mark beside the value, and then click **Save**.



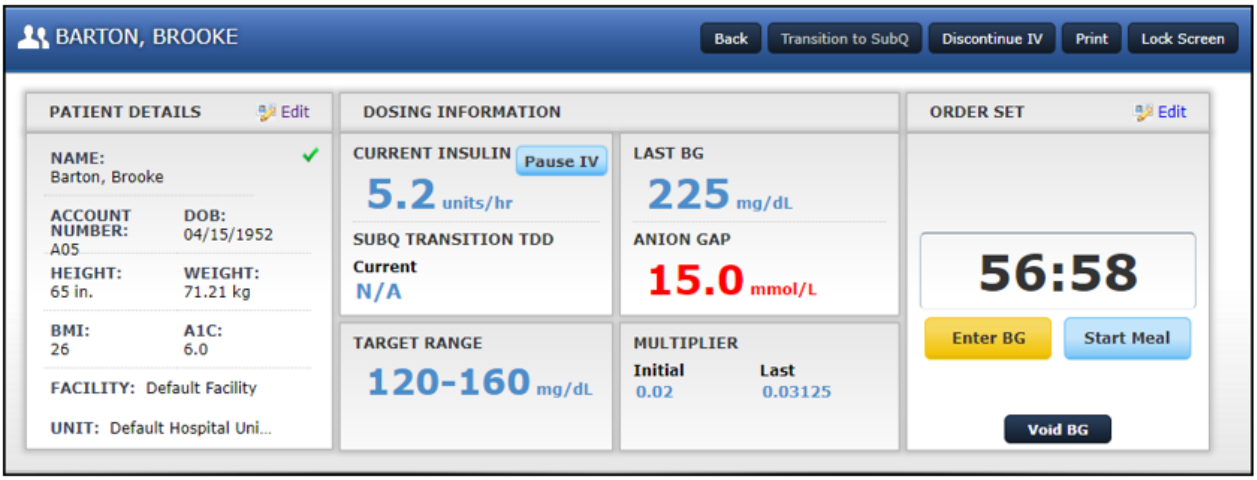
After the patient has been successfully started on treatment, a countdown timer indicating when the next-scheduled BG reading is due displays on the IV patient detail page and the dashboard (Current Patients page).



View IV Patient Detail Page

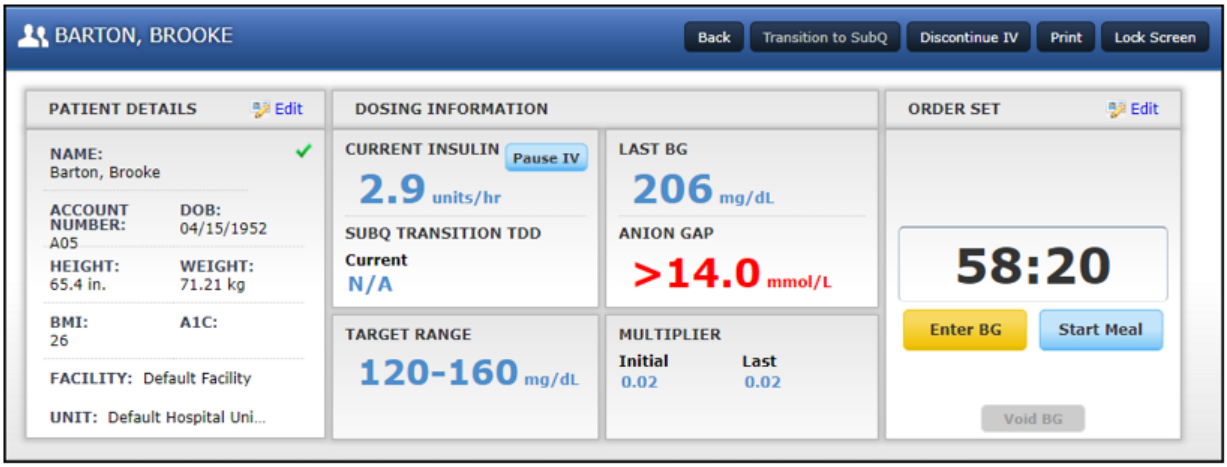
Each patient has an individualized patient detail page containing demographic and dosing information, treatment history, and a blood glucose (BG) trend graph. A countdown timer (e.g., 1:59:39) is also on the patient detail page, indicating when the next BG reading is due.

If a patient on intravenous (IV) treatment has an elevated anion gap, the patient detail page will display that information in an additional section. If the anion gap value is above the configured threshold, the value will display in red as shown below.



After the anion gap normalizes and falls below the threshold, the value displays in green signaling that the acidosis is resolving.

Anion gap values can be displayed with the greater than (>) or less than (<) symbols.



View IV History

Click the **IV History** tab at the bottom of the patient detail page to view the patient's complete IV dosing history within Glucommander.

Using the selectable ☑ fields at the bottom of the page, you can choose the columns in the IV History to suit your viewing interests. Some fields are configured to display by default.

IV History | **Notes (0)** | **History**

Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
03/11/2023 15:05	133 mg/dL	0.9 units/hr	N/A	Gloria Fraeme	N/A	03/11/2023 17:05
03/11/2023 14:04	137 mg/dL	0.9 units/hr	N/A	Gloria Fraeme	N/A	03/11/2023 16:04
03/11/2023 13:20	141 mg/dL	1 unit/hr	N/A	Gloria Fraeme	N/A	03/11/2023 15:20
03/11/2023 11:19	135 mg/dL	0.9 units/hr	N/A	Gloria Fraeme	N/A	03/11/2023 13:19
03/10/2023 23:17	138 mg/dL	0.9 units/hr	N/A	Gloria Fraeme	N/A	03/11/2023 01:17
03/10/2023 21:17	143 mg/dL	1 unit/hr	N/A	Gloria Fraeme	N/A	03/10/2023 23:17
03/10/2023 19:16	149 mg/dL	1 unit/hr	N/A	Gloria Fraeme	N/A	03/10/2023 21:16
03/09/2023 19:15	146 mg/dL	1 unit/hr	N/A	Gloria Fraeme	N/A	03/09/2023 20:15
03/09/2023 18:14	150 mg/dL	1.1 units/hr	N/A	Gloria Fraeme	N/A	03/09/2023 19:14
03/09/2023 17:14	155 mg/dL	1.1 units/hr	N/A	Gloria Fraeme	N/A	03/09/2023 18:14

Asterisk * indicates Meter limit

Previous | 1 | 2 | Next

Number of records to display: 10

Show Columns

☑ Date ☑ BG Value ☑ Insulin Rate ☑ Meal Carbs ☑ Nurse ☑ Hypo Treatment ☐ Target Range ☑ Next BG Due

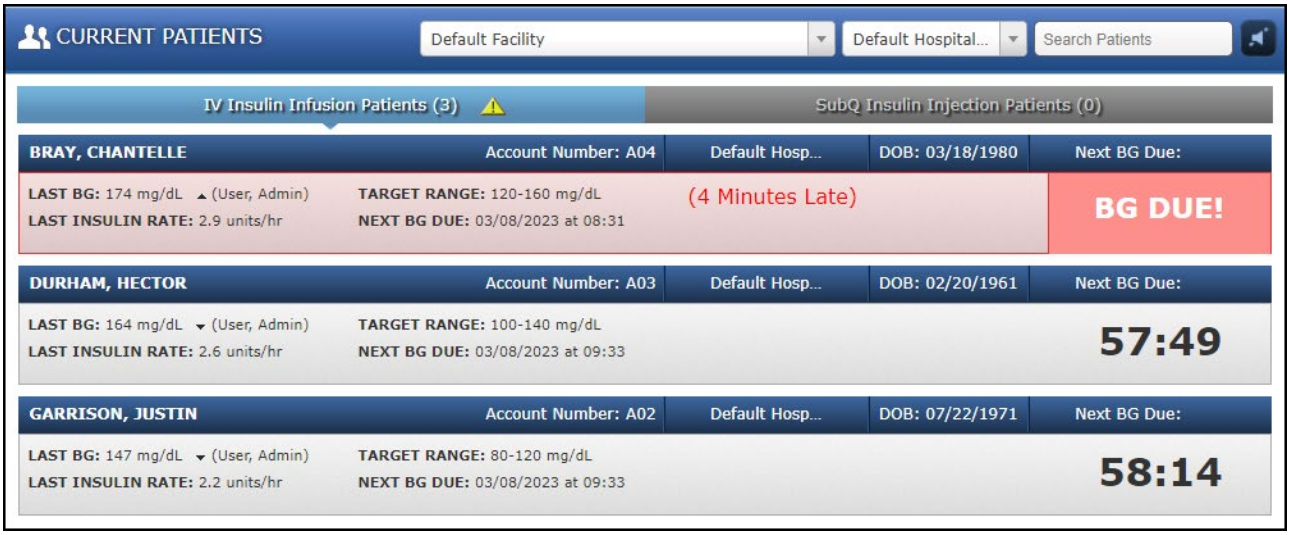
Next IV BG Reading Due

Clinicians are responsible for entering a patient's BG as prompted by Glucommander and carrying out the Glucommander recommendations. Any applicable warnings appear automatically.

Timely BG measurements are required for optimal glycemic control.

Glucommander has a countdown timer that indicates when the next BG reading is due. When the patient's BG reading is due, two alarms are activated: a visual alarm, indicated by a "BG DUE!" message, and an audible alarm.

The "BG DUE!" message also appears on the dashboard (Current Patients page) and on GlucoView. Glucommander records the minutes late if a BG value is not entered as scheduled. The audible alarm can be silenced for a preconfigured interval by clicking the Silence All Alarms button ( ).



When it is time for the patient's next BG reading, on the patient detail page:

1. Click **Enter BG**.

After entering a BG value, you may see various messages display in the Review Messages section:

- "BG value is less than 250 mg/dL. Check orders for possible changes in IV fluids, especially in patients diagnosed with DKA"
- "Patient is at risk for DKA"
- "Patient is at risk for Hyperosmolar Hyperglycemic State," etc.

2. Review the messages, select the check mark(s) before administering the insulin dose, and contact the provider if necessary.

BRAY, CHANTELLE Cancel

Enter Current BG Value

Enter BG: 249 mg/dL Meter MIN Meter MAX

Re-Enter BG: 249 mg/dL

Review Messages

BG value is less than 250 mg/dL. Check orders for possible changes in IV fluids, especially in patients diagnosed with DKA.

Adjust Insulin Infusion Rate to:

3.8 units/hr

Save

3. Click **Save** to complete the BG entry.

Start IV Meal Bolus

The intravenous (IV) meal bolus function is intended to be used after Glucommander has established a multiplier; therefore, it is recommended that the clinician wait until the patient is in the prescribed target range before starting a meal. [1]

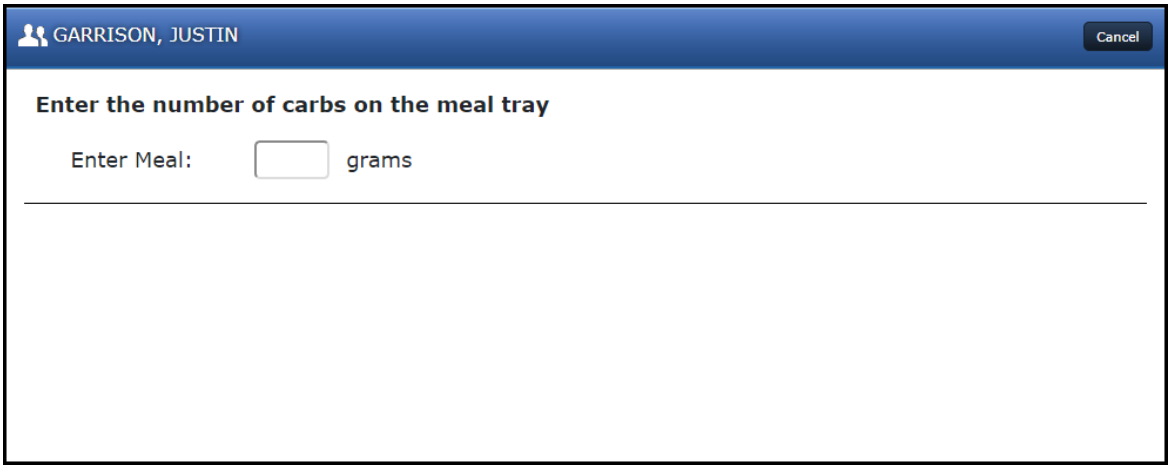
If the IV Meal Bolus option under the Admin IV Protocol Settings is disabled, the **Start Meal** button will not display. If the patient currently has IV Paused, the **Start Meal** button will be inactive (grayed out).

To start a patient on an IV meal bolus, on the patient detail page:

1. Click **Start Meal**.

2. Respond to the prompt, "*Enter the number of carbs on the meal tray*" by entering the estimated number of carbohydrates in grams that are present on the patient's tray in the **Enter Meal** field.

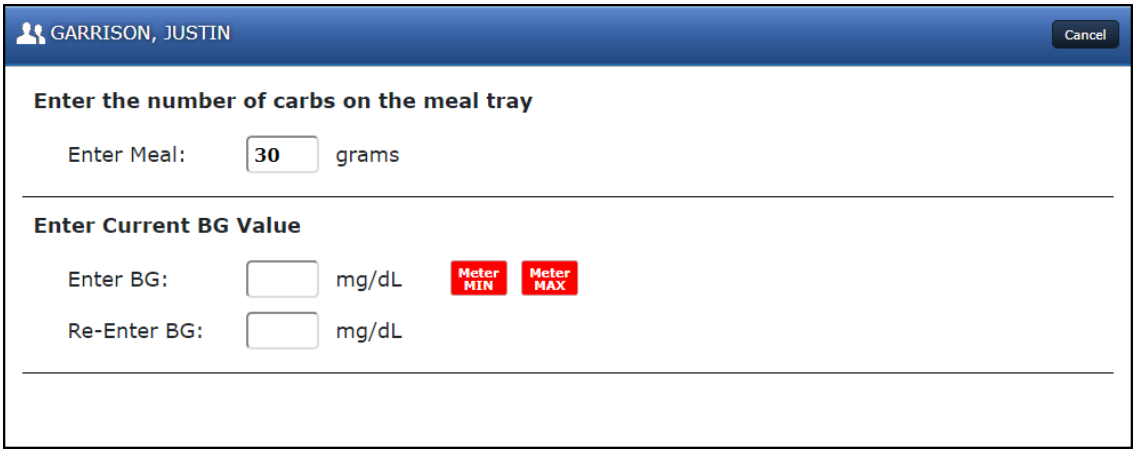
[1] Davidson, P.C., Steed, R.D., Bode, B.W. (2005). Glucommander: a computer-directed intravenous insulin system shown to be safe, simple, and effective in 120,618 h of operation. *Diabetes Care*, *28*(10), 2418-23.



IV meal bolus treatment requires a minimum of 30 grams of carbohydrates.

After the carbohydrate amount is entered, the display expands to show the Enter Current BG Value section.

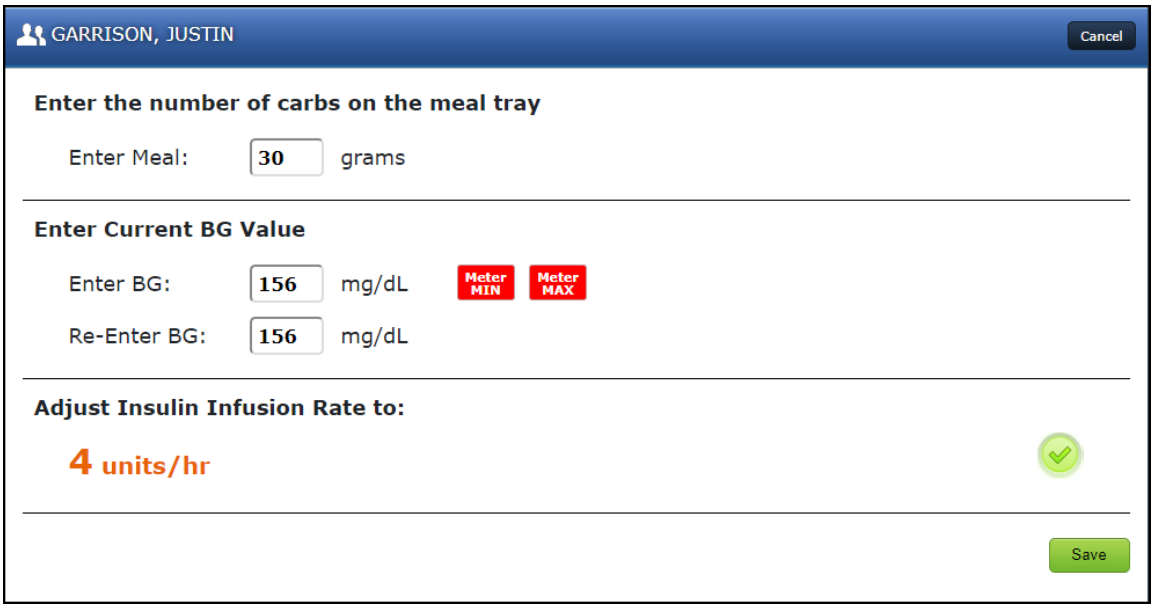
3. Enter the current BG value for the patient in the **Enter BG** and **Re-Enter BG** fields.



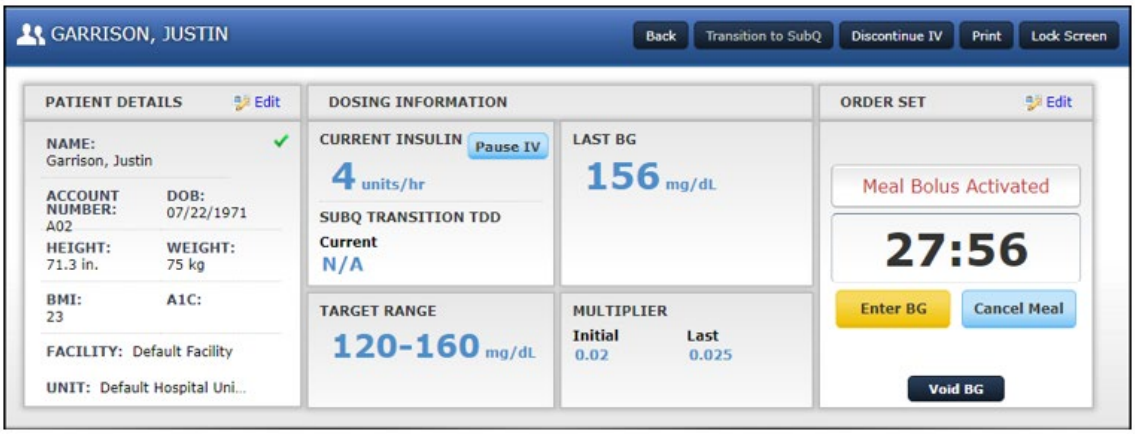
After the BG value is entered twice, the display expands below the **Re-Enter BG** field to show the recommended insulin infusion rate. If this is a new recommendation, the section titled, "*Adjust Insulin Infusion Rate to"* displays.

If the insulin infusion rate is unchanged from the previous rate, the section titled, "*Continue Current Insulin Infusion Rate at"* will display.

4. Administer the recommended insulin dose, confirm by selecting the check mark beside the value, and then click **Save**.



On the patient detail page, the Meal Bolus option is activated, as indicated by the Meal Bolus Activated message displayed in red.



The IV meal bolus is administered to the patient over a two-hour period, consisting of a 30-minute BG reading, a 60-minute BG reading, followed by a 30-minute BG reading.

If an IV meal bolus has already been started, the **Start Meal** button is replaced with a **Cancel Meal** button.

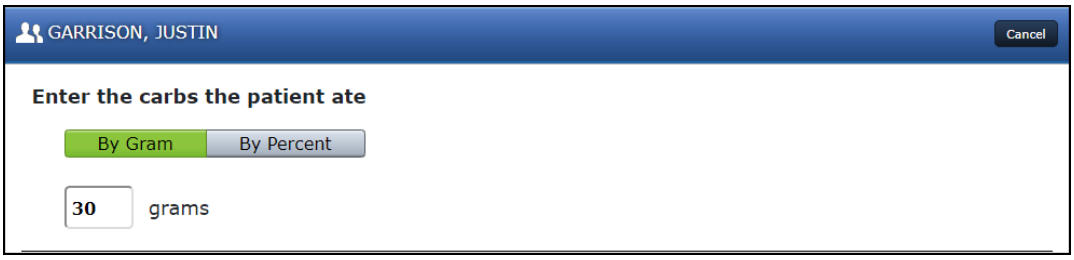
By clicking **Cancel Meal**, you can stop the IV meal bolus process at any time prior to entering the second meal BG. After confirming that the patient has eaten, the meal bolus process cannot be cancelled. If the process is cancelled, enter another BG to establish a baseline insulin infusion rate.

5. When the next BG reading is due, click **Enter BG**. Glucommander prompts you to "*Enter the carbs the patient ate*" by clicking either **By Gram** or **By Percent**. When you click either button, it turns green and opens a corresponding input field.

The carbohydrate entry display is based on your facility's configuration settings.

6. If you click:

- By Gram, enter the actual number of carbohydrates (in grams) the patient consumed in the **Grams** field:



- By Percent, click in the dropdown field and select 0%, 25%, 50%, 75%, or 100%. The corresponding carbohydrate amount in grams is displayed to the right of the dropdown field:

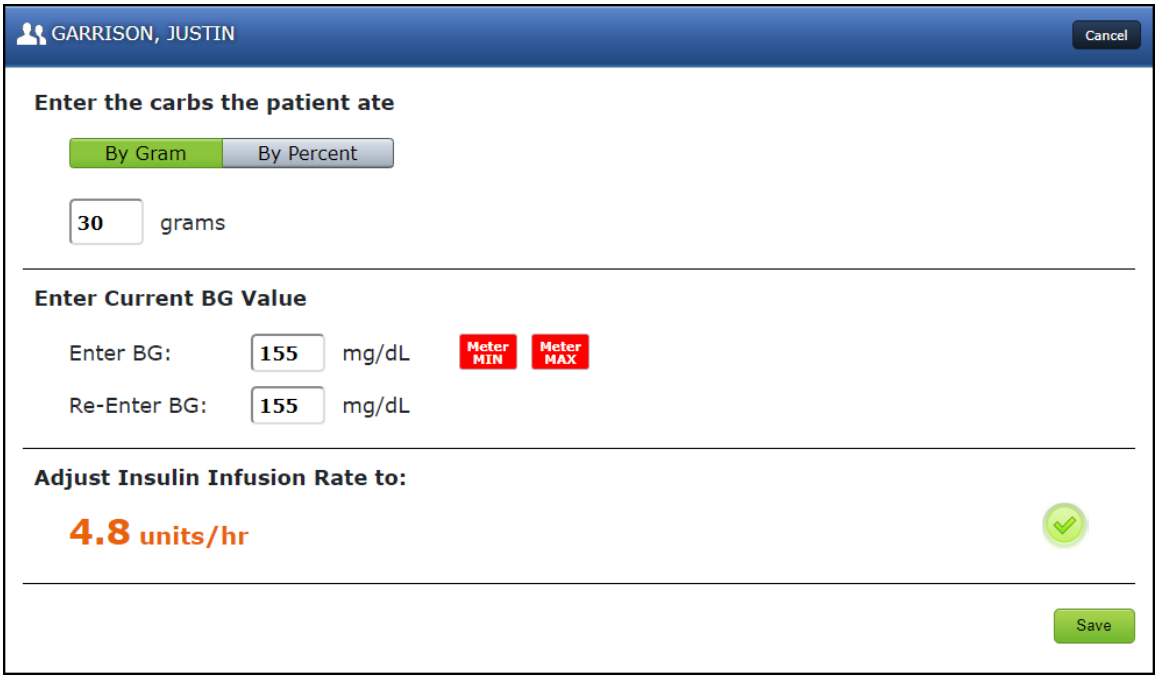
If the amount is between values — for example, between 25% and 50% — select the lesser amount to avoid unexpected lows. Glucommander will adjust to accommodate your estimate.

7. Enter the current BG value for the patient in the Enter BG and Re-Enter BG fields.

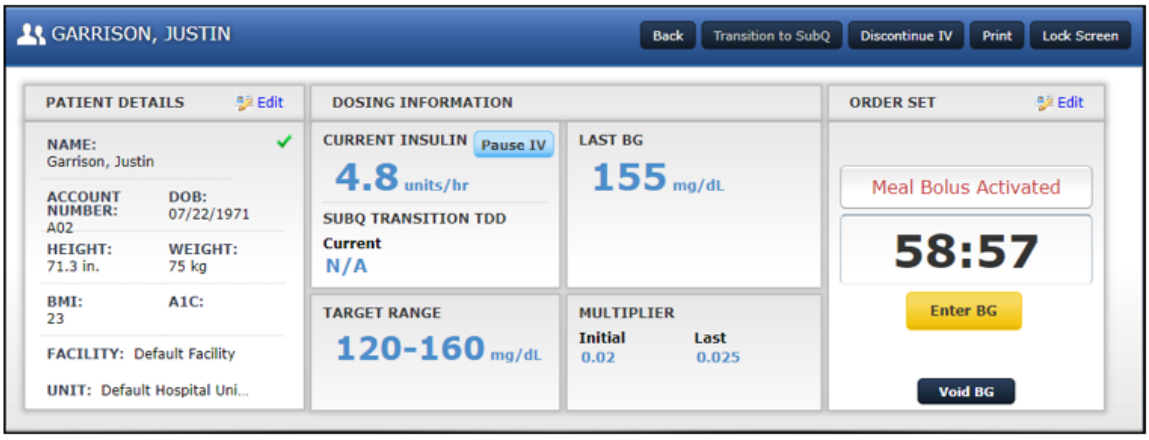
   After the BG value is entered twice, the display expands below the **Re-Enter BG** field to show the recommended insulin infusion rate. If this is a new recommendation, the section titled, "*Adjust Insulin Infusion Rate to"* displays.

   If the insulin infusion rate is unchanged from the previous rate, the section titled, "*Continue Current Insulin Infusion Rate at"* will display.

8. Administer the recommended insulin dose, confirm by selecting the check mark beside the value, and then click **Save**.



On the patient detail page, the **Cancel Meal** button is no longer displayed, and the IV meal bolus can no longer be cancelled.



Continue to enter BGs and respond to countdown notifications until the IV meal bolus is complete.

The "Meal Bolus Activated" message will disappear when the meal has been completed. Meal bolus entries are added to the **IV History** tab:

- The estimated (Est) number of carbohydrates present on the patient's tray is displayed in one row
- The actual number of carbohydrates the patient consumed is displayed in a subsequent row.

IV History | Notes (0) | History

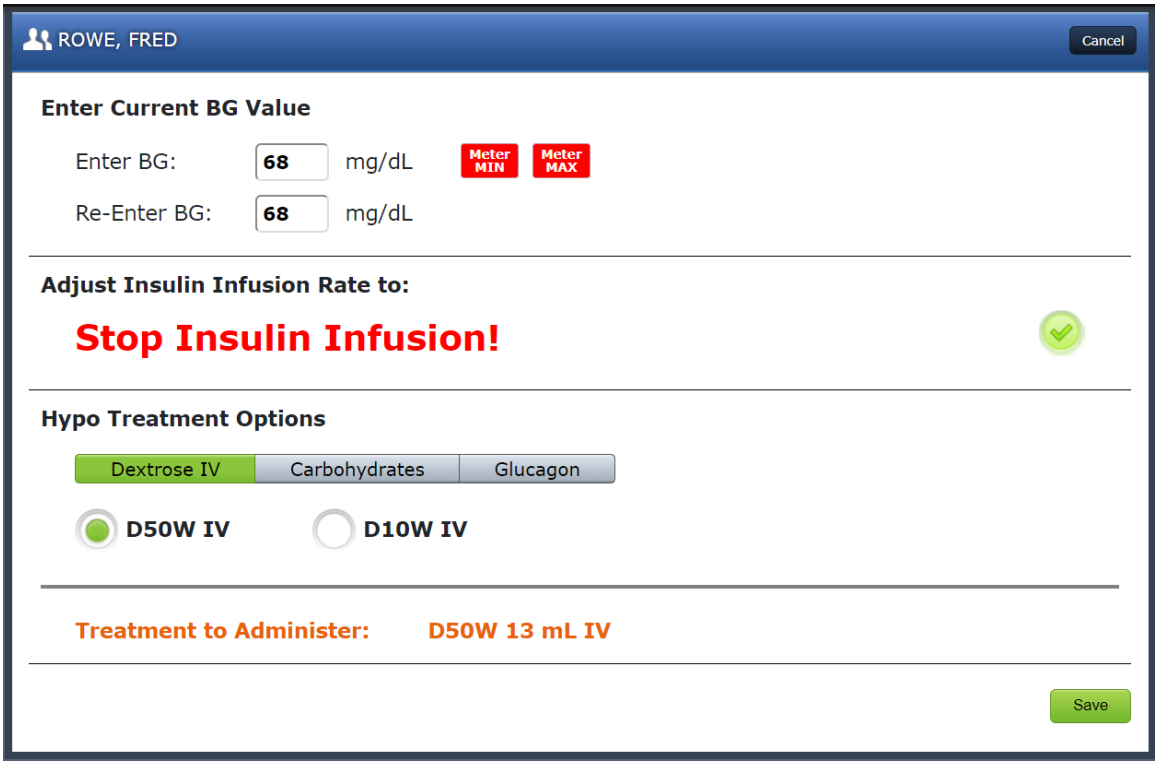
Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
03/28/2023 05:17	155 mg/dL	4.8 units/hr	30	Gloria Fraeme	N/A	03/28/2023 06:17
03/28/2023 04:47	156 mg/dL	4 units/hr	Est:30	Gloria Fraeme	N/A	03/28/2023 05:17
03/28/2023 04:17	180 mg/dL	3 units/hr	N/A	Gloria Fraeme	N/A	03/28/2023 05:17
03/28/2023 03:16	160 mg/dL	2 units/hr	N/A	Gloria Fraeme	N/A	03/28/2023 04:16
03/28/2023 02:16	175 mg/dL	2.3 units/hr	N/A	Gloria Fraeme	N/A	03/28/2023 03:16

IV Hypoglycemia BG

Hypoglycemia treatment options can vary based on your hospital's configuration settings.

If at any point you enter a BG value that is below the configured hypoglycemia (hypo) threshold (BG < 70 mg/dL), the expected hypo messages are triggered even if an IV meal bolus is active.

1. Review the messages and contact the provider if necessary.
2. Select one of the hypo treatment options (Dextrose IV, Carbohydrates, or Glucagon):



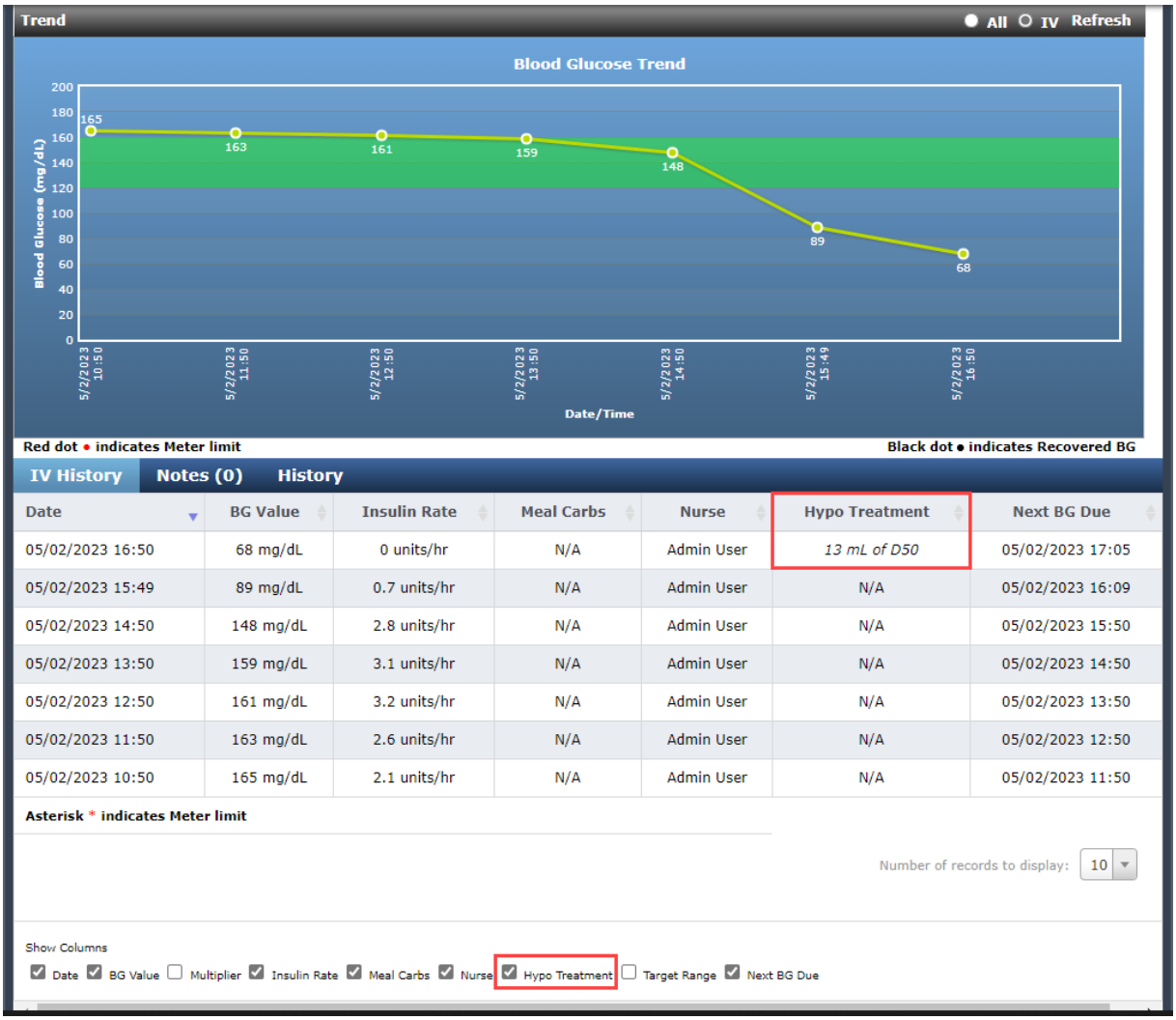
If your hospital has set up a custom hypo message for IV insulin dosing, that message will display instead of the standard system messages shown above.

3. If you select:
   - **Dextrose IV**, the D50W IV and D10W IV radio buttons display below the toggle switch. Select one of the radio buttons to continue.
     - Glucommander will display the recommended D50W IV or D10W IV dose.
   - **Carbohydrates**, note that:
     - 15 grams of carbohydrates will be recommended if the BG is between 54-69 mg/dL
     - 30 grams of carbohydrates will be recommended if the BG < 54 mg/dL
   - **Glucagon**, note that glucagon:
     - Is given in a standard 1 mg dose
     - Is not allowed (disabled) for patients weighing < 20 kg
     - Cannot be given more than twice in 24 hours, and the 24-hr period starts when the last dose was administered. When given twice in 24 hours, it must be given "twice in a row" (that is, with consecutive BG checks).
4. Click **Save**.

After the hypo treatment recommendation is saved, Glucommander starts a 15-minute countdown timer for the patient.

You are prompted to enter a hypo recheck BG within 15 minutes. The hypo treatment will be repeated until a BG greater than the configured hypo threshold is entered for the patient. However, if a BG value that is more than the initial hypo BG is entered less than 15 minutes into the hypo recheck period, this message displays: “Hypo treatment was administered less than *xx* minutes ago. You must wait 15 minutes for the full effect of treatment to be reached.” When you respond to the 15-minute timer with a non-hypo BG, normal treatment resumes.

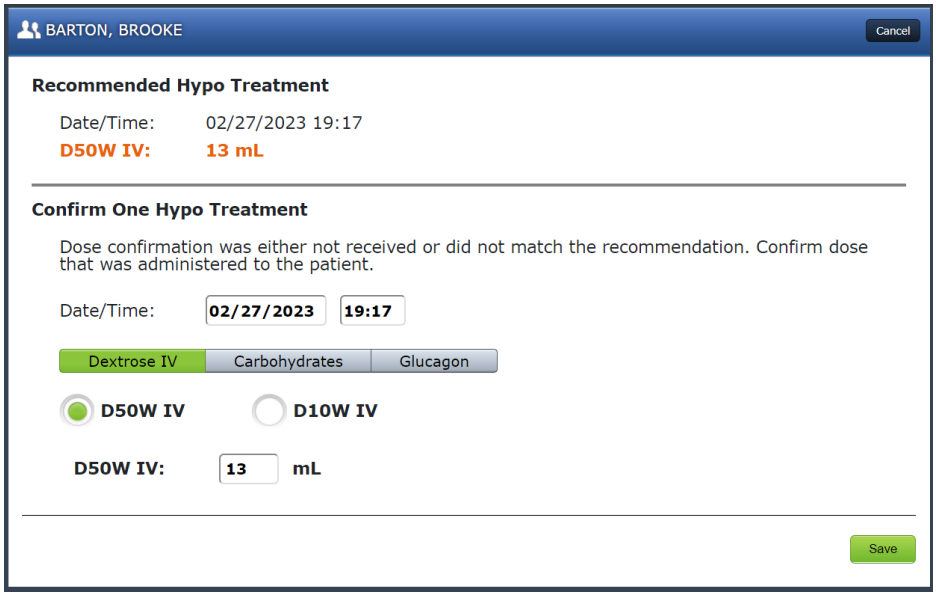
In the **Hypo Treatment** column on the **IV History** tab, the corresponding treatment is recorded in italics. The italics indicate the treatment has not yet been confirmed.



Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
05/02/2023 16:50	68 mg/dL	0 units/hr	N/A	Admin User	*13 mL of D50*	05/02/2023 17:05
05/02/2023 15:49	89 mg/dL	0.7 units/hr	N/A	Admin User	N/A	05/02/2023 16:09
05/02/2023 14:50	148 mg/dL	2.8 units/hr	N/A	Admin User	N/A	05/02/2023 15:50
05/02/2023 13:50	159 mg/dL	3.1 units/hr	N/A	Admin User	N/A	05/02/2023 14:50
05/02/2023 12:50	161 mg/dL	3.2 units/hr	N/A	Admin User	N/A	05/02/2023 13:50
05/02/2023 11:50	163 mg/dL	2.6 units/hr	N/A	Admin User	N/A	05/02/2023 12:50
05/02/2023 10:50	165 mg/dL	2.1 units/hr	N/A	Admin User	N/A	05/02/2023 11:50

If the Hypo Treatment column is not displaying, select the **Hypo Treatment** checkbox below the IV History table.

5. If your installation of Glucommander is:
    - Configured for the Medication Confirmation integration feature, the dose recommendation is automatically confirmed in Glucommander after the message is received that the dose was administered on the MAR.
    - Not configured for the Medication Confirmation integration feature, the dose recommendation needs to be manually confirmed in Glucommander after the dose has been administered. When the 15-minute timer ends, click Enter BG and then proceed to confirm the dose manually:
        a. Review the **Date/Time** the hypo treatment was entered, verify that the correct treatment option is displayed and enter the dose amount, and then click **Save**.



        b. Follow the prompts for entering a BG in *Enter IV BG Value*.

Confirm IV Hypo Dose on MAR

If your installation of Glucommander is configured to work with the Medication Confirmation integration feature, Glucommander automatically sends new hypo dose recommendations to the EMR after the **Save** button is clicked on the Enter Current BG Value page. When you administer the dose and confirm it in MAR, the confirmation is automatically sent to Glucommander via the interface with the MAR.

The Medication Confirmation integration workflow is as follows:

1. Glucommander sends the dose recommendation to the EMR.

a. The IV hypo dose recommendation is displayed in italics in the **Hypo Treatment** column on the **IV History** tab. The italics indicate the treatment has not yet been confirmed.

2. Nurse administers the dose to the patient and then records it on the MAR.
3. Dose confirmation is routed to Glucommander via the interface with the MAR.

- **Glucommander receives dose confirmation from the MAR**
  a. If the dose confirmation from the MAR matches what is displayed in Glucommander:
     i. The dose is automatically confirmed in Glucommander.
     ii. The IV hypo dose recommendation is no longer displayed in italics in the **Hypo Treatment** column on the **IV History** tab. The absence of italics indicates the treatment has been confirmed.
  b. If the dose confirmation from the MAR does not match what is displayed in Glucommander (different value) or a 0 [zero]:
     i. The dose is not automatically confirmed in Glucommander.
     ii. Nurse must manually confirm the dose in Glucommander on the Reconciliation page, which automatically displays the next time **Enter BG** is clicked.

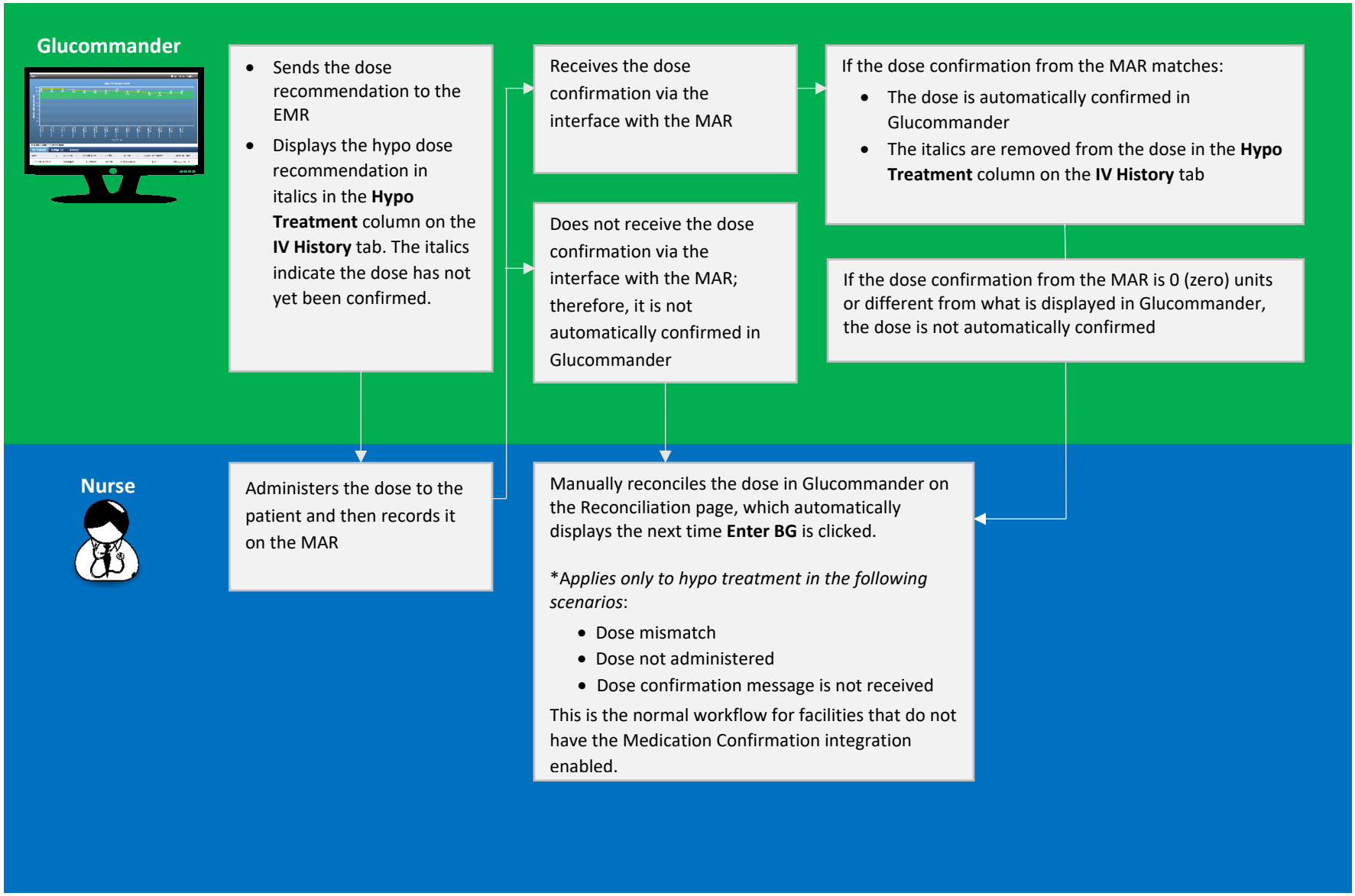
The manual reconciliation process applies only to hypo treatment in the following scenarios:

- Dose mismatch
- Dose not administered
- Dose confirmation message is not received

This is the normal workflow for facilities that do not have the Medication Confirmation integration feature enabled.

- **Glucommander does not receive dose confirmation from the MAR**
  a. The dose is not automatically confirmed in Glucommander.
  b. Nurse must manually confirm the dose in Glucommander on the Reconciliation page, which automatically displays the next time **Enter BG** is clicked.

See the chart on the next page for a different representation of this workflow.

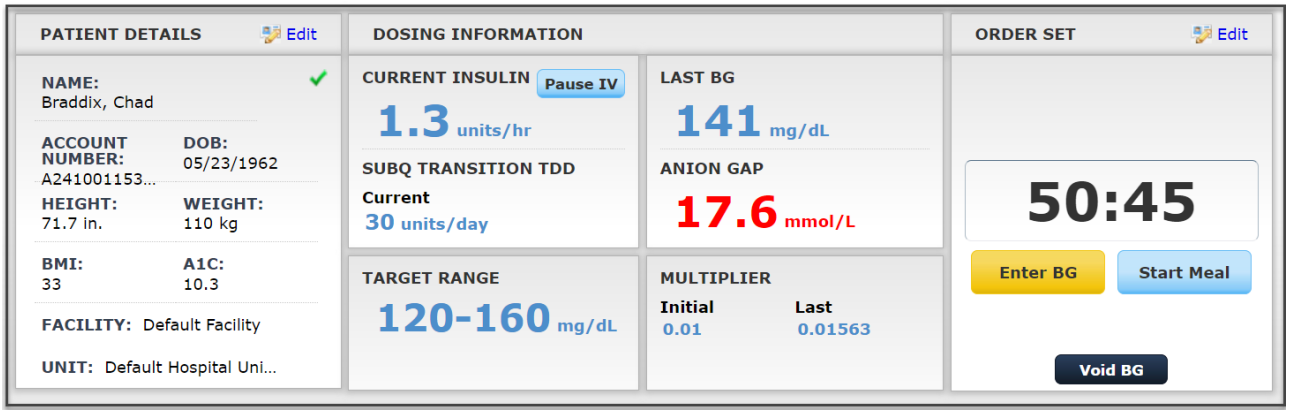

Glucommander
Sends the dose recommendation to the EMR
Displays the hypo dose recommendation in italics in the **Hypo Treatment** column on the **IV History** tab. The italics indicate the dose has not yet been confirmed.
Receives the dose confirmation via the interface with the MAR
If the dose confirmation from the MAR matches:
The dose is automatically confirmed in Glucommander
The italics are removed from the dose in the **Hypo Treatment** column on the **IV History** tab
Does not receive the dose confirmation via the interface with the MAR; therefore, it is not automatically confirmed in Glucommander
If the dose confirmation from the MAR is 0 (zero) units or different from what is displayed in Glucommander, the dose is not automatically confirmed
Nurse
Administers the dose to the patient and then records it on the MAR
Manually reconciles the dose in Glucommander on the Reconciliation page, which automatically displays the next time **Enter BG** is clicked.
Applies only to hypo treatment in the following scenarios:
Dose mismatch
Dose not administered
Dose confirmation message is not received
This is the normal workflow for facilities that do not have the Medication Confirmation integration enabled.

Pause IV

The Pause Intravenous (IV) function is intended to be used when there is an interruption in the insulin infusion.

If the insulin infusion is interrupted, do not restart the insulin infusion without resuming Glucommander.

If the Pause IV configuration setting is enabled, Glucommander will display the **Pause IV** button on the patient detail page.

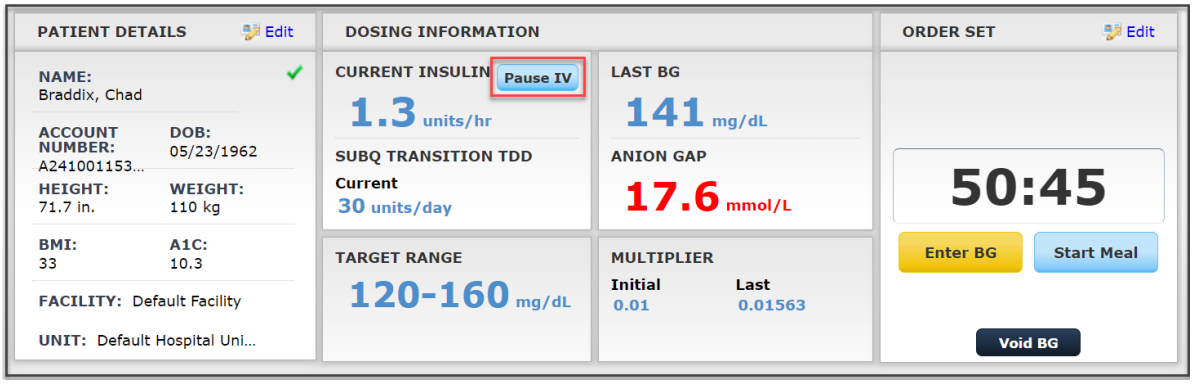


If the Pause IV option under the Admin IV Protocol Settings is disabled, the **Pause IV** button will not display.

The Pause Time configuration setting is set for 150 minutes. If the Pause Time exceeds 150 minutes, new orders are required to resume the insulin infusion.

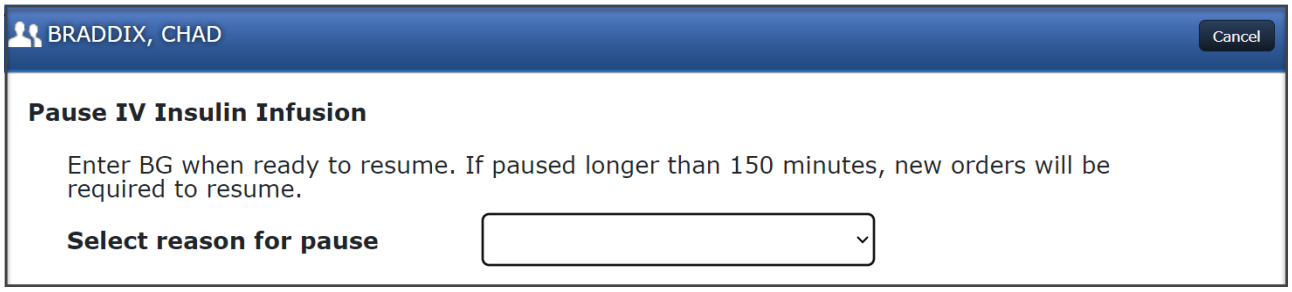
To pause Glucommander IV treatment, on the patient detail page:

1. Click **Pause IV**.

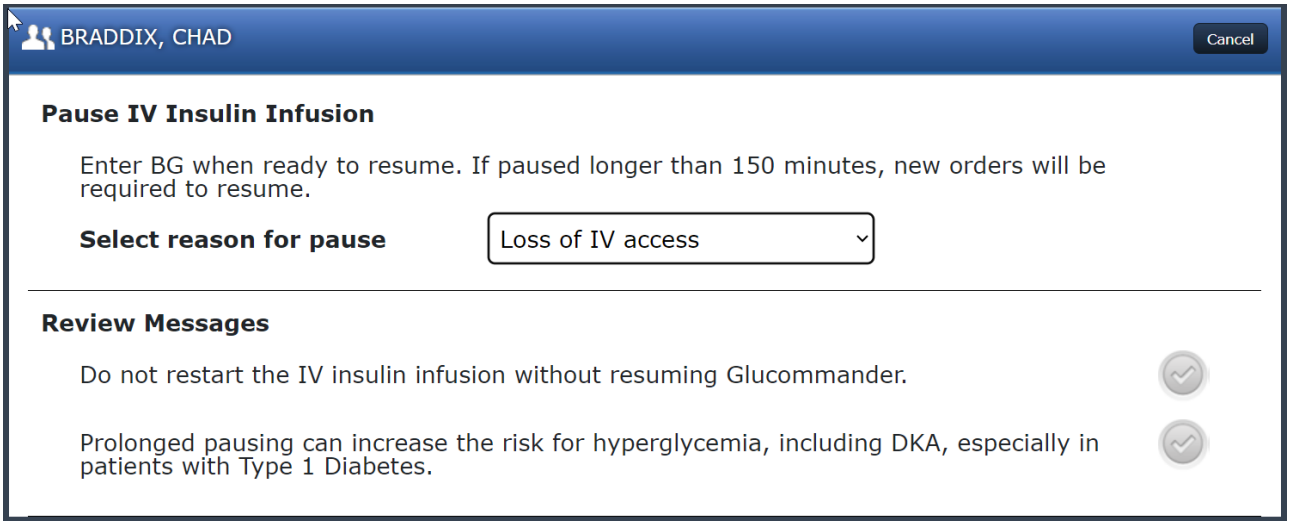


2. Respond to the prompt, "*Select Reason for Pause*" by choosing one of the options listed:

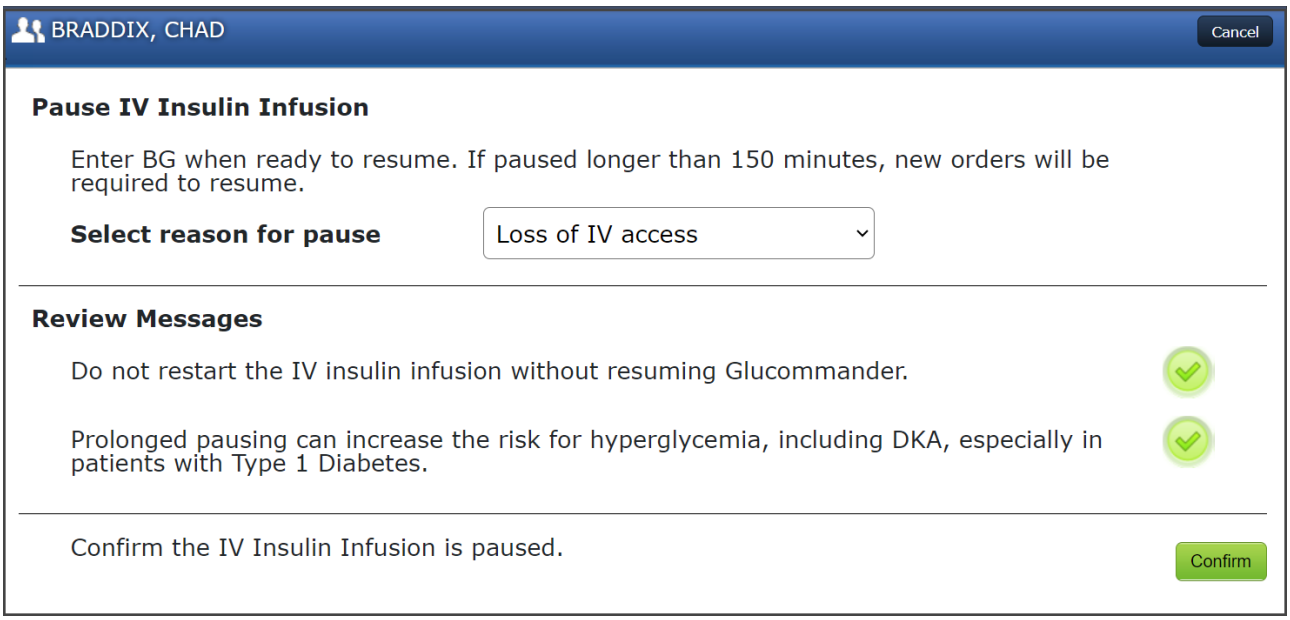
- Loss of IV access
- Provider Order
- Hypokalemia
- Off unit
- IV pump does not allow recommended rate
- Awaiting medication
- Patient transfer
- TF/TPN interruption



3. After the reason for pausing is selected, the section titled, "*Review Messages*" will display.

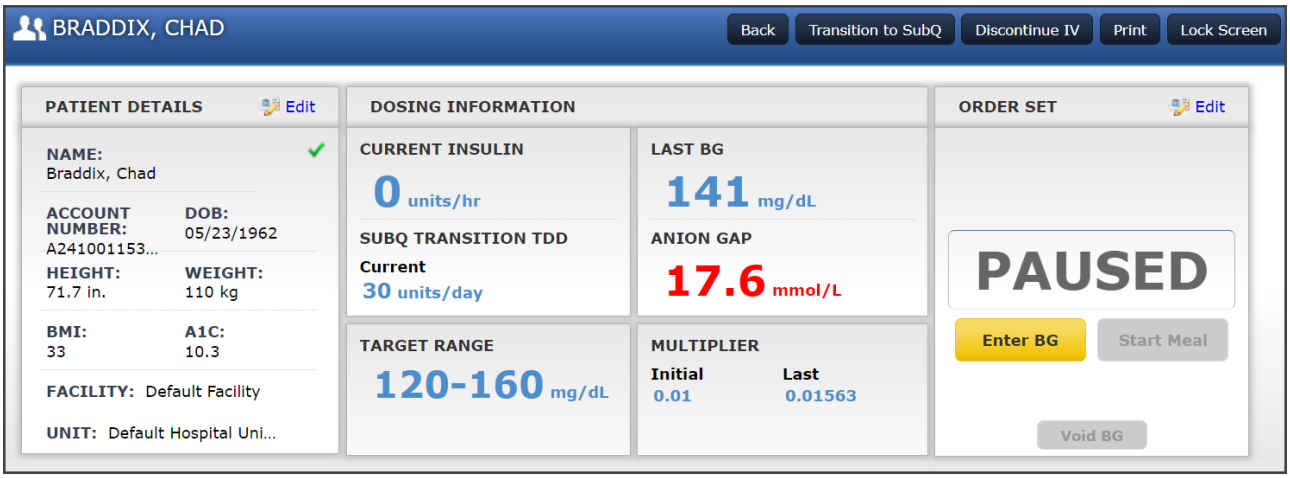


4. Acknowledge all messages by selecting the appropriate check marks, and then click **Confirm**.

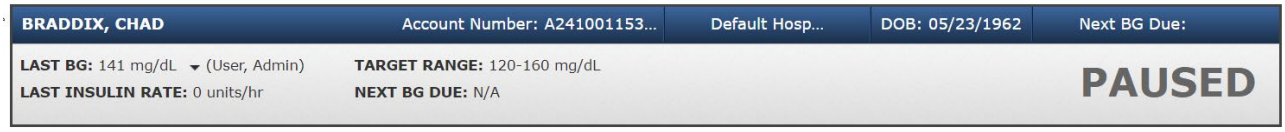


On the patient detail page, the **Pause IV** button is no longer displayed, and the countdown timer is replaced by the **PAUSED** message.

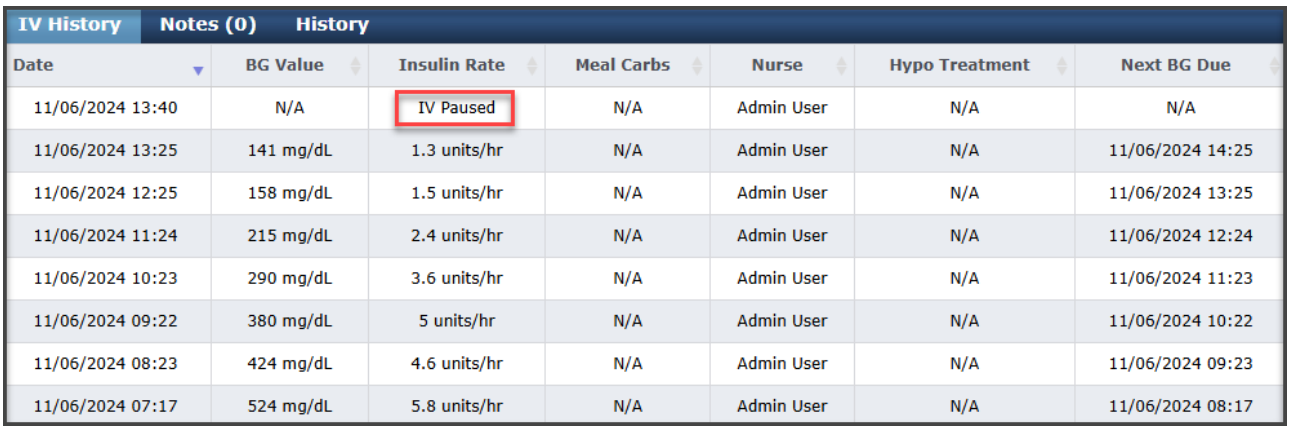
If IV is paused, the **Start Meal** button is no longer active, and a meal bolus cannot be started until the insulin is resumed. See *Start IV Meal Bolus* for more information. .



The PAUSED message also appears on the dashboard (Current Patients page) and on the GlucoView.



Click the **IV History** tab at the bottom of the patient detail page to view the patient's Paused entry.



IV History | Notes (0) | History

Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
11/06/2024 13:40	N/A	IV Paused	N/A	Admin User	N/A	N/A
11/06/2024 13:25	141 mg/dL	1.3 units/hr	N/A	Admin User	N/A	11/06/2024 14:25
11/06/2024 12:25	158 mg/dL	1.5 units/hr	N/A	Admin User	N/A	11/06/2024 13:25
11/06/2024 11:24	215 mg/dL	2.4 units/hr	N/A	Admin User	N/A	11/06/2024 12:24
11/06/2024 10:23	290 mg/dL	3.6 units/hr	N/A	Admin User	N/A	11/06/2024 11:23
11/06/2024 09:22	380 mg/dL	5 units/hr	N/A	Admin User	N/A	11/06/2024 10:22
11/06/2024 08:23	424 mg/dL	4.6 units/hr	N/A	Admin User	N/A	11/06/2024 09:23
11/06/2024 07:17	524 mg/dL	5.8 units/hr	N/A	Admin User	N/A	11/06/2024 08:17

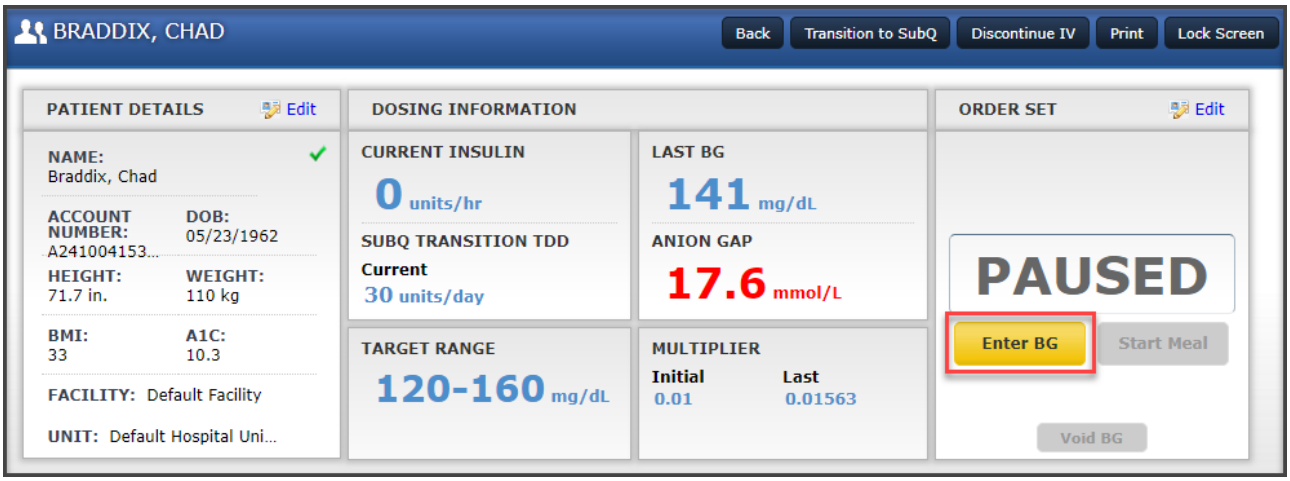
An Audit history entry is recorded when the IV is paused. See *Patient Access, Control, and Communication (Patient Detail – History)* for more information.

Enter BG Value and Resume IV

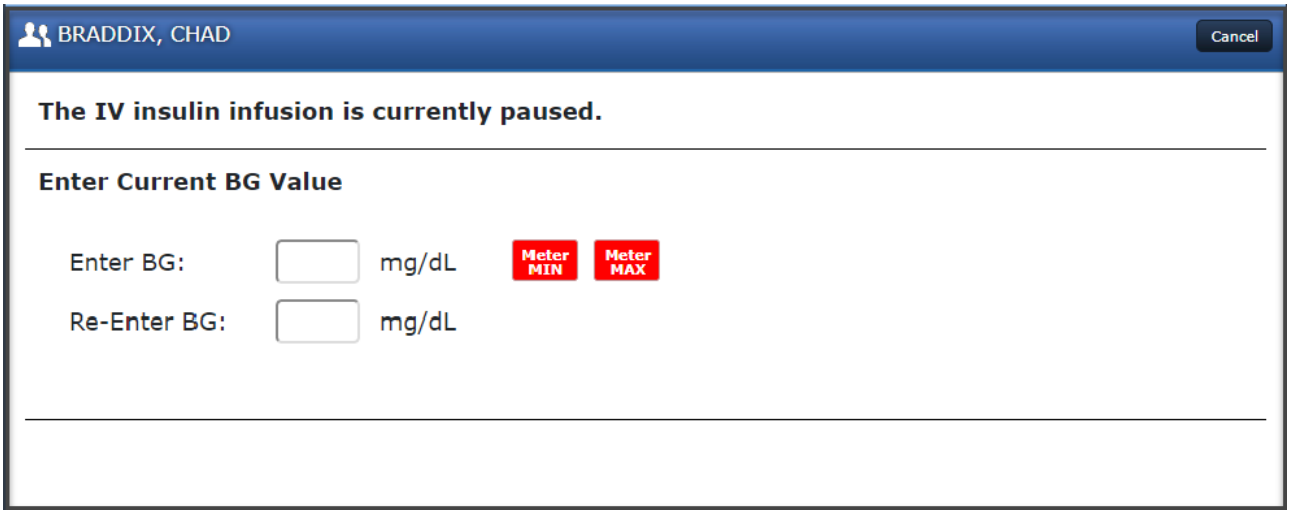
The PAUSED message will continue to display until Glucommander is resumed or when the Pause IV Time configuration has expired (greater than 150 minutes).

To resume patient on IV treatment, on the patient detail page:

1. Click **Enter BG**.



2. Note: The IV insulin infusion is currently paused. Enter the current BG value for the patient in the **Enter BG** and **Re-Enter BG** fields.



3. After the BG value is entered twice, the display expands below the **Re-Enter BG** field to show the recommended insulin infusion rate. Glucommander will ask *"Do you want to resume Glucommander with this recommendation?"*

BRADDIX, CHAD
Cancel

The IV insulin infusion is currently paused.

Enter Current BG Value

Enter BG: 159 mg/dL Meter MIN Meter MAX

Re-Enter BG: 159 mg/dL

Adjust Insulin Infusion Rate to:

1.5 units/hr

Do you want to resume Glucommander with this recommendation?

Yes **No**

4. Select the "Yes" check mark in response to the question, *"Do you want to resume Glucommander with this recommendation?"*
5. Click **Save** to confirm the insulin infusion is resumed at recommended rate.

BRADDIX, CHAD
Cancel

The IV insulin infusion is currently paused.

Enter Current BG Value

Enter BG: 159 mg/dL Meter MIN Meter MAX

Re-Enter BG: 159 mg/dL

Adjust Insulin Infusion Rate to:

1.5 units/hr

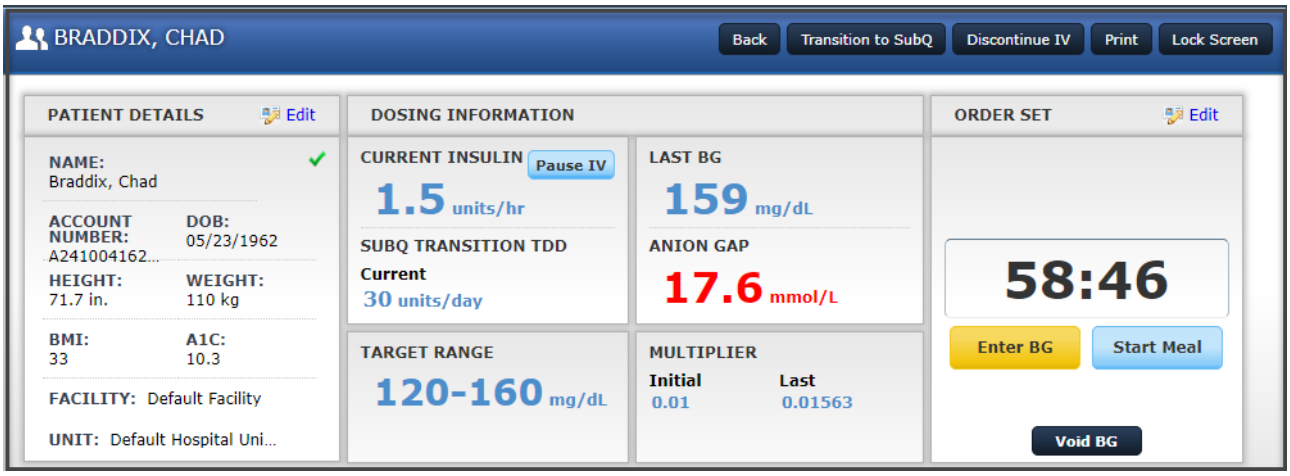
Do you want to resume Glucommander with this recommendation?

Yes **No**

Confirm Insulin infusion is resumed at 1.5 units/hr.

Save

6. On the patient detail page, the **Pause IV** button and the countdown timer are displayed.



7. The BG entry will be recorded on the **IV History** tab.

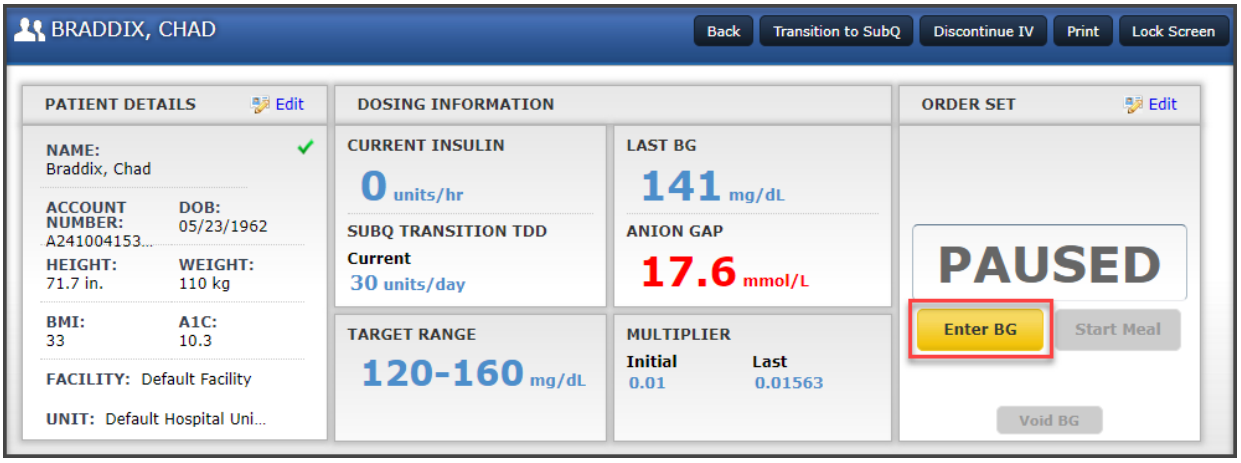
IV History | Notes (0) | History

Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
11/06/2024 14:32	159 mg/dL	1.5 units/hr	N/A	Admin User	N/A	11/06/2024 15:32
11/06/2024 13:40	N/A	IV Paused	N/A	Admin User	N/A	N/A
11/06/2024 13:25	141 mg/dL	1.3 units/hr	N/A	Admin User	N/A	11/06/2024 14:25
11/06/2024 12:25	158 mg/dL	1.5 units/hr	N/A	Admin User	N/A	11/06/2024 13:25
11/06/2024 11:24	215 mg/dL	2.4 units/hr	N/A	Admin User	N/A	11/06/2024 12:24
11/06/2024 10:23	290 mg/dL	3.6 units/hr	N/A	Admin User	N/A	11/06/2024 11:23
11/06/2024 09:22	380 mg/dL	5 units/hr	N/A	Admin User	N/A	11/06/2024 10:22
11/06/2024 08:23	424 mg/dL	4.6 units/hr	N/A	Admin User	N/A	11/06/2024 09:23
11/06/2024 07:17	524 mg/dL	5.8 units/hr	N/A	Admin User	N/A	11/06/2024 08:17

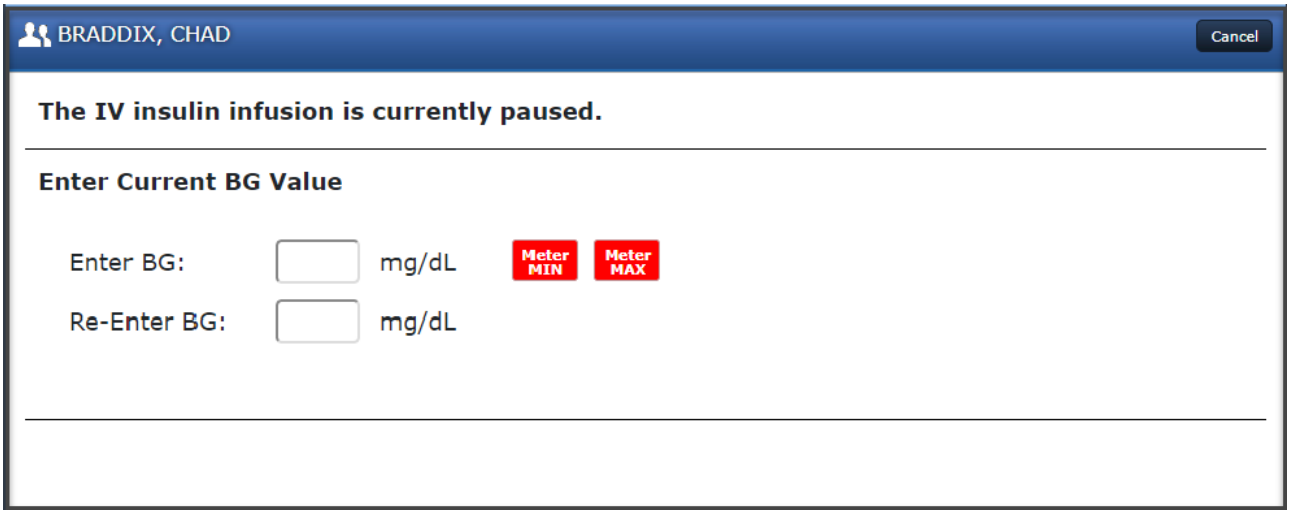
Enter BG Value without Resuming IV

To enter a BG value while paused:

1. On the patient detail page, click **Enter BG**.



2. Enter the current BG value for the patient in the **Enter BG** and **Re-Enter BG** fields.



3. After the BG value is entered twice, the display expands below the Re-Enter BG field to show the recommended insulin infusion rate. Glucommander will ask *"Do you want to resume Glucommander with this recommendation?"*

BRADDIX, CHAD
Cancel

The IV insulin infusion is currently paused.

Enter Current BG Value

Enter BG: 159 mg/dL Meter MIN Meter MAX

Re-Enter BG: 159 mg/dL

Adjust Insulin Infusion Rate to:

1.5 units/hr

Do you want to resume Glucommander with this recommendation?

Yes **No**

4. Select the "No" check mark in response to the question, *"Do you want to resume Glucommander with this recommendation?"*
5. Click **Save** to confirm the IV Insulin Infusion is paused.

BRADDIX, CHAD
Cancel

The IV insulin infusion is currently paused.

Enter Current BG Value

Enter BG: 159 mg/dL Meter MIN Meter MAX

Re-Enter BG: 159 mg/dL

Adjust Insulin Infusion Rate to:

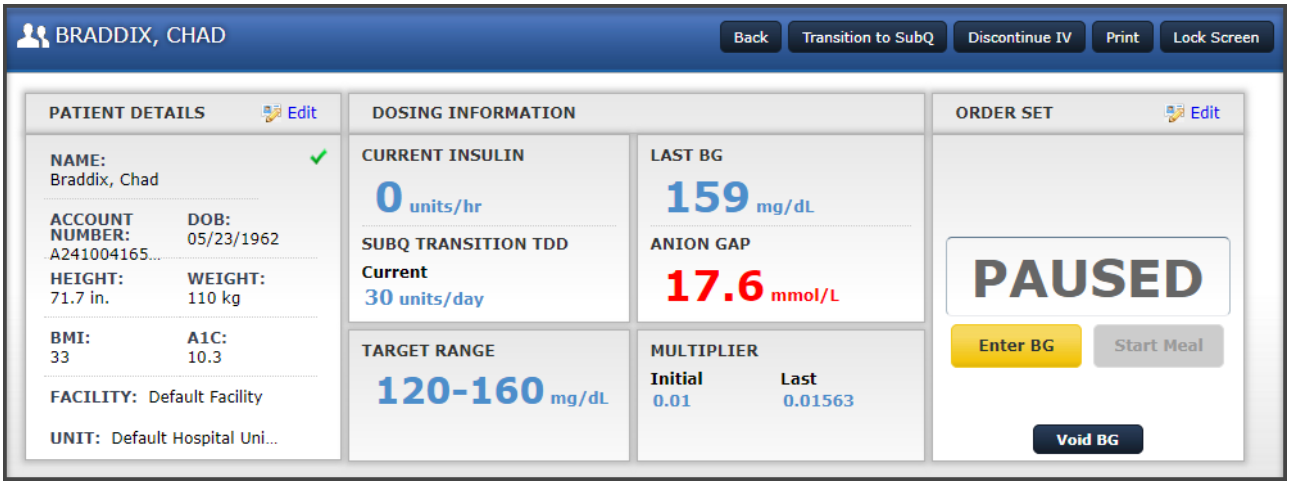
0 units/hr

Do you want to resume Glucommander with this recommendation?

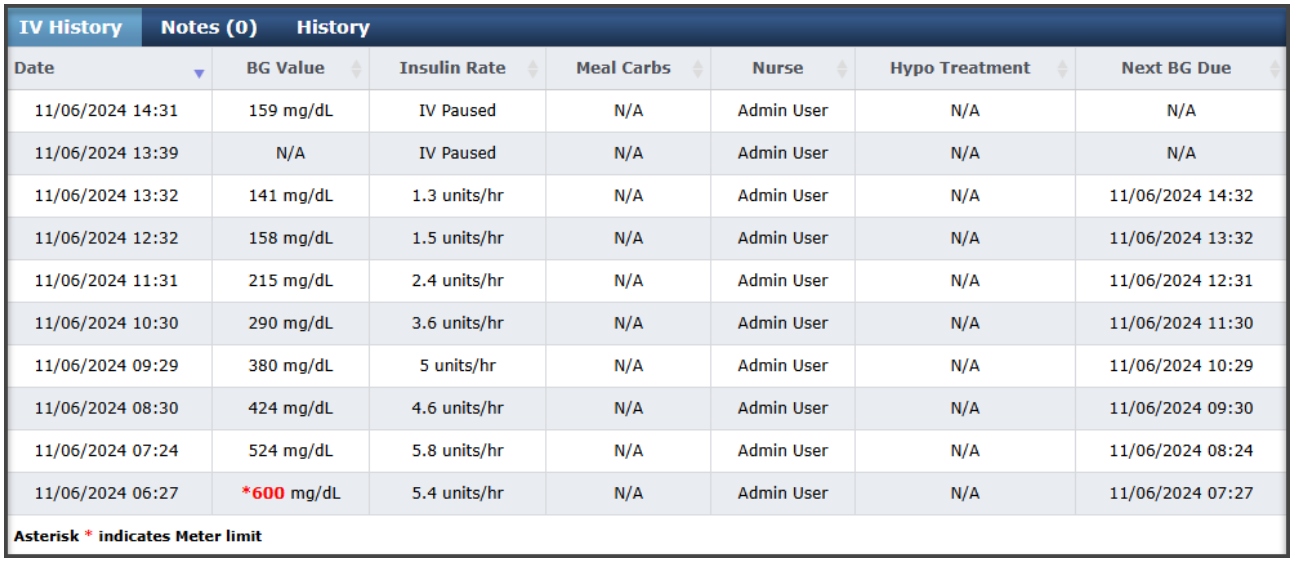
Yes **No**

Confirm the IV insulin infusion is paused.
Save

On the patient detail page, the **PAUSED** message continues to display.



6. The BG entry will be recorded on the **IV History** tab.



IV History | Notes (0) | History

Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
11/06/2024 14:31	159 mg/dL	IV Paused	N/A	Admin User	N/A	N/A
11/06/2024 13:39	N/A	IV Paused	N/A	Admin User	N/A	N/A
11/06/2024 13:32	141 mg/dL	1.3 units/hr	N/A	Admin User	N/A	11/06/2024 14:32
11/06/2024 12:32	158 mg/dL	1.5 units/hr	N/A	Admin User	N/A	11/06/2024 13:32
11/06/2024 11:31	215 mg/dL	2.4 units/hr	N/A	Admin User	N/A	11/06/2024 12:31
11/06/2024 10:30	290 mg/dL	3.6 units/hr	N/A	Admin User	N/A	11/06/2024 11:30
11/06/2024 09:29	380 mg/dL	5 units/hr	N/A	Admin User	N/A	11/06/2024 10:29
11/06/2024 08:30	424 mg/dL	4.6 units/hr	N/A	Admin User	N/A	11/06/2024 09:30
11/06/2024 07:24	524 mg/dL	5.8 units/hr	N/A	Admin User	N/A	11/06/2024 08:24
11/06/2024 06:27	*600 mg/dL	5.4 units/hr	N/A	Admin User	N/A	11/06/2024 07:27

Asterisk * indicates Meter limit

If at any point you enter a BG value that is below the configured hypoglycemia (hypo) threshold (BG < 70 mg/dL), the expected hypo messages are triggered, and hypo treatment options will display.

After the hypo treatment recommendations are saved, Glucommander will start a 15-minute countdown timer for the hypo recheck BG. See *IV Hypoglycemia BG* for more information.

Pause IV during an IV Meal Bolus

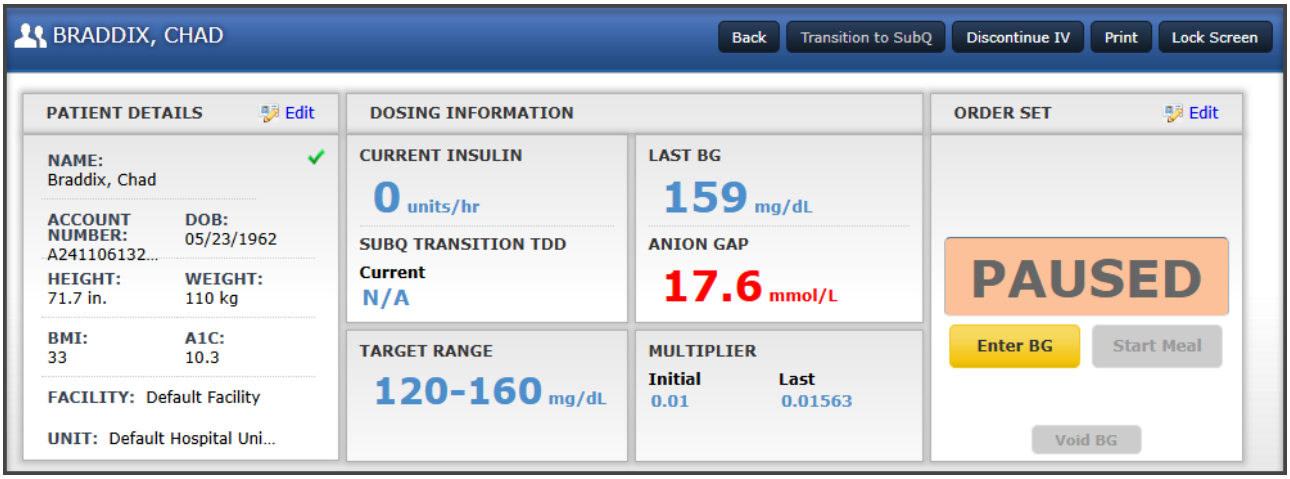
If the IV Meal Bolus is active and the Pause IV is initiated, Glucommander will automatically cancel the IV meal bolus. The cancellation entry will be noted in the **IV History** tab.

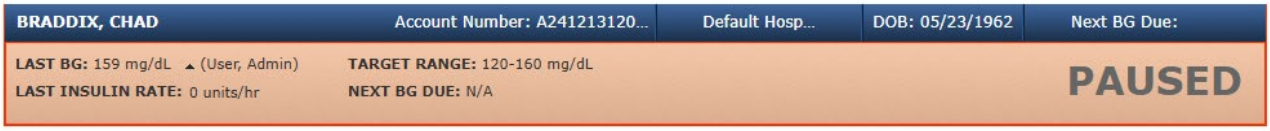
IV History | Notes (0) | History

Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
11/06/2024 15:18	N/A	IV Paused	Canceled	Admin User	N/A	N/A
11/06/2024 15:00	159 mg/dL	3.5 units/hr	Est:60	Admin User	N/A	11/06/2024 15:30
11/06/2024 14:08	141 mg/dL	1.3 units/hr	N/A	Admin User	N/A	11/06/2024 15:08
11/06/2024 13:08	158 mg/dL	1.5 units/hr	N/A	Admin User	N/A	11/06/2024 14:08
11/06/2024 12:07	215 mg/dL	2.4 units/hr	N/A	Admin User	N/A	11/06/2024 13:07
11/06/2024 11:06	290 mg/dL	3.6 units/hr	N/A	Admin User	N/A	11/06/2024 12:06
11/06/2024 10:05	380 mg/dL	5 units/hr	N/A	Admin User	N/A	11/06/2024 11:05
11/06/2024 09:06	424 mg/dL	4.6 units/hr	N/A	Admin User	N/A	11/06/2024 10:06
11/06/2024 08:00	524 mg/dL	5.8 units/hr	N/A	Admin User	N/A	11/06/2024 09:00
11/06/2024 07:03	*600 mg/dL	5.4 units/hr	N/A	Admin User	N/A	11/06/2024 08:03

Paused Time within 15-minute alert

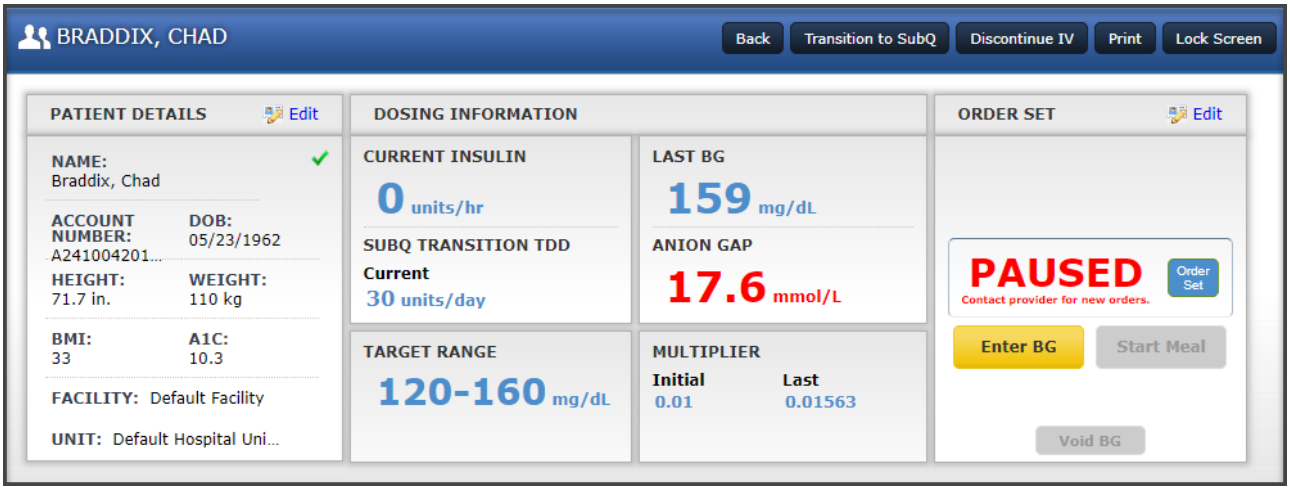
When Glucommander IV has been paused and the time is within 15 minutes of requiring new orders, the background behind the PAUSED message will turn amber on the patient detail page, the dashboard (Current Patients page) and GlucoView.

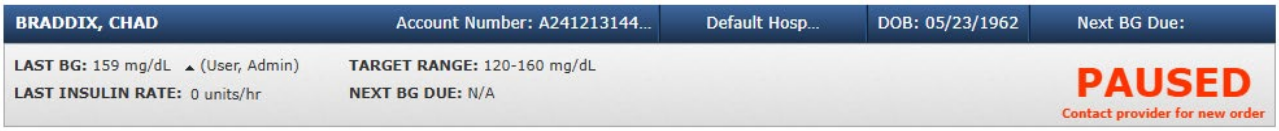




Paused Time Exceeds 150 Minutes

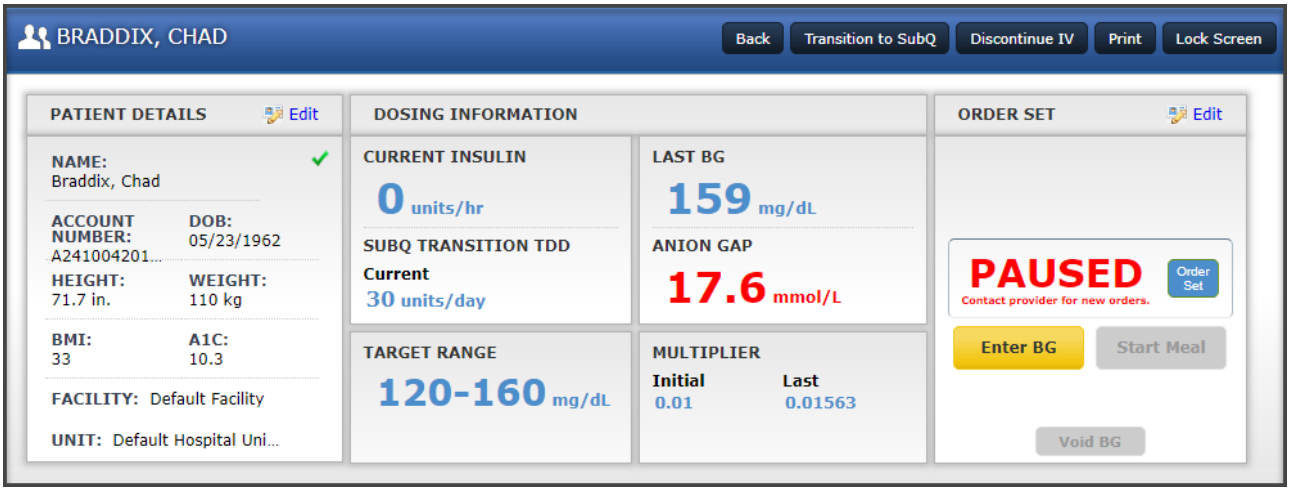
When Glucommander IV is paused longer than 150 minutes, the **PAUSED** label and a new message *Contact provider for new orders* will display in red font on the patient detail page, the dashboard (Current Patients page) and GlucoView.





If IV is paused during transition after the basal insulin dose is confirmed, the pause time will not expire, and new orders will not be required to resume Glucommander.

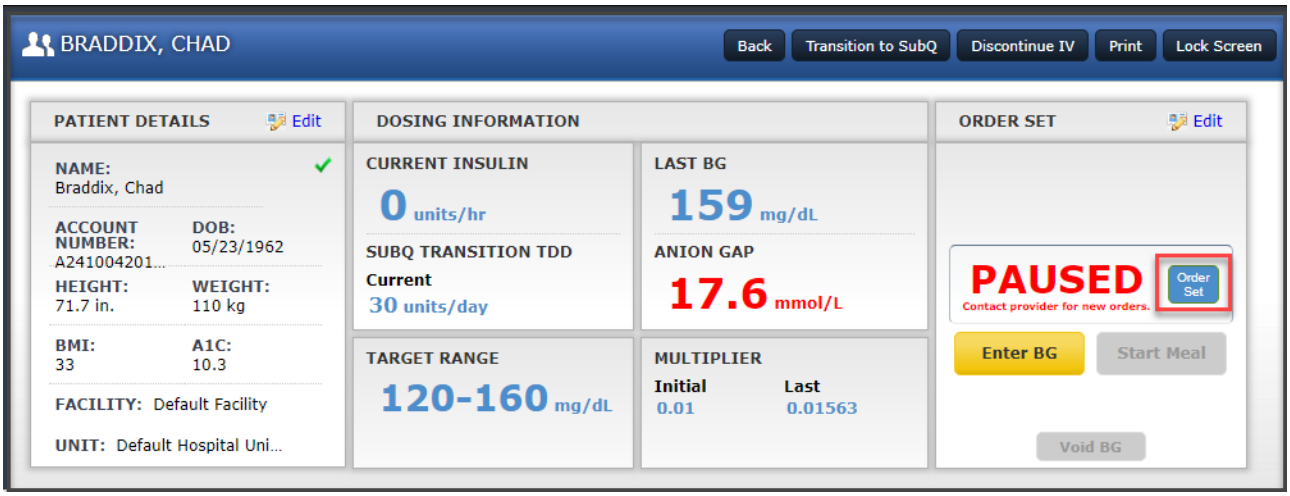
A new **Order Set** button will display next to the PAUSED message on the patient detail page.



Resuming IV when New Orders are Required

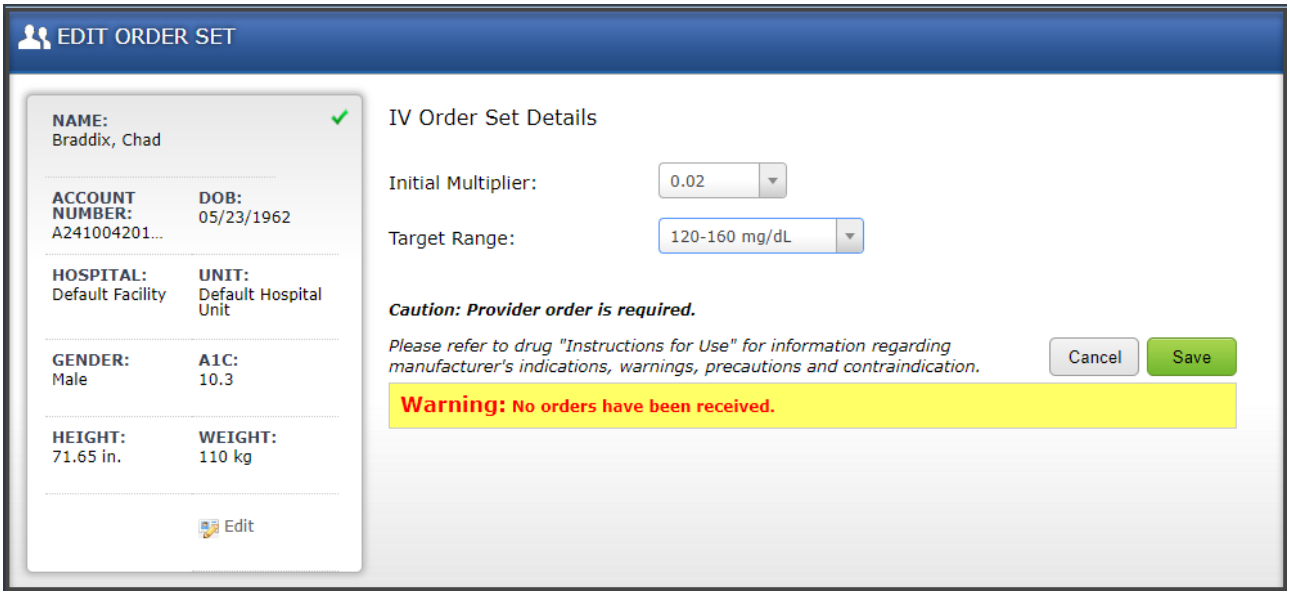
To resume Glucommander IV with new orders, on the patient detail page:

1. Click **Order Set**.



2. If Order Set Integration is enabled and new orders have been received since the IV insulin was paused, Glucommander will receive the new order set parameters through the interface with the EMR. The Start Order Set page displays the parameters received from the EMR in a read-only format.

If Order Set Integration is disabled, Glucommander will not receive order set parameters through the interface with the EMR. See *Verify IV Order Set Manually (Order Set Integration Disabled)*.



If new orders have not been received since IV was paused, contact provider to obtain new orders to resume Glucommander.

3. Click **Save**
4. Follow the prompts for entering a BG in *Enter IV BG Value*.

After saving the BG entry and insulin recommendation, the patient detail page will display. The countdown timer indicates when the next-scheduled BG reading is due displays.

The **IV History** tab displays all entries recorded for this patient. The latest entry will be marked with a *New Order* message indicating that IV is resumed with new orders.

IV History | **Notes (0)** | **History**

Date	BG Value	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
11/06/2024 16:15 New Order	178 mg/dL	2.4 units/hr	N/A	Admin User	N/A	11/06/2024 17:15
11/06/2024 14:32	159 mg/dL	IV Paused	N/A	Admin User	N/A	N/A
11/06/2024 13:39	N/A	IV Paused	N/A	Admin User	N/A	N/A
11/06/2024 13:23	141 mg/dL	1.3 units/hr	N/A	Admin User	N/A	11/06/2024 14:23
11/06/2024 12:23	158 mg/dL	1.5 units/hr	N/A	Admin User	N/A	11/06/2024 13:23
11/06/2024 11:22	215 mg/dL	2.4 units/hr	N/A	Admin User	N/A	11/06/2024 12:22
11/06/2024 10:21	290 mg/dL	3.6 units/hr	N/A	Admin User	N/A	11/06/2024 11:21
11/06/2024 09:20	380 mg/dL	5 units/hr	N/A	Admin User	N/A	11/06/2024 10:20
11/06/2024 08:21	424 mg/dL	4.6 units/hr	N/A	Admin User	N/A	11/06/2024 09:21
11/06/2024 07:15	524 mg/dL	5.8 units/hr	N/A	Admin User	N/A	11/06/2024 08:15

If the pause time has expired and new orders are required, Glucommander will allow entry of a hypoglycemic BG without starting new orders. Select the **Enter BG** button and enter a BG value that is below the configured hypoglycemia (hypo) threshold (BG < 70 mg/dL), the expected hypo messages are triggered, and hypo treatment options will display.

If a BG > configured hypoglycemia threshold is entered, a message displays indicating new orders are required. The **Continue to IV Order Set** button will display. Select the **Continue to IV Order Set** button to enter new orders and resume Glucommander.

Void IV BG Entry

After a BG is entered and a recommended dose is confirmed on the Confirm Insulin Dosage screen, the **Void BG** button is enabled on the patient detail page for a 10-minute period. After this time limit, the button is disabled (grayed out). The BG can be voided by any user with access to the patient's unit.

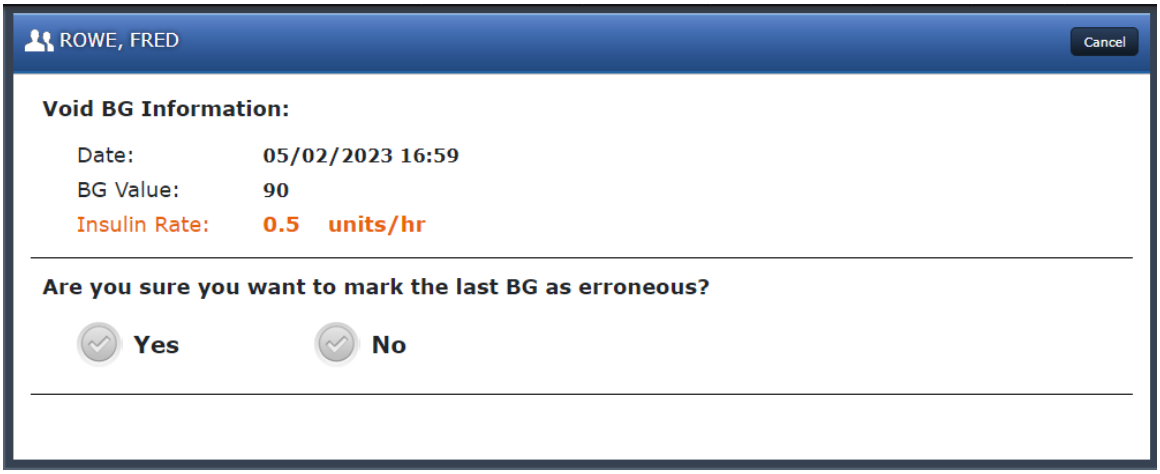
The BG that starts a patient on intravenous (IV) treatment cannot be voided. This includes the first BG on IV treatment following transition from SubQ treatment.

For hypoglycemia (hypo) BGs, the **Void BG** button is disabled after you administer the dose and confirm it in MAR. If you need to void the BG and hypo treatment has been charted on the MAR but not administered to the patient, un-chart the hypo-treatment on the MAR. If it has been within 10 minutes since the BG was entered, select the **Void BG** button in Glucommander. BGs cannot be voided if hypo treatment has been administered to the patient.

To void an IV BG entry:

1. Click **Void BG**.

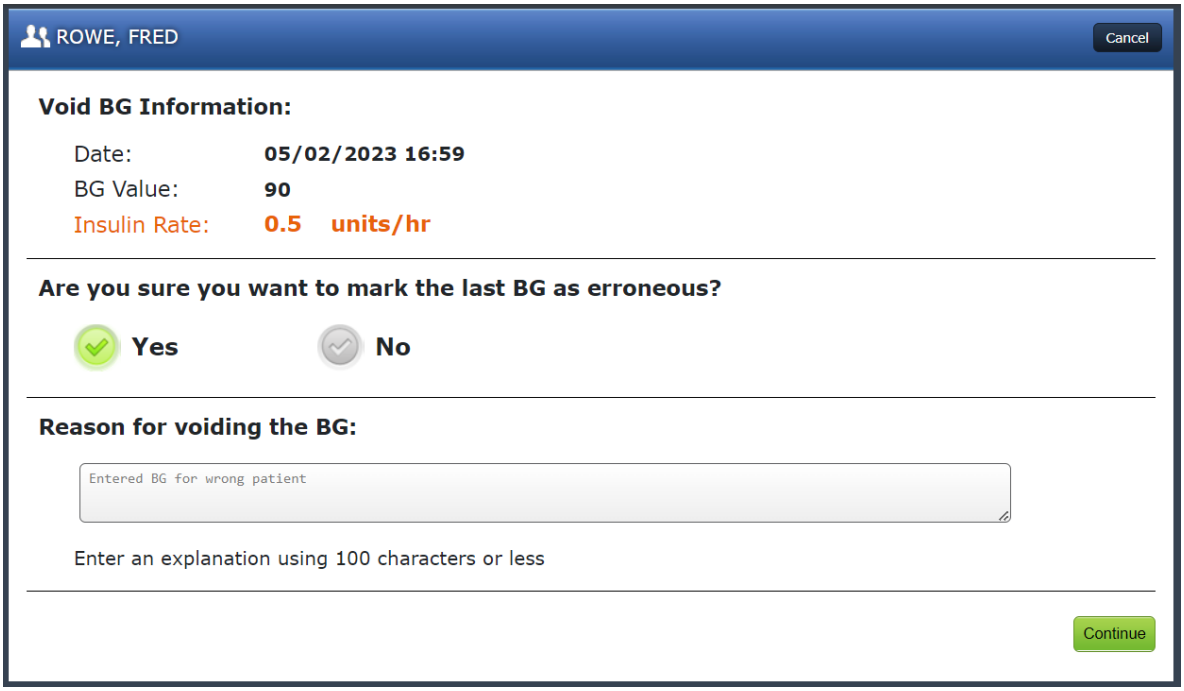
2. Select the "Yes" check mark in response to the question, "*Are you sure you want to mark the last BG as erroneous?*"



If you want to stop the void BG process, click **Cancel**. Selecting "No" will not allow you to stop the process.

3. In the **Reason for voiding the BG** field, enter your reason for voiding the BG.

   For example, you might type "Entered BG for wrong patient" or "Entered wrong value."



4. Click **Continue**.

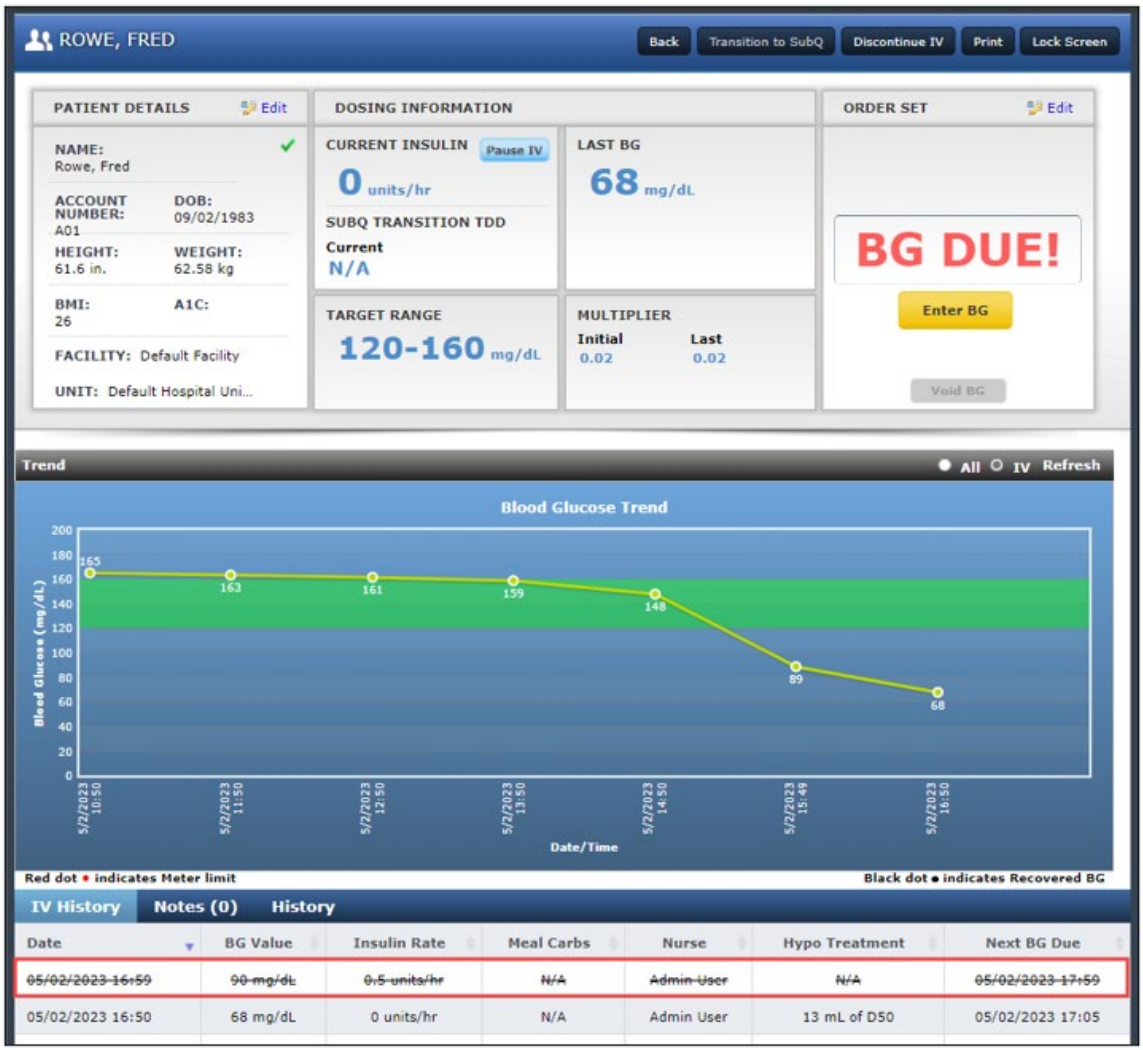
5. Confirm the adjustment of the insulin rate back to what it was before the BG was entered by selecting the check mark and then clicking **Continue**.

The patient detail page displays the patient's treatment state prior to entry of the just-voided BG.

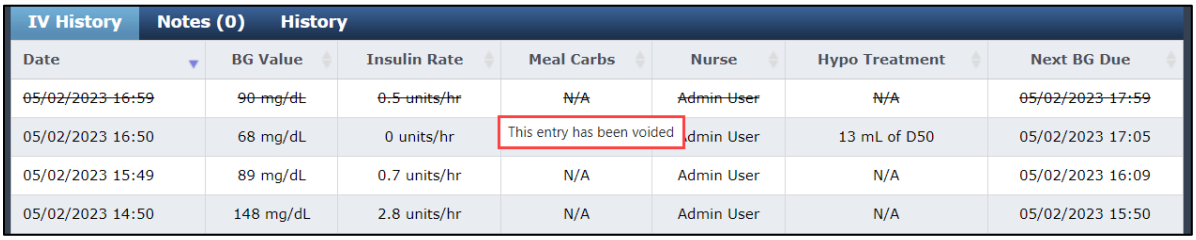
If the voided BG was entered when:

- "BG DUE!" was displayed, "BG DUE!" is displayed again.
- Countdown timer was in progress, countdown timer resumes where it was when voided BG was entered.
- "PAUSED" was displayed, "PAUSED" is displayed again.

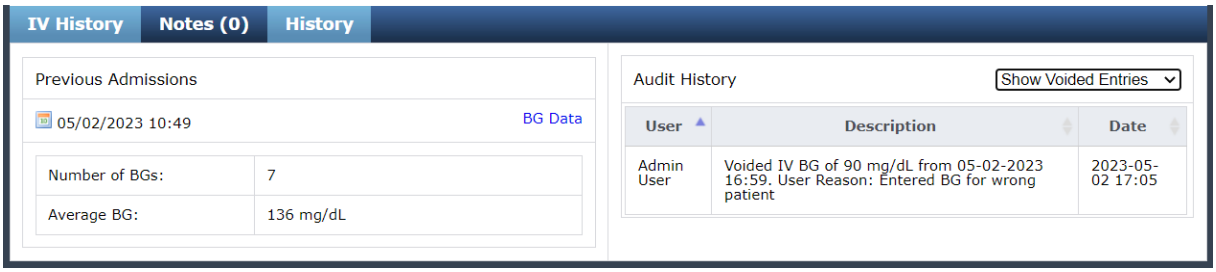
On the **IV History** tab, the voided BG is marked with a strikethrough line:



A tooltip also displays when you hover over the voided BG with your cursor: “This entry has been voided.”



Lastly, on the **History** tab, you can select **Show Voided Entries** to view the voided BG entry.



Edit IV Patient Information

From the top half of the intravenous (IV) patient detail page, you can edit patient information:

- To edit patient demographic information, click the **Edit** button in the **Patient Details** section.
- To modify order set parameters, click the **Edit** button in the **Order Set** section.

If the Edit Patient Information setting is disabled, the Edit function for Patient Details will allow editing of only the patient's height, weight, A1C value, A1C resulted date, and insulin order set.

Changes to fields in the insulin order set require a provider's order.

Here is an example of how the Edit Patient Details page looks when the Edit Patient Information setting is Disabled.

EDIT PATIENT DETAILS

PATIENT INFORMATION

First Name:* Brooke

Last Name:* Barton

Account Number :* A05

MRN :* M05

DOB:* 04/15/1952 (EX: mm/dd/yyyy)

Room Number:

Gender:* Female

Hospital Unit:* Default Facility : Default Hospital Unit

PATIENT DEMOGRAPHICS

Height:* 65 in

Weight:* 71.21 kg

A1C: <7.0

A1C Resulted Date: 02/17/2023 (EX: mm/dd/yyyy)

Physician:

Only these fields remain editable when the **Edit Patient Information** setting is disabled

PATIENT TYPE

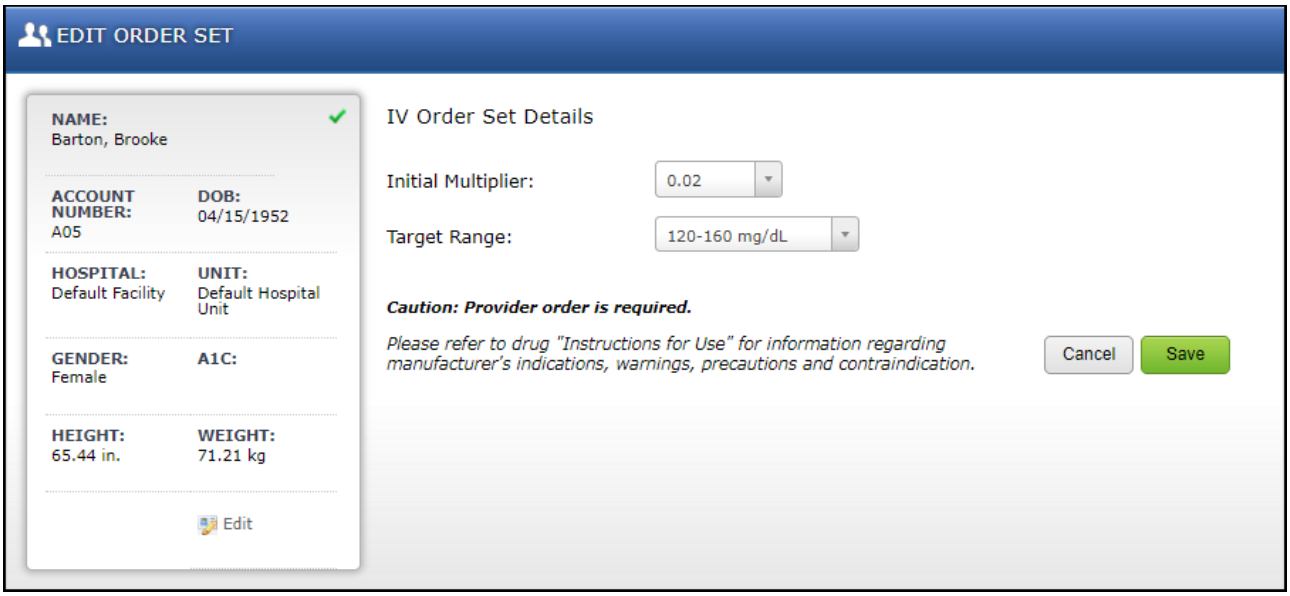
Patient Type:* IV

Cancel | Save and Continue

In the **A1C** field, values containing greater than (>) or less than (<) symbols can be used in the following instances:

- < with values 1-7
- > with values 9 or above

Here is an example of the Edit Patient IV Insulin Order Set page. Edit the parameters to match the provider's order and then click **Save**.

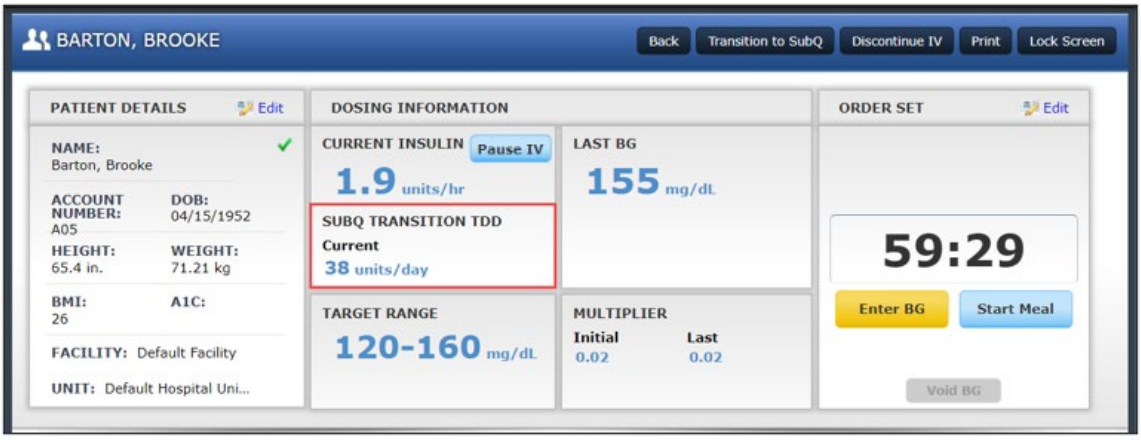


The multiplier appearing on the order set screen may have been adjusted by Glucommander during treatment and may not match initial order. It is not recommended to edit this value unless specifically ordered by provider.

Transition to SubQ

To transition a patient from intravenous (IV) to subcutaneous (SubQ) treatment, on the patient detail page:

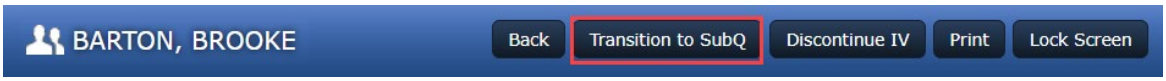
1. Take note of the value displayed in the SubQ Transition TDD section of the IV patient detail page:



Glucommander will calculate a SubQ Transition TDD when the patient meets the criteria to transition to SubQ insulin. The SubQ Transition TDD reflects the patient's estimated current insulin needs in 24 hours. If the field shows a units/day value (38 in the example above), a transition TDD has been calculated and the patient is eligible for transition. If the field shows "N/A," a transition TDD has not been calculated and the patient is not yet eligible for transition.

Another indicator that the patient is eligible for transition is the status of the **Transition to SubQ** button.

2. Click **Transition to SubQ**.



The **Transition to SubQ** button is disabled and a tooltip will display if:

The patient does not meet the minimum criteria for transition:

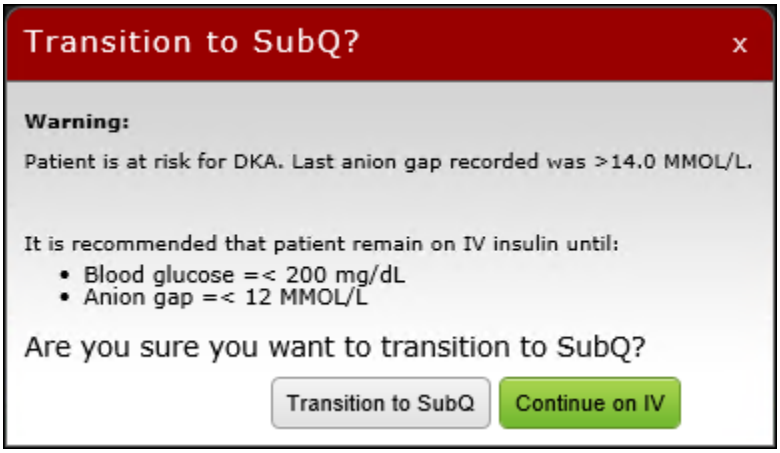
- 6 hours of BG entries on IV therapy with BGs in the 70-180 mg/dL range
  - There must be at least 45 minutes between2 consecutive BGs in the 70-180 mg/dL range
- It has been more than 3 hours since the last BG was entered
- An IV Meal Bolus treatment is active (see page 2424)
- The patient's local (facility) time is between 01:00 and 04:00

You can transition patients off IV therapy at any time if the SubQ Module option is configured as disabled. The lockout timeframe of 01:00 to 04:00 does not apply.

The **Transition to SubQ** button is not displayed if the Transition to SubQ Therapy option is configured as disabled.

3. Review the following message if displayed:

- ***Anion Gap and Transition***
    - If the patient's anion gap value is above your hospital's configured threshold, you may encounter the following message:



    - In response to this message, click one of the following:
        - **Continue on IV**, thereby canceling the transition request
        - **Transition to SubQ**, to proceed with transition

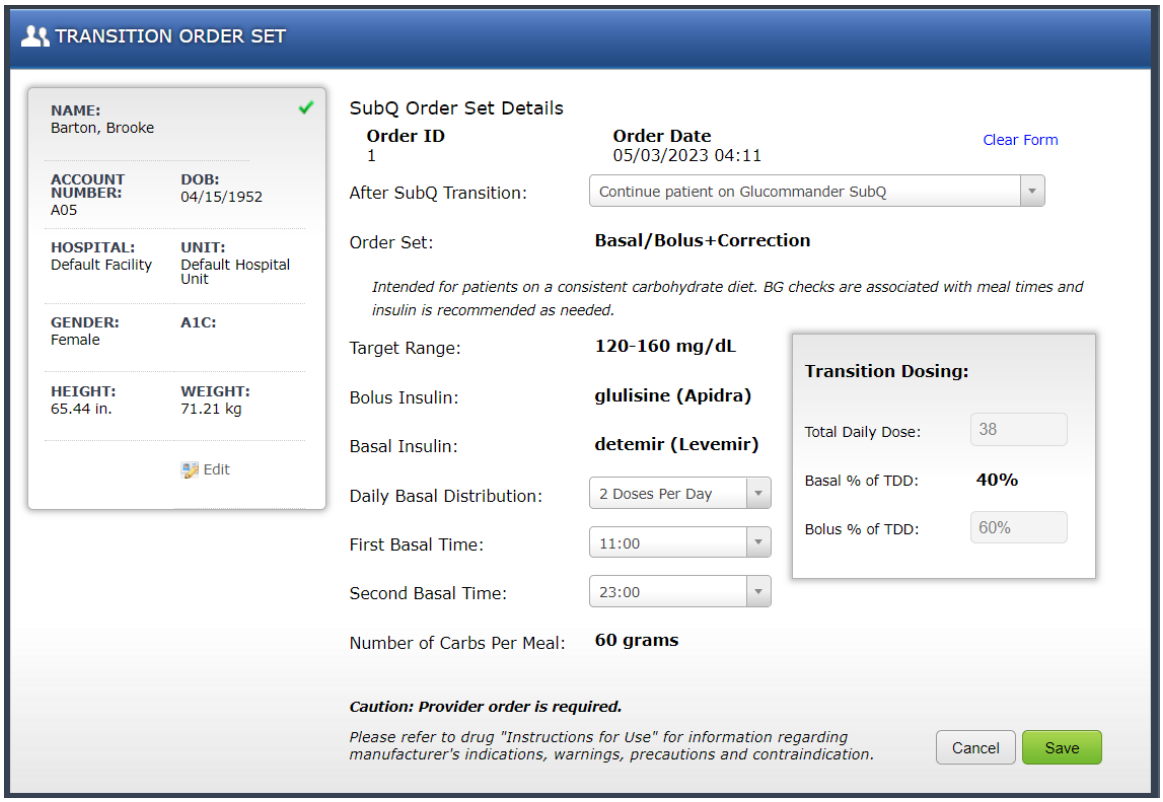
    The Transition Order Set page displays.

4. If your installation of Glucommander is:

- Configured for the order set integration feature and an order has been initiated in the EMR, the order set details will automatically display. See *Complete SubQ Order Set Initiated in EMR*.
- Not configured for the order set integration feature, the order set details will not automatically display. See *Verify SubQ Order Set Manually (Order Set Integration Disabled)*.

5. In the After SubQ Transition field, select one of the following:

   - **Continue patient on Glucommander SubQ** – When the transition from IV insulin dosing is complete, continue the patient on Glucommander for SubQ insulin dosing.
   - **Discontinue patient** – When the transition from IV insulin dosing is complete, discontinue the patient from Glucommander with recommendations for ongoing SubQ insulin dosing.



If you selected **Discontinue patient**, only some of the SubQ insulin order set fields are displayed.

6. If all order set parameters have been received for the order set, click **Save**. If any order set parameters have not been received (field value displays as blank), make manual selections per the provider order and then click **Save**.

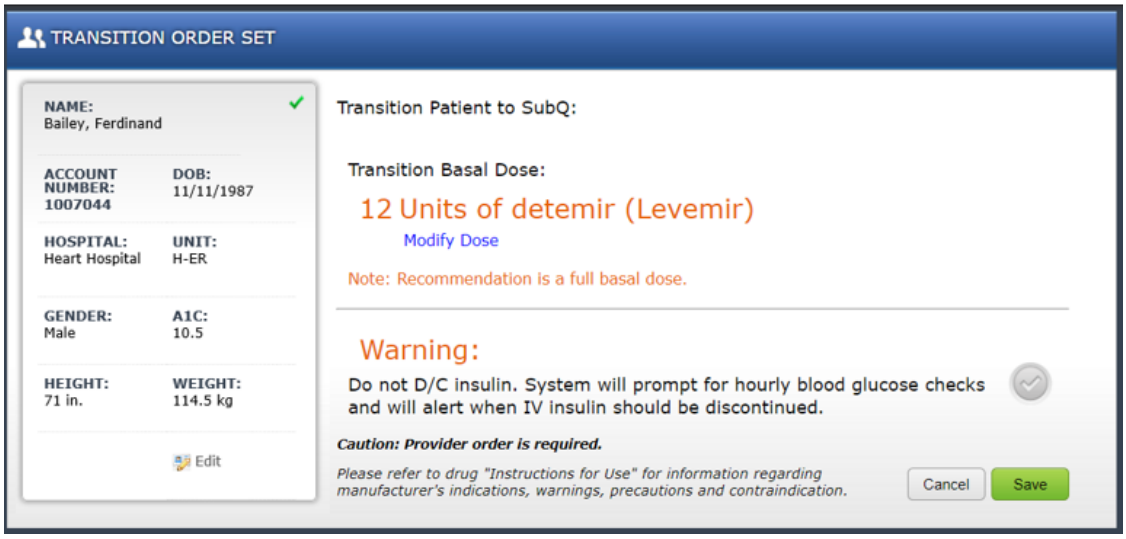
When transitioning patients to SubQ treatment and the TDD is low, this message displays, “Total Daily Dose calculation is too low to qualify for SubQ Treatment. Total transition basal dose must be at least 3 units. Contact provider for additional orders.”

If the transitional basal dose recommendation is 200 units or more, this message displays: “Total daily dose of insulin is high (200 units or above). Do you want to continue?”

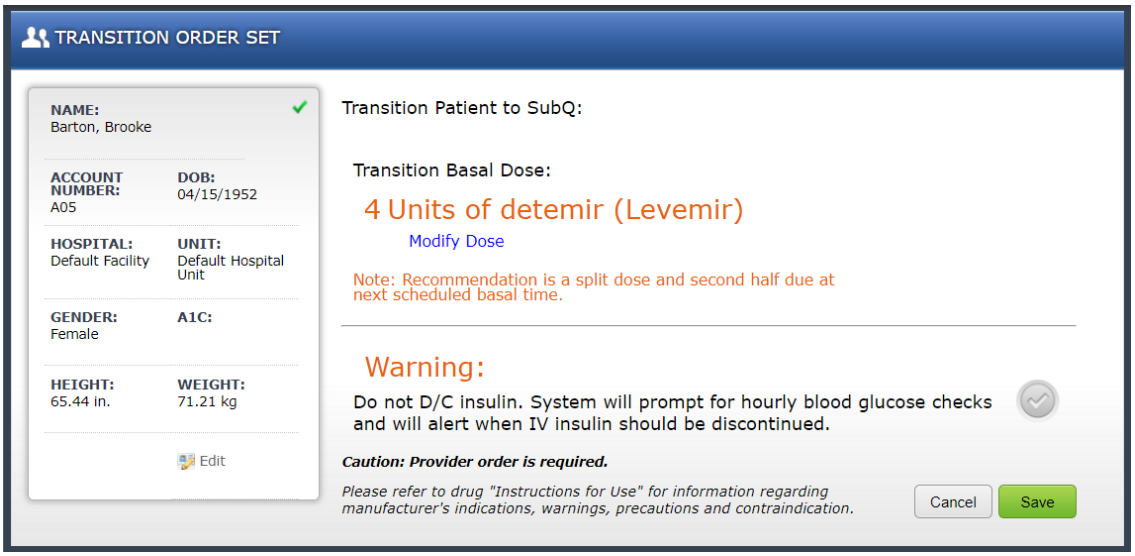
7. Note the recommended transitional basal dose.

   The transitional basal dose recommended may be half of the total basal amount, depending on the dose distribution and how close in time the transitional dose is to the first scheduled basal dose. The note immediately below the recommended transitional basal dose indicates whether the dose is a full dose or half the calculated amount (split dose).

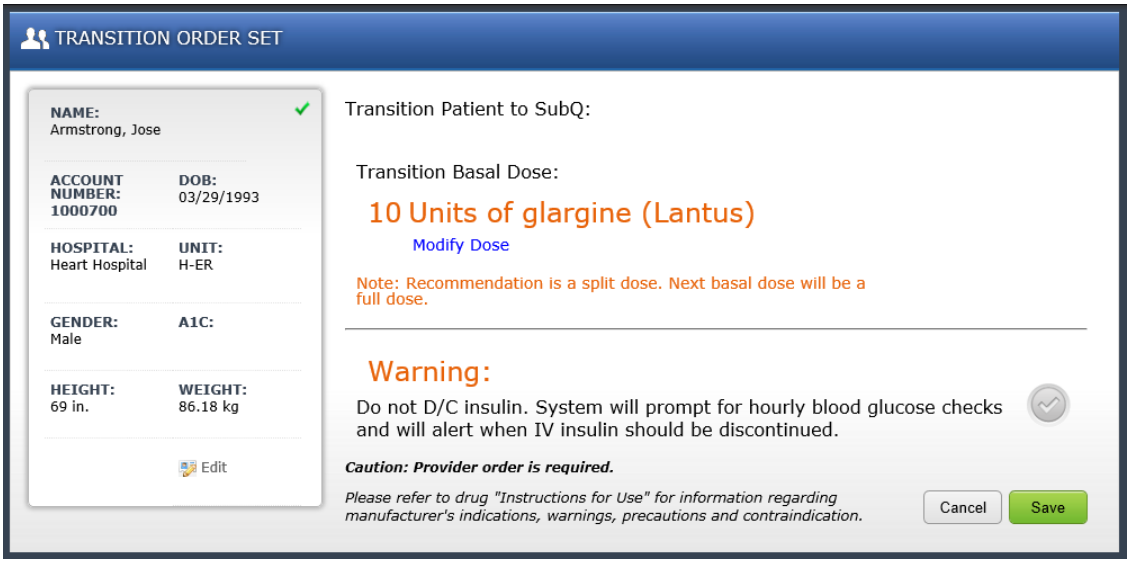
   Example of recommendation for full basal dose



Example of recommendation for split basal dose



Example of recommendation for split/full basal dose



See the table below for information on when the transitional basal dose recommended may be all or half the calculated amount.

Dose distribution	If the transitional basal dose will be given…	Then Glucommander recommends giving…
1 dose per day	**Between 4 hours <u>before and after</u>** the first scheduled basal dose (e.g., between 17:00 and 01:00 if the scheduled dose is at 21:00)	The full basal dose (e.g., 10 units) for today will be given at transition. First scheduled dose will begin tomorrow (at 21:00).

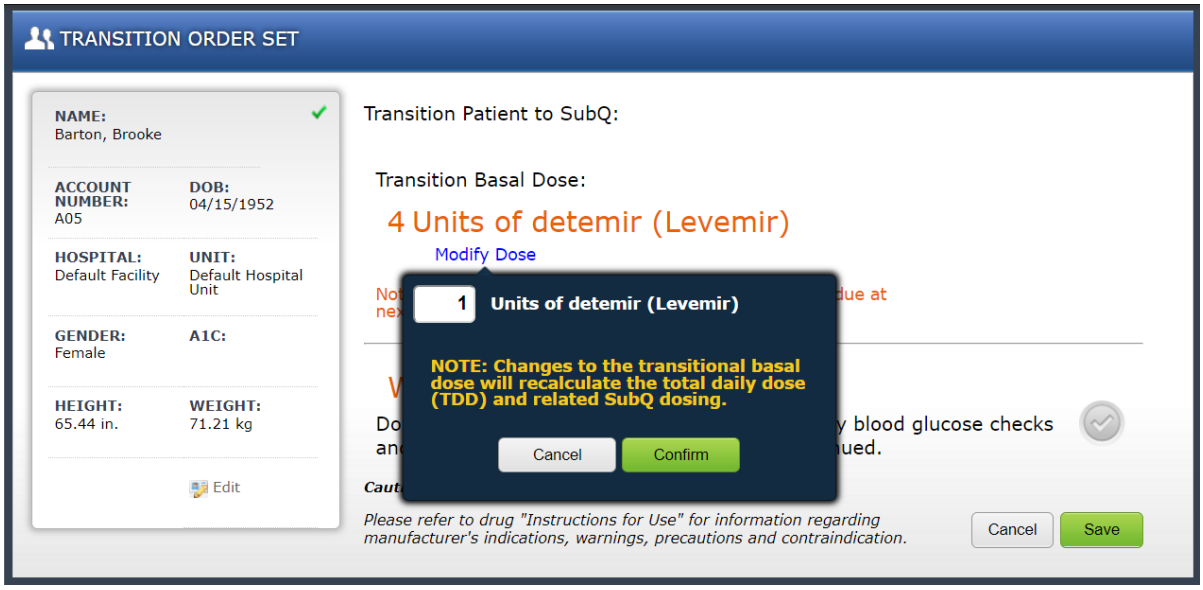
Dose distribution	If the transitional basal dose will be given…	Then Glucommander recommends giving…
	Between 16 and 4 hours before the first scheduled basal (e.g., between 06:00 and 18:00 if the scheduled dose is at 22:00)	Half the basal dose at transition and half at the first scheduled time (e.g., 5 units at transition and 5 at 22:00).
	Between 4 and 8 hours after the first scheduled basal dose (e.g., after 14:00 and before 18:00, following a scheduled basal at 10:00)	Half of the full dose (e.g., 5 units) at transition and the full dose at the first scheduled time (10 units at 10:00)
2 doses per day	**Between 4 hours before and after** the first scheduled basal dose (e.g., between 06:00 and 14:00, if the first basal is scheduled at 10:00)	The full basal dose (e.g., 5 units) will be given at transition for the first scheduled dose (at 10:00) and resuming the regular basal schedule with the next scheduled dose (5 units at 22:00).
	Between 4 hours before and after the second scheduled basal (e.g., between 16:00 and 00:00, if the second basal is scheduled at 20:00),	The full basal dose (e.g., 5 units) will be given at transition, for the second scheduled dose (at 20:00), and resuming the regular basal schedule with the next scheduled dose (at 10:00).
	At all other times between the 2 doses	Half the basal dose (e.g., 3 units) at transition and half (e.g., 3 units) at the next scheduled time.

5. Following the provider order, you can modify the transitional basal dose amount by clicking **Modify Dose**.

If you modify the dose, the new amount will be used to calculate the total daily dose (TDD) and other SubQ dosing.

A modified transitional basal dose is recorded as an “edit” event in the Audit History.

Patients cannot start or transition to SubQ treatment on < 3 units of basal insulin.



6. Note the messages displayed below the recommended transtional basal dose.

As the Warning note on the screen indicates, during this transition period it is important not to prematurely discontinue IV insulin given the risk of hyperglycemia.

7. After the BG entry, the patient detail page displays.

8. If your installation of Glucommander is:
   a. Configured for the Medication Confirmation integration feature, the basal dose is automatically confirmed in Glucommander after the message is received that the dose was administered on the MAR.
   b. Not configured for the Medication Confirmation integration feature, the basal dose needs to be manually confirmed in Glucommander after the dose has been administered on the MAR. See *Confirm Transitional Basal Dose Manually* below.

Confirm Transitional Basal Dose Manually

In Glucommander, the patient detail page displays an active Confirm Basal button.

When the Confirm Basal button appears on the patient detail page, the basal dose calculation will expire after 4 hours.

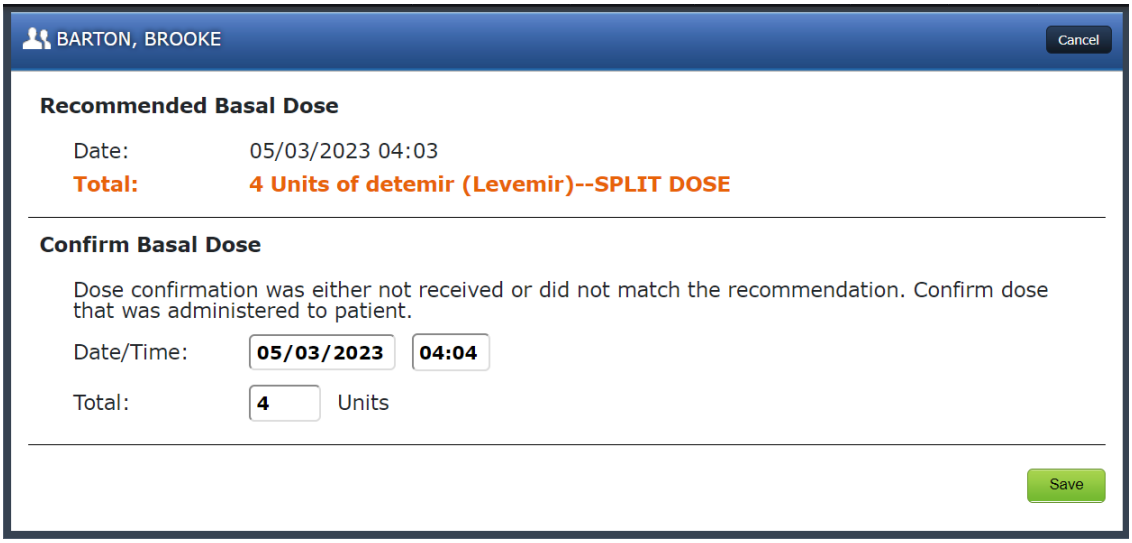
If more than 4 hours have passed and the basal dose is not confirmed, the Confirm Basal Dose page displays when you access the patient detail page. You are required to record whether the basal dose was given or not before proceeding with the next entry. See *Enter Late Entry Basal Dose*.

If "0" units are entered to indicate the basal dose was not given, the transition to SubQ will be cancelled; however, the patient will continue with IV treatment. A transition cancellation note will be added to the Notes tab.

Follow these steps to confirm the basal dose manually.

1. If your hospital is not configured with Medication Confirmation integration when you are ready to administer the basal, click **Confirm Basal**.

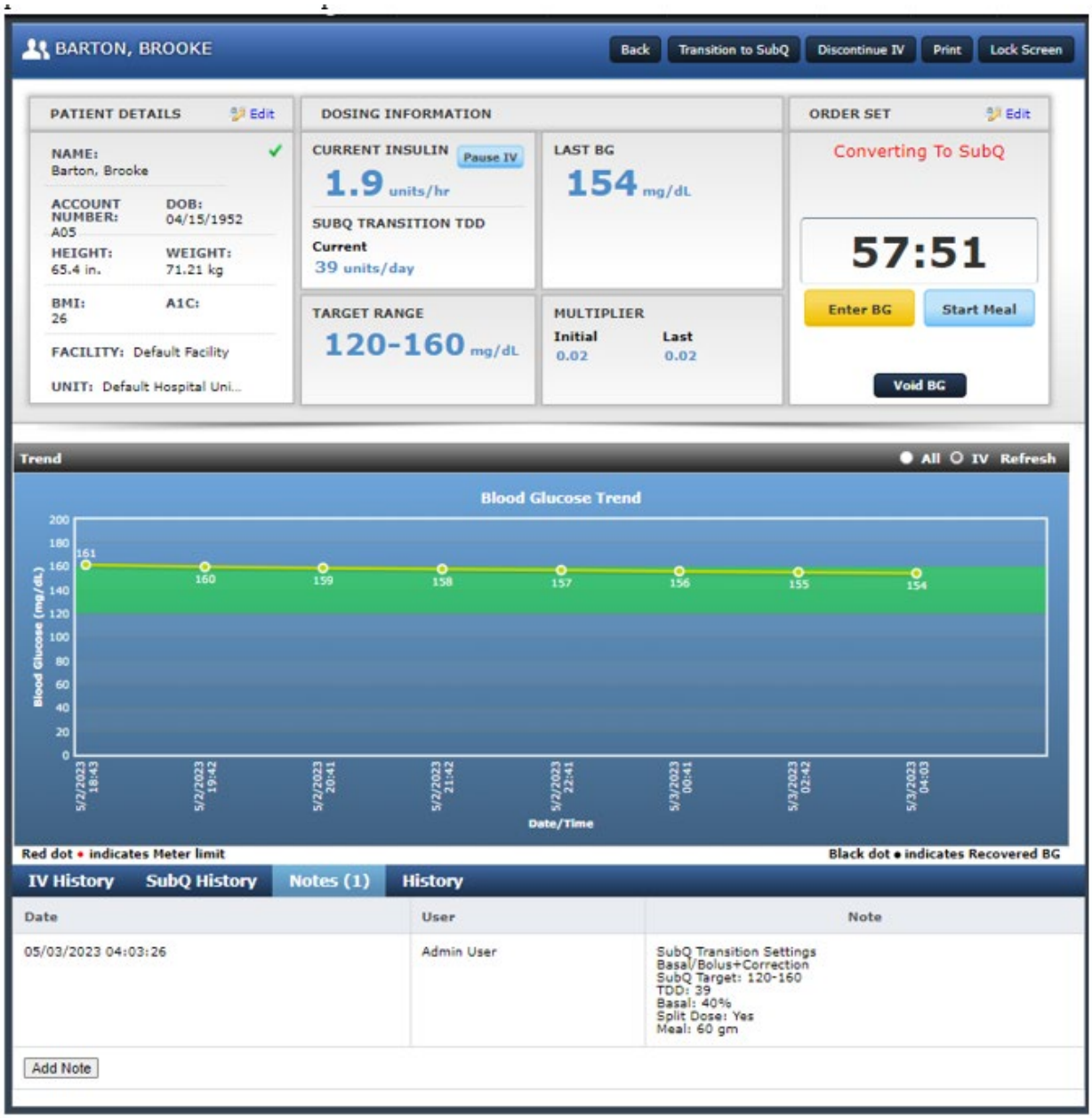
2. In the **Date/Time** field, enter the date and time you administered the basal dose to the patient. In the **Total** field, enter the number of basal units administered to the patient and then click **Save.**



Conversion to SubQ

The “Converting to SubQ” message displays, indicating that transition to SubQ has begun.

Glucommander will automatically add a note to the **Notes** tab, below the BG trend graph, recording parameters that were saved as part of the transition order as shown below.



On the **IV History** tab, "N/A" will display for the time the basal was administered.

IV History | SubQ History | Notes (1) | History

Date	BG Value	Multiplier	Insulin Rate	Meal Carbs	Nurse	Hypo Treatment	Next BG Due
05/03/2023 04:04	N/A	N/A	N/A	N/A	Admin User	N/A	N/A
05/03/2023 04:03	154 mg/dL	0.02	1.9 units/hr	N/A	Admin User	N/A	05/03/2023 05:03
05/03/2023 02:42	155 mg/dL	0.02	1.9 units/hr	N/A	Admin User	N/A	05/03/2023 04:42

Also, a **SubQ History** tab is added. Click the SubQ History tab for more details regarding the administered basal dose.

IV History | SubQ History | Notes (1) | History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
05/03/2023 04:04	N/A	Basal	4 Units of detemir (Levemir)	N/A	N/A	N/A	N/A	Admin User

The conversion process takes 2 or 4 hours depending on your configuration. During this time, you have the option of administering an IV meal bolus if the patient wants to eat prior to the start of SubQ treatment. Click the **Start Meal** button to begin the IV meal bolus, which lasts 2 hours and follows the same process described under *Start IV Meal Bolus*.

IV can be paused while the patient is transitioning to SubQ. To pause during transition, see *Pause IV* for more information. Pausing IV during transition will not impact the transition end time and new order will not be required to resume Glucommander.

Otherwise, continue to respond to "BG DUE!" messages and interact with the patient and Glucommander as you do during normal IV treatment.

When the transition to SubQ is complete, Glucommander displays a discontinue insulin infusion message.

BARTON, BROOKE — Cancel

Enter Current BG Value

Enter BG: 149 mg/dL Meter MIN Meter MAX

Re-Enter BG: 149 mg/dL

Adjust Insulin Infusion Rate to:

Discontinue Insulin Infusion

Discontinue IV insulin to prevent hypoglycemia.

After you confirm the messages on this screen, Glucommander displays a printable message with recommendations for transition. Depending on whether the patient is continuing on Glucommander SubQ therapy or discontinuing from Glucommander, the transition recommendations will vary:

Example of recommendations for patient continuing Glucommander SubQ therapy

BARTON, BROOKE

Transition to SubQ completed successfully. The patient is now on SubQ treatment.

SubQ Transition Recommendations:

Name:	Barton, Brooke
Account Number:	A05
Total Daily Dose:	39 units per day
Initial Basal Dose:	8 unit(s) detemir (Levemir) per dose, 2 dose(s) per day
I:C	12 grams carbohydrate
Fixed Meal Bolus:	8 unit(s) of glulisine (Apidra) at Meal Time
Correction Factor:	1 unit will decrease BG by 44 mg/dL
Basal Received:	4 unit(s) of detemir (Levemir) 05/03/2023 04:04

Print Close

Example of recommendations for patient discontinuing from Glucommander

AGUILAR, COREY

Patient IV treatment discontinued successfully.

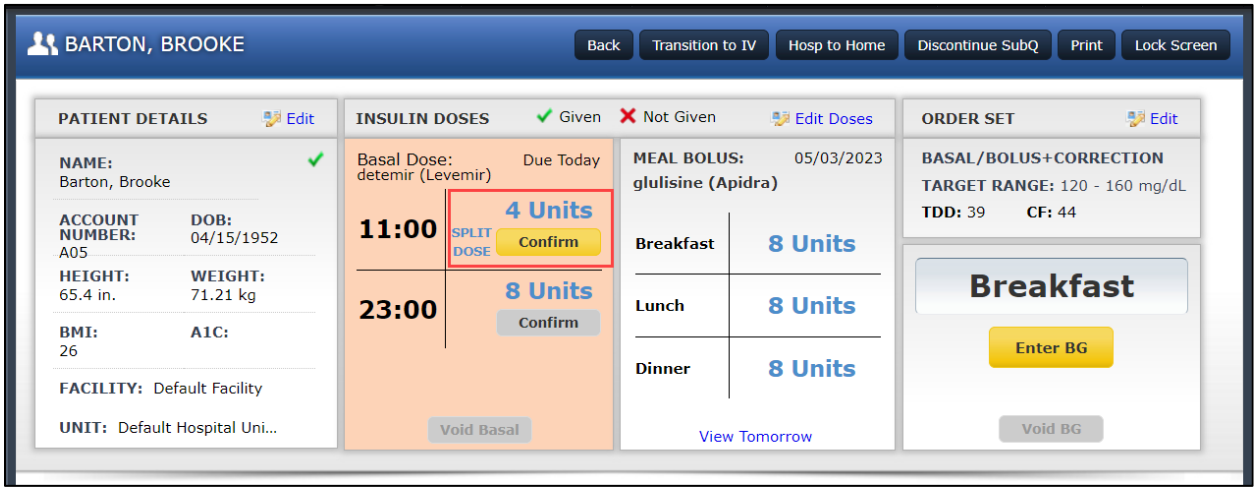
SubQ Transition Recommendations:

Name:	Zhang, Mary
Account Number:	1001318
Total Daily Dose:	37
I:C	12 grams carbohydrate
Correction Factor:	1 unit will decrease BG by 46 mg/dL
Basal Received:	19 unit(s) of detemir (Levemir) 05/05/2020 19:24

Print Close

Patients transitioning to SubQ treatment on Glucommander with a Basal+Correction order set type do not have a Fixed Meal Bolus amount among their transition recommendations. These patients do not receive meal bolus dosing.

The patient is then transitioned to SubQ treatment on Glucommander if you selected that option earlier. The SubQ patient detail page for the patient displays.



On the SubQ patient detail page, when half the basal dose is given during the transition to SubQ therapy, “Split Dose” is displayed next to the basal dose amount.

Hypoglycemia and Transition

If a patient transitioning from IV to SubQ treatment ends the transition period with a BG < 70 mg/dL, Glucommander:

1. Responds with the standard message recommending hypoglycemia treatment options.
2. Transitions the patient to SubQ or discontinues the patient from Glucommander after hypoglycemia has been resolved.

Discontinue IV

In some instances, patients may need to be discontinued from intravenous (IV) therapy per provider's order rather than transitioning to subcutaneous (SubQ) therapy.

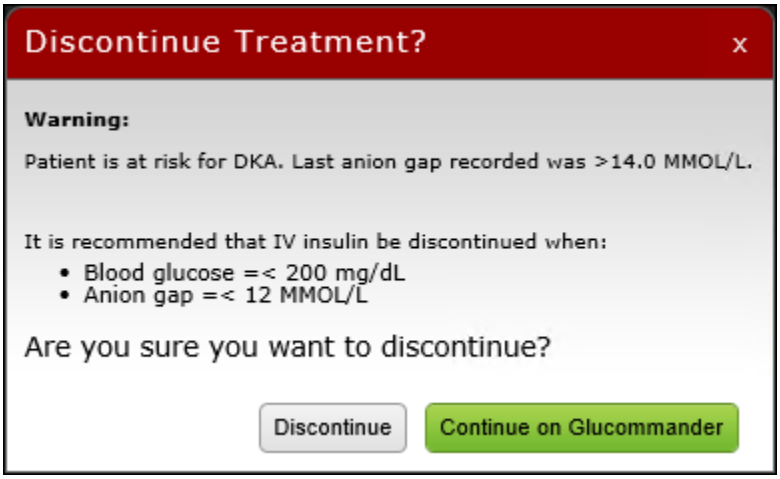
The Discontinue IV button discontinues a patient from IV therapy in Glucommander, but does not affect the patient's admission status within the hospital. Patients remain available for treatment until they are discharged through the hospital's Admission/Discharge/Transfer (ADT) system.

To discontinue treatment, on the patient detail page:

1. Click **Discontinue IV**.

2. If you try to discontinue a patient on IV treatment and the patient's anion gap (acidosis level) has not been resolved, the following message is displayed if *either* of the following conditions are met:

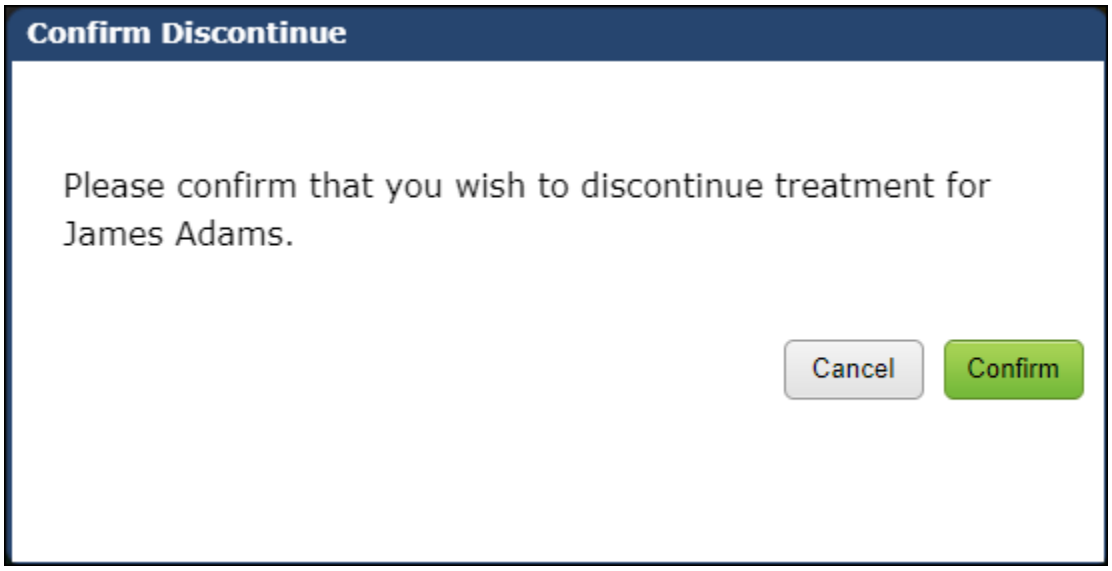
   - The patient's anion gap exceeds the configured Anion Gap Value (12, in the example below).
   - The patient's current blood glucose (BG) value exceeds the configured Anion Gap BG Value (200, in the example below).



3. Answer the question, "*Are you sure you want to discontinue?*" by clicking one of the following:

   - **Continue on Glucommander**, which cancels the Discontinue action.
   - **Discontinue**, and then proceed to the step below.

Click **Confirm**.



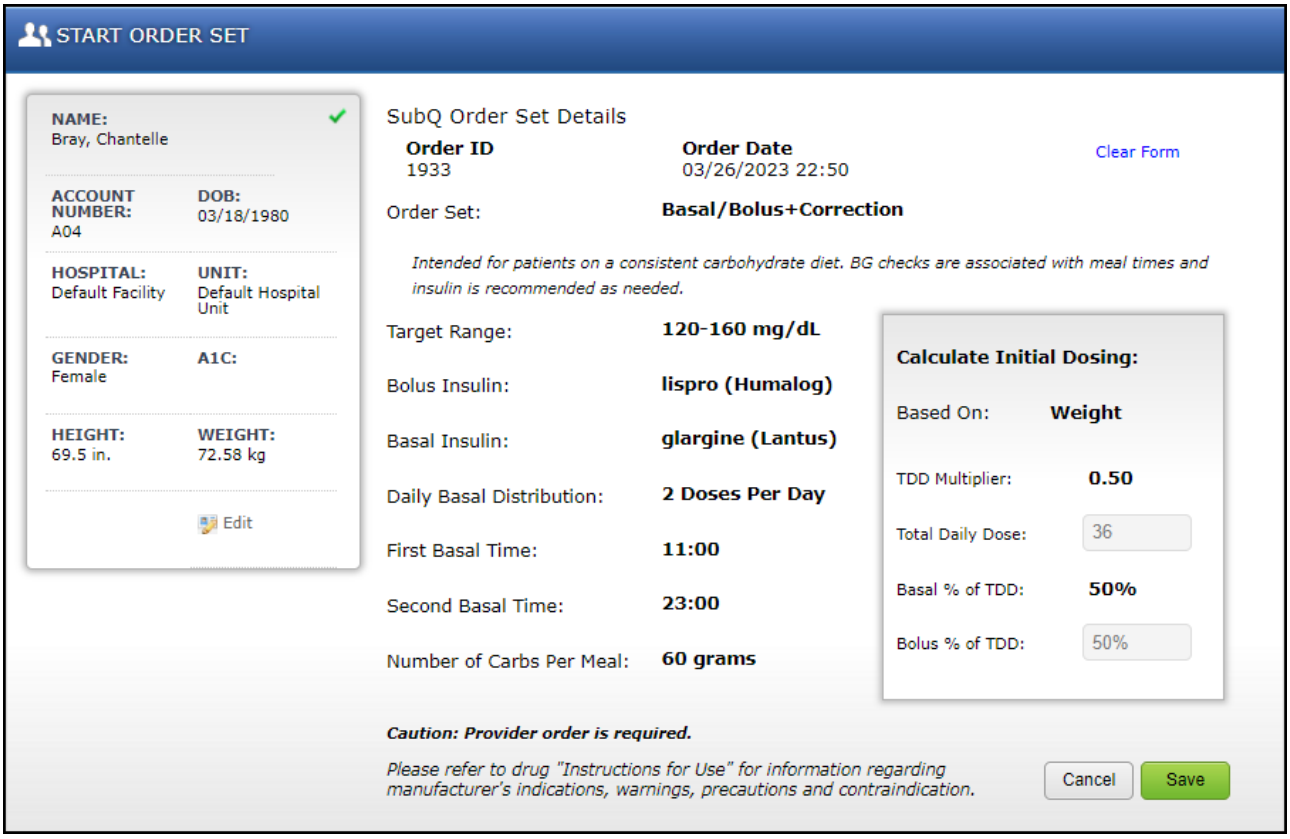
The patient is discontinued and no longer appears on the dashboard (Current Patients page).

Initiating Subcutaneous (SubQ) Therapy

Complete SubQ Order Set Initiated in EMR

If Order Set Integration is enabled, Glucommander will receive order set parameters through the interface with the EMR. The Start Order Set page displays the parameters received from the EMR in a read-only format.

> If Order Set Integration is disabled, Glucommander will not receive order set parameters through the interface with the EMR. See *Verify SubQ Order Set Manually (Order Set Integration Disabled)*.



The Start Order Set page also displays a unique order set identifier provided by your hospital in the **Order ID** field and the order set transaction date and time in the **Order Date** field. The most recent order set for SubQ treatment is displayed, based on transaction date/time. A yellow box containing a warning message may also display. For a list of warnings, see *Order Set Integration warnings*.

If Glucommander detects more than one active order for the patient, the Start Order Set page may display two Order IDs and transaction date/time entries within the completed order set. Glucommander cannot accept more than two orders to start SubQ therapy.

START ORDER SET

NAME: Garrison, Justin
ACCOUNT NUMBER: A02
DOB: 07/22/1971
HOSPITAL: Default Facility
UNIT: Default Hospital Unit
GENDER: Male
A1C:
HEIGHT: 71.26 in.
WEIGHT: 75 kg
Edit

SubQ Order Set Details

Order ID	Order Date
1872	03/26/2023 23:27
1871	03/26/2023 23:24

Clear Form

Order Set: **Basal/Bolus+Correction**

Intended for patients on a consistent carbohydrate diet. BG checks are associated with meal times and insulin is recommended as needed.

Target Range: **120-160 mg/dL**
Bolus Insulin: **lispro (Humalog)**
Basal Insulin: **glargine (Lantus)**
Daily Basal Distribution: **2 Doses Per Day**
First Basal Time: **09:00**
Second Basal Time: **21:00**
Number of Carbs Per Meal: **60 grams**

Calculate Initial Dosing:
Based On: **Weight**
TDD Multiplier: **0.50**
Total Daily Dose: 38
Basal % of TDD: **50%**
Bolus % of TDD: 50%

Caution: Provider order is required.

Please refer to drug "Instructions for Use" for information regarding manufacturer's indications, warnings, precautions and contraindication.

Cancel Save

When all required fields are complete, the order set is considered complete and ready to use in Glucommander:

1. Click **Save**.
2. Follow the prompts for entering a BG in *Enter SubQ BG Value*.

Clicking **Clear Form** will remove the parameters received through the interface. Complete the order set by manually making selections for the required fields to start Glucommander treatment. To display the parameters received through the interface again, click **Reset Form**.

When order set parameters are not received for any of the required fields, the field value displays as blank, and the order set is considered incomplete. For example, if the **Target Range** was not received, the field value will be displayed as blank.

START ORDER SET

NAME: Hooper, Cory
ACCOUNT NUMBER: A08
DOB: 05/15/2016
HOSPITAL: Default Facility
UNIT: Default Hospital Unit
GENDER: Male
A1C:
HEIGHT: 43.79 in.
WEIGHT: 25 kg
Edit

SubQ Order Set Details
Order ID 245
Order Date 05/04/2023 00:12
Clear Form
Order Set: Basal+Correction
Intended for patients who are NPO. Recommended insulin regimen is 50% basal and correction doses, with no nutritional (bolus) insulin.
BG Frequency: Every 4 Hours
Target Range:
Bolus Insulin: lispro (Humalog)
Basal Insulin: glargine (Lantus)
Daily Basal Distribution: 2 Doses Per Day
First Basal Time: 10:00
Second Basal Time: 22:00

Calculate Initial Dosing:
Based On: Weight
TDD Multiplier: 0.50
Total Daily Dose: 13
Basal % of TDD: 50%

Caution: Provider order is required.
Please refer to drug "Instructions for Use" for information regarding manufacturer's indications, warnings, precautions and contraindication.
Cancel Save
Warning: Order set incomplete. Fill in missing information.

To complete the order set in Glucommander:

1. Make manual selections per the provider order and then click **Save**.

SubQ order set field	Description
Order Set	**Required.** Type of SubQ protocol ordered for the patient: • [blank] – When specified as default, this value prevents the clinician from saving the order set without selecting one of the non-blank values (either Basal/Bolus+Correction or Basal+Correction). • Basal/Bolus+Correction – Intended for patients on a consistent carbohydrate diet. Blood glucose (BG) checks are associated with mealtimes and insulin is recommended as needed. • Basal+Correction – Intended for patients who are NPO or on continuous enteral feeds. Recommended insulin regimen is 50% basal and correction doses, with no nutritional (bolus) insulin. The 50% basal amount is editable. BG reading frequency is per provider order, on a q4hr or q6hr schedule. **Note:** A selection of Basal+Correction also requires an entry in the **BG Frequency** field.
BG Frequency	**Required** (if Order Set = Basal+Correction). Schedule for BG readings on the Basal+Correction order set type: • Every 4 Hours – Check BG every 4 hours, at 00:00, 04:00, 08:00, 12:00, 16:00, and 20:00. • Every 6 Hours – Check BG every 6 hours, at 00:00, 06:00, 12:00, and 18:00.
Target Range	**Required.** Desired target range for patient's BG readings on SubQ therapy. Select one of the listed ranges. **Note:** When [blank] is specified as the default, you cannot save the order set without selecting a non-blank target range value.
Bolus Insulin	**Required.** Insulin to be used for meal bolus dose. Select one of the rapid acting insulins: • glulisine (Apidra) • lispro (Humalog) • aspart (Novolog) • lispro (Admelog) • aspart (Fiasp) • lispro-aabc (Lyumjev)

SubQ order set field	Description
Basal Insulin	**Required.** Insulin to be used for basal dose. Select one of the long-acting insulins. • detemir (Levemir) • glargine (Lantus) • NPH • glargine (Basaglar) • glargine (Toujeo) • glargine (Semglee)
Daily Basal Distribution	**Required.** How often per day the basal dose is to be administered. Select either: • 1 Dose Per Day • 2 Doses Per Day – available for all basal insulins selectable from the **Basal Insulin** field **Note:** For 1 Dose Per Day distribution: • NPH is not available. • detemir (Levemir) is restricted to the hours of 18:00–23:00.

Basal Time
 	
First Basal Time
Second Basal Time
	Required. Hour(s) in which basal dose(s) are due. Depending on the selection in the **Daily Basal Distribution** field (1–2 doses per day), different basal insulin time fields display:
	• Basal Time – 1 Dose Per Day
	• First Basal Time, Second Basal Time – 2 Doses Per Day
	Note:
	• When [blank] is specified as the default in the **Basal Time** field, you cannot proceed without making a selection.
	• Basal dose scheduling options are from:
	  ○ 08:00 to 23:00
	  ▪ for Lantus, Basaglar, Toujeo, Semglee – 1 or 2 Doses Per Day
	  ▪ for Levemir – 2 Doses Per Day
	  ▪ for NPH – 2 Doses Per Day
	  ○ 18:00 to 23:00
	  ▪ for Levemir – 1 Dose Per Day
	• A basal dose scheduled from 20:00 to 23:00 can be administered up to 4 hours later and still count for the previous day.

Number of Carbs per Meal	Number of carbohydrates per meal. Measured in grams. Select one of the listed counts. **Note:** This field is not displayed as part of the Basal+Correction order set.

SubQ order set field	Description
Based On	**Required.** Basis for patient's initial SubQ insulin dosing. Select either: • Weight • Custom Dose The options available for Weight and Custom Dose vary with the order set type selected.
Based on: Weight	
TDD Multiplier	**Required.** Multiplier used to calculate a patient's total daily dose (TDD) of SubQ insulin (units/kg/day). Glucommander calculates the initial TDD using the ordered multiplier and patient's weight. The standard TDD multiplier for adult SubQ patients aged 18 or above is 0.5For adult SubQ patients who are frail, elderly, or have renal disease, the recommended multiplier is typically 0.3. **Note:** When [blank] is specified as the default, you cannot proceed without making a selection.
Total Daily Dose	Total daily dose (TDD) of SubQ insulin for the patient, measured in units. Glucommander calculates the initial TDD using the TDD multiplier. **Note:** If the TDD has reached or exceeded 200 units, a warning appears. To confirm the dose, click **Save**.
Basal % of TDD	**Required.** Percentage of TDD made up by basal insulin. Select one of the listed percentages.
Bolus % of TDD	Percentage of TDD made up by bolus insulin. Value is calculated automatically relative to the value in the **Basal % of TDD** field. **Note:** If Basal+Correction is selected in the **Order Set** field, the value in this field defaults to 0% and cannot be changed.
Based on: Custom Dose	
Total Basal Dose	**Required.** Total basal dose of SubQ insulin for the patient, measured in units. **Note:** This is the only custom dosing option available for Basal+Correction.
Breakfast Bolus Dose	**Required.** Number of units of bolus insulin recommended for Breakfast. This option is available only as part of a custom Basal/Bolus+Correction order.
Lunch Bolus Dose	**Required.** Number of units of bolus insulin recommended for Lunch. This option is available only as part of a custom Basal/Bolus+Correction order.
Dinner Bolus Dose	**Required.** Number of units of bolus insulin recommended for Dinner. This option is available only as part of a custom Basal/Bolus+Correction order.

Note: If the total daily dose has reached or exceeded 200 units, a warning appears. To confirm the dose, click **Save**.

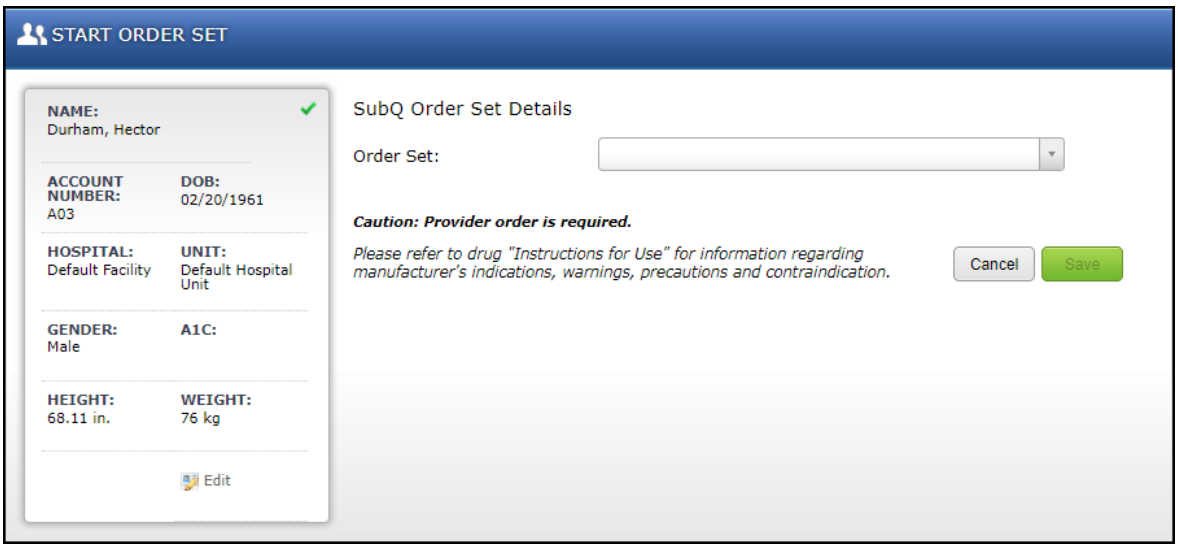
2. Follow the prompts for entering a BG in *Enter SubQ BG Value*.

Verify SubQ Order Set Manually (Order Set Integration Disabled)

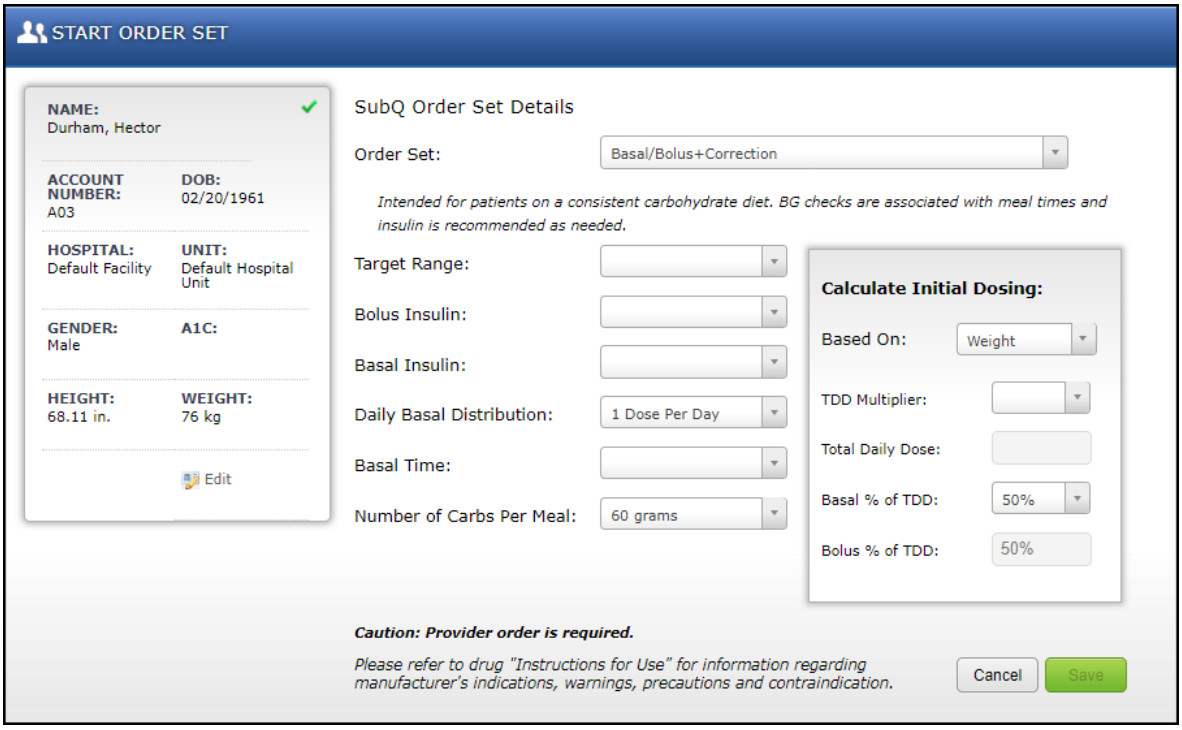
After obtaining orders to initiate a patient on SubQ therapy:

1. Verify that all the parameters match the provider's order and complete all fields for the SubQ order set.

For SubQ order set fields and descriptions, see *Complete SubQ Order Set Initiated in EMR*.



After a selection has been made in the **Order Set** field, additional fields required to complete the order set display. The SubQ order set page is prepopulated with default settings for your hospital unit.



Changes to fields in the SubQ order set require a provider's order.

Based on the insulin type selected, recommendations may be provided for the daily basal distribution and the basal time.

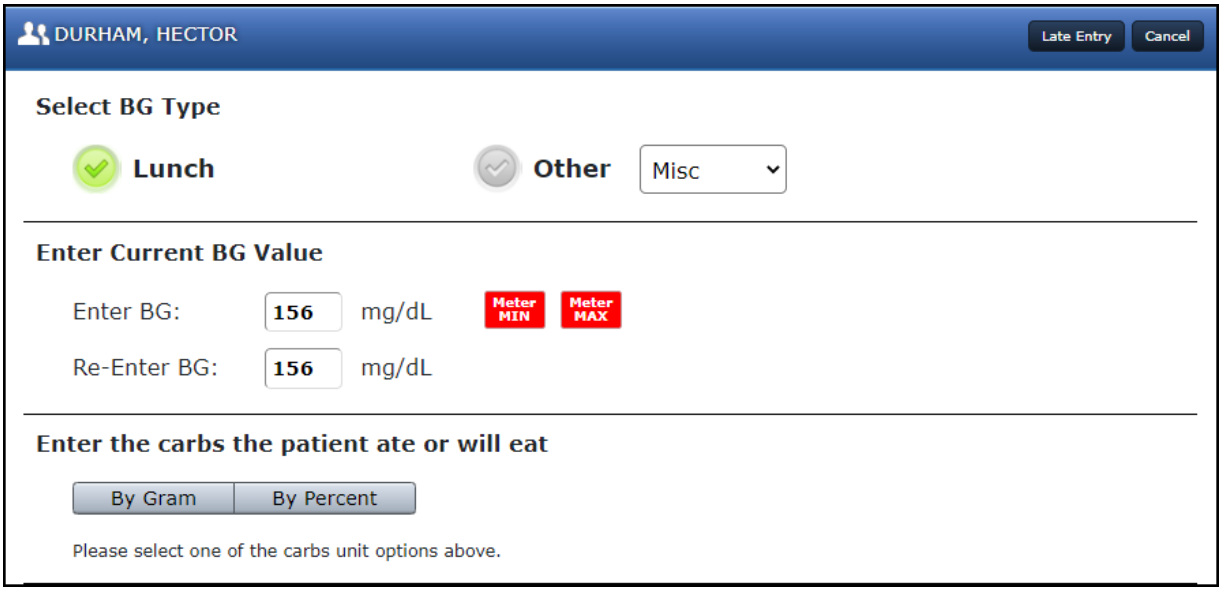
For example, in the **Basal Insulin** field when detemir (Levemir) is selected, this message displays below the field: "detemir (Levemir) - 1 dose per day: Basal times required 18:00-23:00."

2. After all order set fields have been completed, the **Save** button is enabled. Click **Save**.
3. Proceed to *Enter SubQ BG Value* below.

Enter SubQ BG Value

After verifying and completing the subcutaneous (SubQ) order set:

1. Verify that the correct blood glucose (BG) type is selected, and then enter the current BG value for the patient in the **Enter BG** and **Re-Enter BG** fields.



If it is the patient's first BG (Lunch, in the example above), only the BG type for the current time and Other (Misc) are available for selection.

For all BGs after the start of treatment, the default selection is the current meal time. If that meal has already been recorded, "Other" will be the default selection and you must select a mealtime option from the dropdown. The set mealtimes are:

Breakfast – 05:00-10:59
Lunch – 11:00-15:59
Dinner – 16:00-19:59
Bedtime – 20:00-23:59
The Midsleep BG type is available only if configured.

The Meter MIN and Meter MAX buttons are available for out-of-range readings. For more information, see *Enter Minimum/Maximum BG Value*.

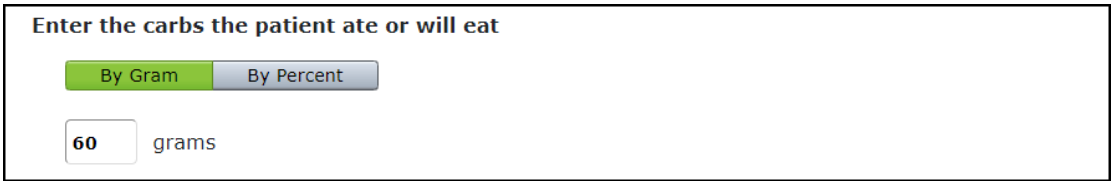
If a BG value greater than your facility's preconfigured meter maximum is entered, a yellow notification box displays with the message, "Entry cannot be above *configured Meter MAX value*. Select Meter MAX button to proceed." For more information, see *Enter Minimum/Maximum BG Value*.

2. Respond to the prompt, "*Enter the carbs the patient ate or will eat*" by clicking either **By Gram** or **By Percent**. (For patients on the Basal/Bolus+Correction order set, the **By Percent** button displays.) When you click either button, it turns green and opens a corresponding input field.

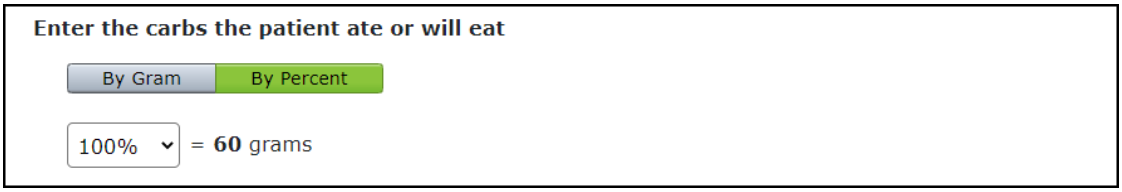
The carbohydrate entry display is based on your facility's configuration settings.

3. If you click:

- By Gram, enter the actual number of carbohydrates (in grams) the patient consumed in the **Grams** field:

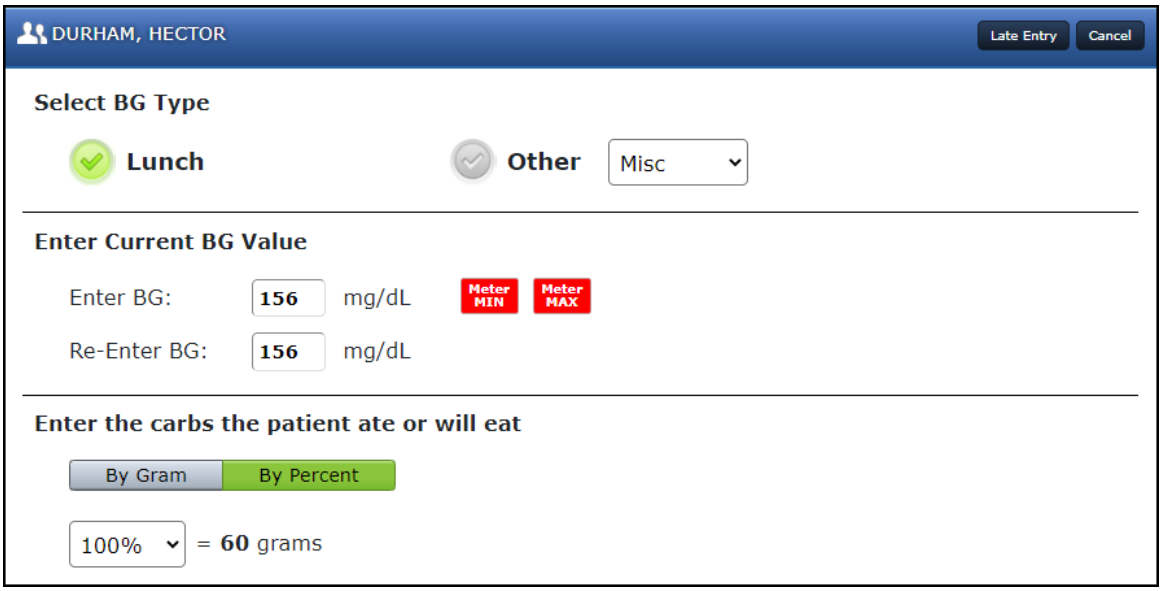


- By Percent, click in the dropdown field and select 0%, 25%, 50%, 75%, or 100%. The corresponding carbohydrate amount in grams is displayed to the right of the dropdown field:



If the amount is between values — for example, between 25% and 50% — select the lesser amount to avoid unexpected lows. Glucommander will adjust to accommodate your estimate. You can select the percentage of carbs the patient consumed for the Breakfast, Lunch, and Dinner mealtimes.

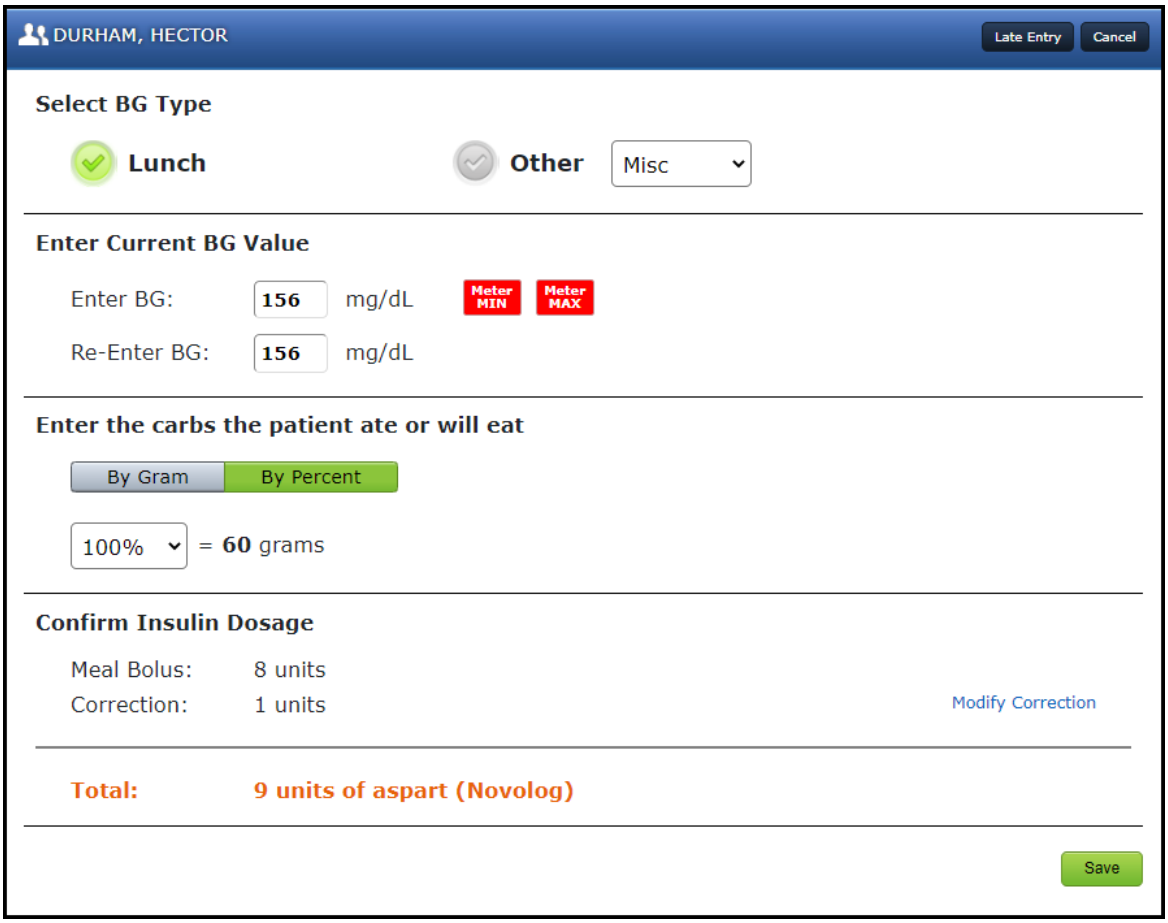
If the patient will not consume any carbs, enter "0."



If you respond with:

- **Any carb amount above 0**, an insulin dose recommendation that may include both meal bolus and correction doses is given. Confirm the carbohydrate amount on the tray. For adults, you can specify up to 100 grams and for pediatric patients up to 150 grams. Conversely, the carbohydrate amount can be decreased all the way to 0 grams.
- 0 (zero) carbs, only a correction dose may be recommended. The meal bolus amount is adjusted to "0" and is displayed with a green check mark (✔) in the Meal Bolus area on the patient detail page.

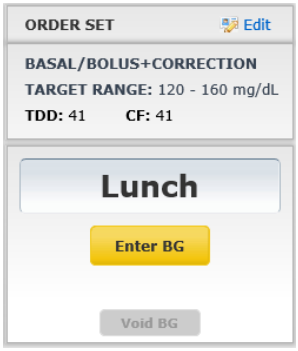
4. The Confirm Insulin Dosage section displays. Click **Save** to save the order set, insulin recommendation and start the patient on treatment.



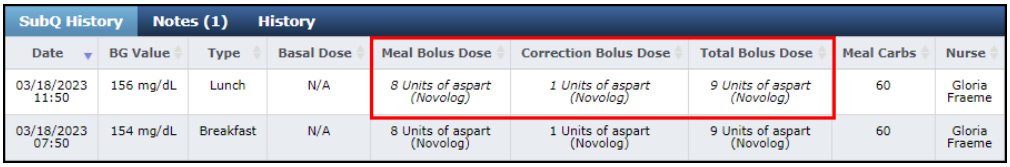
After the patient has been successfully started:

- The current mealtime (e.g., Breakfast, Lunch, Dinner, q4hr 16:00, q6hr 18:00) displays on the SubQ patient detail page and the dashboard (Current Patients page).

  The next-scheduled mealtime displays on the SubQ patient detail page and the dashboard (Current Patients page) when the current mealtime ends.

Meal label color	Description
Gray 	The meal BG and a carbohydrate amount other than 0 was charted for the meal
Black  	The label will display in black in the following scenarios: • The meal BG has not charted. • The meal BG was charted but 0 carbs was entered for the meal.

- The new dose recommendation is displayed on the **SubQ History** tab. The dose recommendation is displayed with:
  - Italics, if the dose has not been confirmed.



SubQ History | Notes (1) | History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
03/18/2023 11:50	156 mg/dL	Lunch	N/A	*8 Units of aspart (Novolog)*	*1 Units of aspart (Novolog)*	*9 Units of aspart (Novolog)*	60	Gloria Fraeme
03/18/2023 07:50	154 mg/dL	Breakfast	N/A	8 Units of aspart (Novolog)	1 Units of aspart (Novolog)	9 Units of aspart (Novolog)	60	Gloria Fraeme

- Regular font, if the dose has been confirmed.

SubQ History | Notes (1) | History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
03/18/2023 11:50	156 mg/dL	Lunch	N/A	8 Units of aspart (Novolog)	1 Units of aspart (Novolog)	9 Units of aspart (Novolog)	60	Gloria Fraeme
03/18/2023 07:50	154 mg/dL	Breakfast	N/A	8 Units of aspart (Novolog)	1 Units of aspart (Novolog)	9 Units of aspart (Novolog)	60	Gloria Fraeme

- If your installation of Glucommander is:
  - Configured for the Medication Confirmation integration feature, the dose recommendation is automatically confirmed in Glucommander after the message is received that the dose was administered on the MAR.
  - Not configured for Medication Confirmation integration feature, the dose recommendation needs to be manually confirmed in Glucommander after the dose has been administered. When it is time to confirm the insulin dose, click **Enter BG** and then proceed to *Confirm SubQ or Hypoglycemia Dose on Reconciliation Page*.

Confirm SubQ or Hypo Dose on MAR

If your installation of Glucommander is configured to work with the Medication Confirmation integration feature, Glucommander automatically sends new dose recommendations to the EMR after the **Save** button is clicked on the Enter Current BG Value page. When you administer the dose and confirm it in MAR, the confirmation is automatically sent to Glucommander via the interfaced connection with the MAR.

The Medication Confirmation integration workflow is as follows:

1. Glucommander sends the dose recommendation to the EMR.
    a. In Glucommander, the SubQ dose recommendation is displayed in italics on the **SubQ History** tab and the hypo dose recommendation is also displayed in italics on the tab in the **Hypo Treatment** column. The italics indicate the dose has not yet been confirmed.
2. Nurse administers the dose to the patient and then records it on the MAR.
3. Dose confirmation is routed to Glucommander via the interface with the MAR.

- **Glucommander receives dose confirmation**
    a. If the dose confirmation from the MAR matches what is displayed in Glucommander:
        i. The dose is automatically confirmed in Glucommander.
        ii. The dose is no longer displayed in italics on the **SubQ History** tab or in the **Hypo Treatment** column. The absence of italics indicates the dose has been confirmed.
    b. If the dose confirmation from the MAR does not match what is displayed in Glucommander (different value):
        i. The dose is not automatically confirmed in Glucommander.
        ii. Nurse must manually reconcile the dose in Glucommander on the Reconciliation page, which automatically displays the next time **Enter BG** is clicked.
    c. If the dose confirmation from the MAR is 0 (zero) or does not match what is displayed in Glucommander for a hypo dose:
        i. *For SubQ doses*: If the SubQ dose confirmation from the MAR is 0 [zero], the dose is automatically confirmed in Glucommander as not administered.
        ii. *For hypo doses*: The dose is not automatically confirmed in Glucommander. Nurse must manually reconcile the dose in Glucommander on the Reconciliation page, which automatically displays the next time **Enter BG** is clicked.

The manual reconciliation process applies only to SubQ basal or bolus doses in the following scenarios:

- Dose mismatch
- Dose confirmation message is not received

This is the normal workflow for facilities that do not have the Medication Confirmation integration feature enabled.

- **Glucommander does not receive dose confirmation**
    a. The dose is not automatically confirmed in Glucommander.
    b. Nurse must manually confirm the dose in Glucommander on the Reconciliation page, which automatically displays the next time **Enter BG** is clicked.

See the chart on the next page for a different representation of this workflow.

Glucommander

- Sends the dose recommendation to the EMR
- Displays the SubQ dose recommendation in italics on the **SubQ History** tab and the hypo dose recommendation is also displayed in italic in the **Hypo Treatment.** The italics indicate the dose has not yet been confirmed.

Receives the dose confirmation via the interface with the MAR

If the dose confirmation from the MAR matches:

- The dose is automatically confirmed in Glucommander
- The *italics* are removed from the dose on the **SubQ History** tab or the **Hypo Treatment** column

Does not receive the dose confirmation via the interface with the MAR; therefore, it is not automatically confirmed in Glucommander

If the dose confirmation from the MAR is different from what is displayed in Glucommander or 0 (zero) units for a hypo dose, the dose is not confirmed.

For SubQ doses, if the dose confirmation from the MAR is 0 [zero], the dose is automatically confirmed in Glucommander as not administered.

Nurse

Administers the dose to the patient and then confirms it on the MAR

Manually reconciles the dose in Glucommander on the Reconciliation page, which automatically displays the next time **Enter BG** is clicked.

**Applies only to SubQ basal, meal bolus, and correction bolus doses in the following scenarios*:

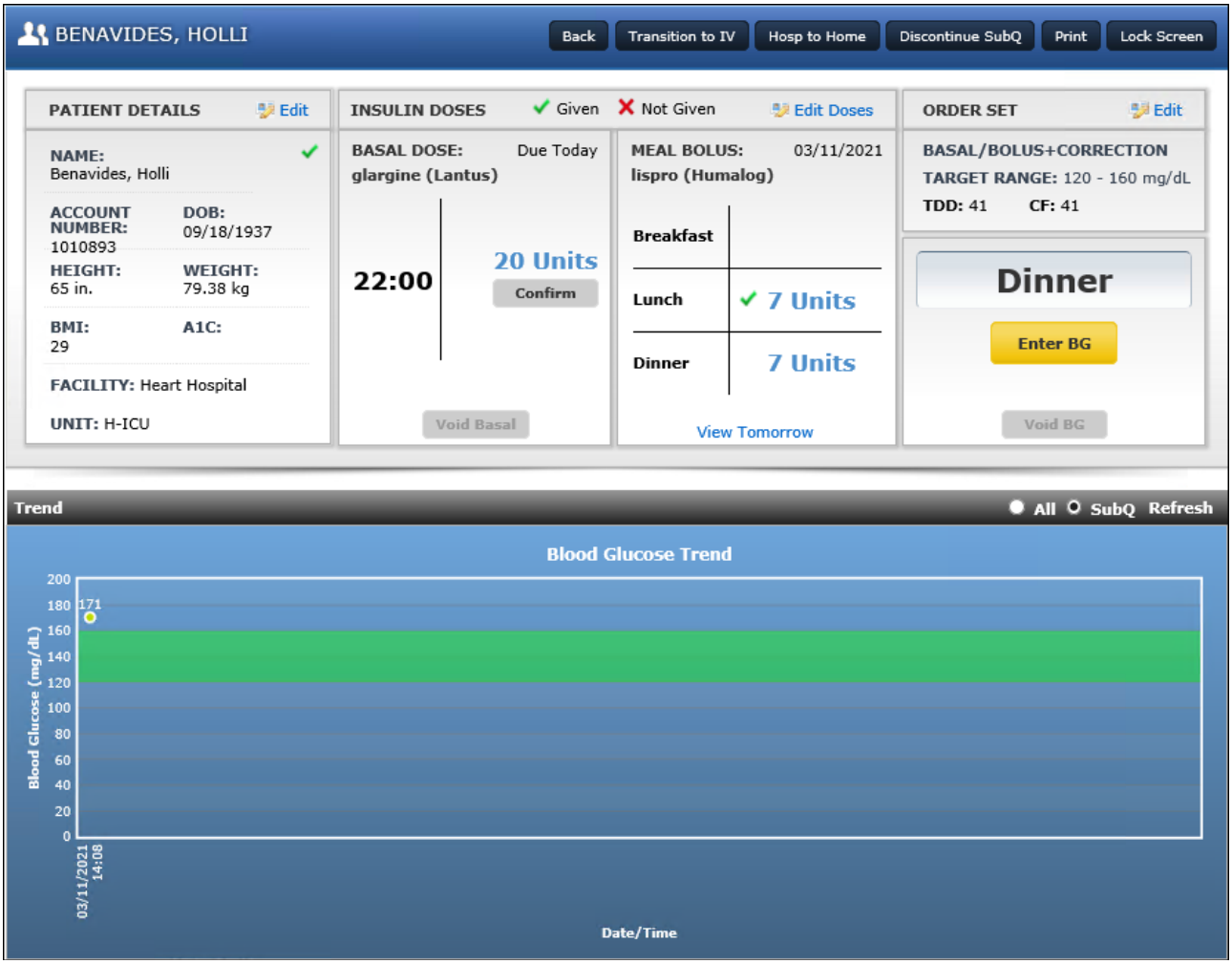
- Dose mismatch
- Dose confirmation message is not received

This is the normal workflow for facilities that do not have the Medication Confirmation integration feature enabled.

View SubQ Patient Detail Page

Each patient has an individualized patient detail page containing demographic and dosing related information, treatment history, and a blood glucose (BG) trend graph.

The current mealtime displays on the patient detail page. The label displayed (e.g., Breakfast, Lunch, Dinner, q4hr 16:00, q6hr 18:00) indicates when a BG entry is due for that patient.



View SubQ History

Click the **SubQ History** tab at the bottom of the patient detail page to view the patient's complete SubQ dosing history within Glucommander.

Using the selectable ☑ fields at the bottom of the page, you can choose the columns in the SubQ History to suit your viewing interests. Some fields are configured to display by default.

SubQ History | **Notes (1)** | **History**

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
07/21/2020 21:43	167 mg/dL	Bedtime	N/A	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	N/A	Gloria Fraeme
~~07/21/2020 21:41~~	~~168 mg/dL~~	~~Bedtime~~	~~N/A~~	~~0 Units of lispro (Humalog)~~	~~0 Units of lispro (Humalog)~~	~~0 Units of lispro (Humalog)~~	~~N/A~~	~~Gloria Fraeme~~
07/21/2020 21:35	N/A	Basal	11 Units of glargine (Lantus)	N/A	N/A	N/A	N/A	Gloria Fraeme
07/21/2020 12:46	174 mg/dL	Lunch	N/A	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	13	Gloria Fraeme
~~07/21/2020 12:45~~	~~175 mg/dL~~	~~Lunch~~	~~N/A~~	~~4 Units of lispro (Humalog)~~	~~6 Units of lispro (Humalog)~~	~~10 Units of lispro (Humalog)~~	~~20~~	~~Gloria Fraeme~~
07/21/2020 06:56	180 mg/dL	Breakfast	N/A	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	13	Gloria Fraeme
07/20/2020 22:00	N/A	Basal	10 Units of glargine (Lantus)	N/A	N/A	N/A	N/A	Admin User
07/20/2020 20:56	186 mg/dL	Bedtime	N/A	1 Units of lispro (Humalog)	1 Units of lispro (Humalog)	2 Units of lispro (Humalog)	10	Gloria Fraeme
07/20/2020 17:36	194 mg/dL	Dinner	N/A	3 Units of lispro (Humalog)	1 Units of lispro (Humalog)	4 Units of lispro (Humalog)	16	Gloria Fraeme
07/20/2020 13:31	198 mg/dL	Lunch	N/A	4 Units of lispro (Humalog)	1 Units of lispro (Humalog)	5 Units of lispro (Humalog)	23	Admin User

Asterisk * indicates Meter limit

Number of records to display: 10

Show Columns

☑ Date ☑ BG Value ☑ Type ☑ Basal Dose ☑ Meal Bolus Dose ☑ Correction Bolus Dose ☑ Total Bolus Dose ☐ Hypo_Treatment ☑ Meal Carbs ☐ Target Range ☑ Nurse

Next SubQ BG Reading Due

Clinicians are responsible for entering a patient's blood glucose (BG) as prompted by Glucommander and carrying out the Glucommander recommendations. Any applicable warnings appear automatically.

Timely BG measurements are required for optimal glycemic control.

Mealtimes begin and end at scheduled times. If a SubQ BG reading is not recorded during the scheduled hours for a meal (e.g., Breakfast), Glucommander advances to the next mealtime (e.g., Lunch) and displays that mealtime label on the patient detail page.

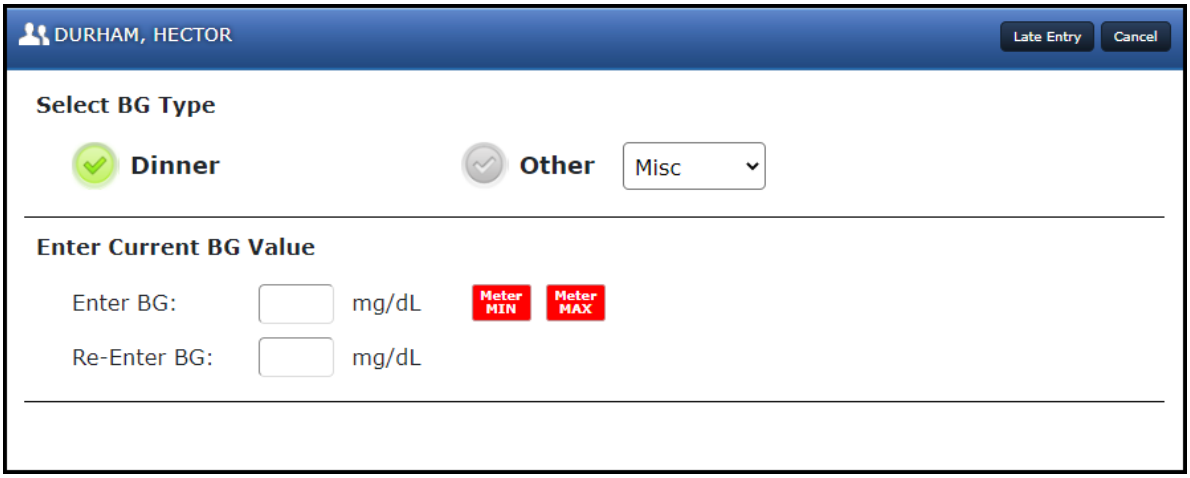
Even though the patient's BG value was not entered at the scheduled time, you can still record it after the time has passed. See *Enter Late Entry BG Value*.

When it is time for the patient's next meal, on the patient detail page:

1. Click **Enter BG**.

   Note: If the Reconciliation page displays, *Confirm SubQ or Hypoglycemia Dose on Reconciliation Page*.

2. Verify that the correct blood glucose (BG) type is selected. The next BG type that is due — in this case, Dinner — should be selected by default.



Click **Late Entry** in the upper right-hand corner to record a patient's BG as a late entry. If you are performing a late entry, select the corresponding BG type (e.g., Breakfast, Lunch, 08:00, 12:00). For more information see *Enter Late Entry BG Value.*

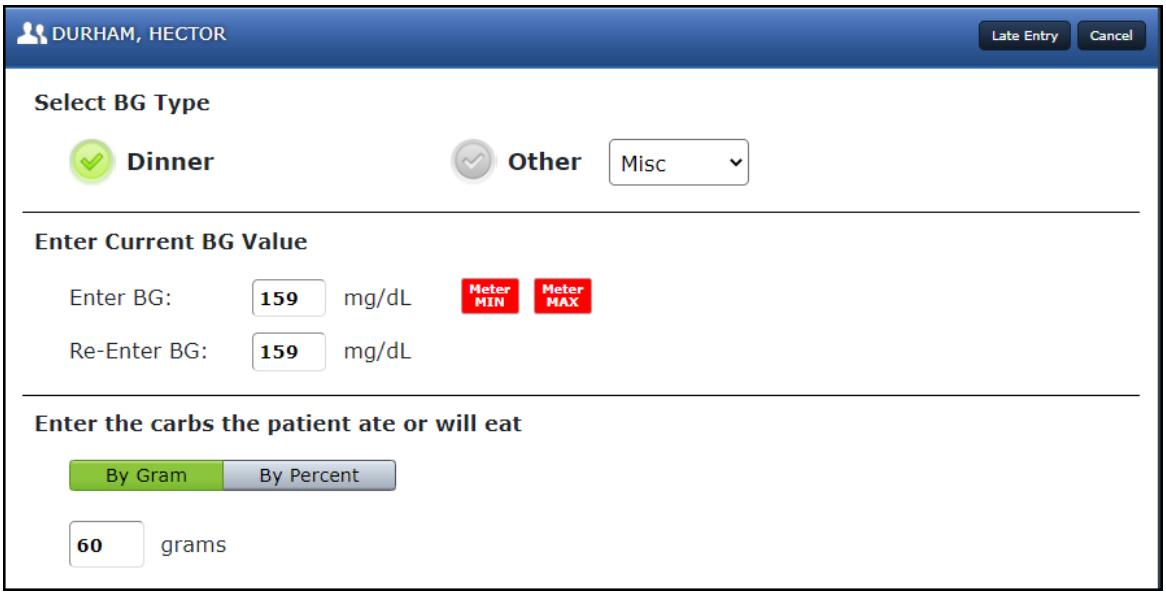
3. Enter the current BG value for the patient in the **Enter BG** and **Re-Enter BG** fields.

4. Respond to the prompt, *"Enter the carbs the patient ate or will eat"* by clicking **By Gram** to specify an actual carbohydrate amount.

   For adults, you can specify up to 100 grams, and for pediatric patients up to 150 grams. Any amount over the ordered carbohydrate amount (e.g., 60 gm) will increase the recommended insulin dose.

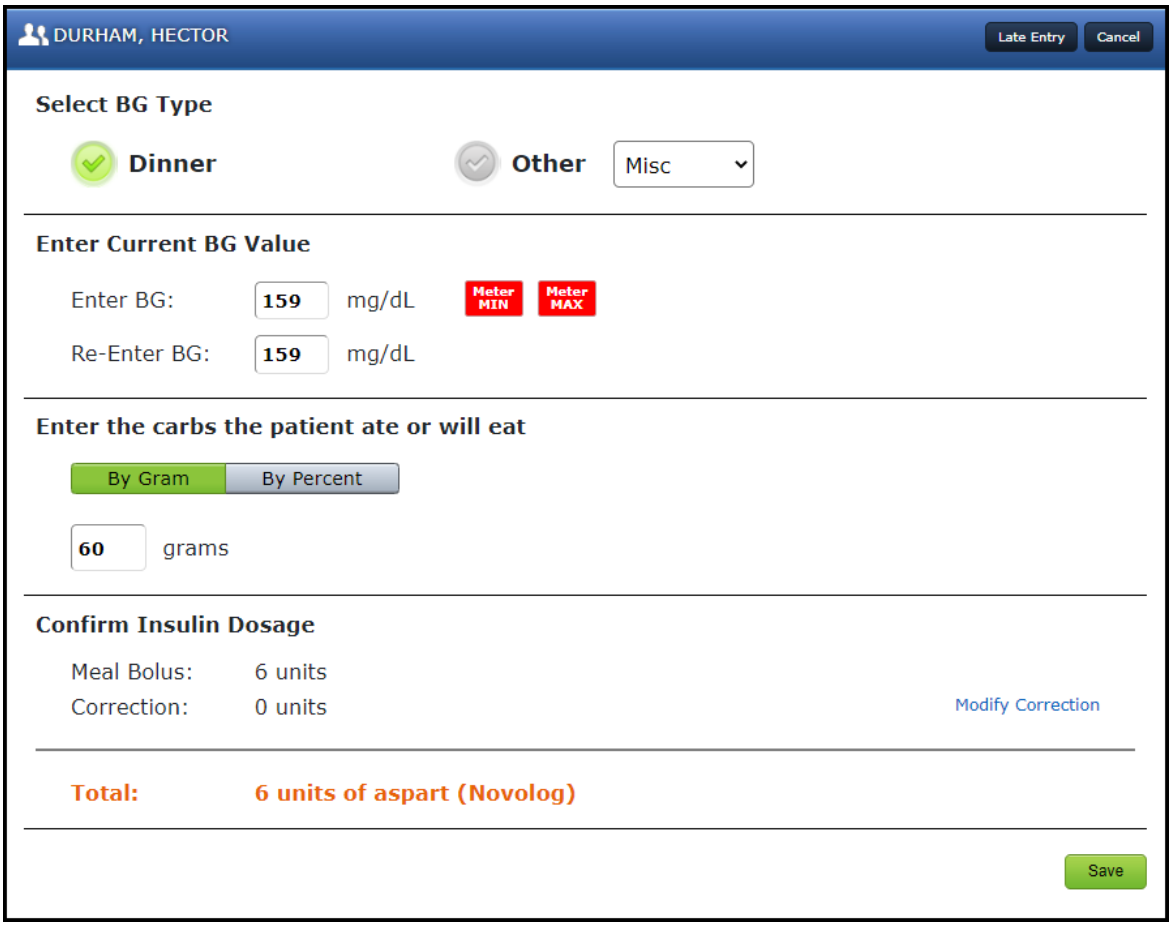
   For patients on the Basal/Bolus+Correction order set, click **By Percent** instead to select a percentage value of carbohydrates (0%, 25%, 50%, 75%, or 100%). When you select a percentage, Glucommander automatically converts the percentage to the number of carbs in grams. For example, if the ordered carbohydrate amount was 60 gm and you select 25%, 15 grams is displayed. If 50% is selected, 30 grams is displayed.

   If the amount of carbohydrates is between values — for example, between 25% of carbs and 50% of carbs, perhaps 33% or less — select the lesser amount (e.g., 25% of carbs).



Depending on the patient's BG value and the number of carbs the patient will consume, a meal bolus dose and a correction dose may be recommended.

5. Review the dose recommendation and then click **Save**.



A positive correction dose may be recommended when the BG value is *above* mid-target of the patient's assigned target range.

A negative correction dose may be recommended when the BG value is *below* mid-target of the patient's assigned target range. The insulin will be reduced, and the correction dose will display as a negative value. If the total dose (meal bolus and correction) is a negative value, the recommended dose will be 0 units. The reduction in insulin doses applies only to patients on the Basal/Bolus+Correction order set.

To prevent stacking insulin, a correction dose will not be recommended within 3 hours of another correction dose previously given (or as configured per facility settings).

To adjust the correction dose, click **Modify Correction**. If Glucommander performs a downward adjustment, negative correction values may not be edited.

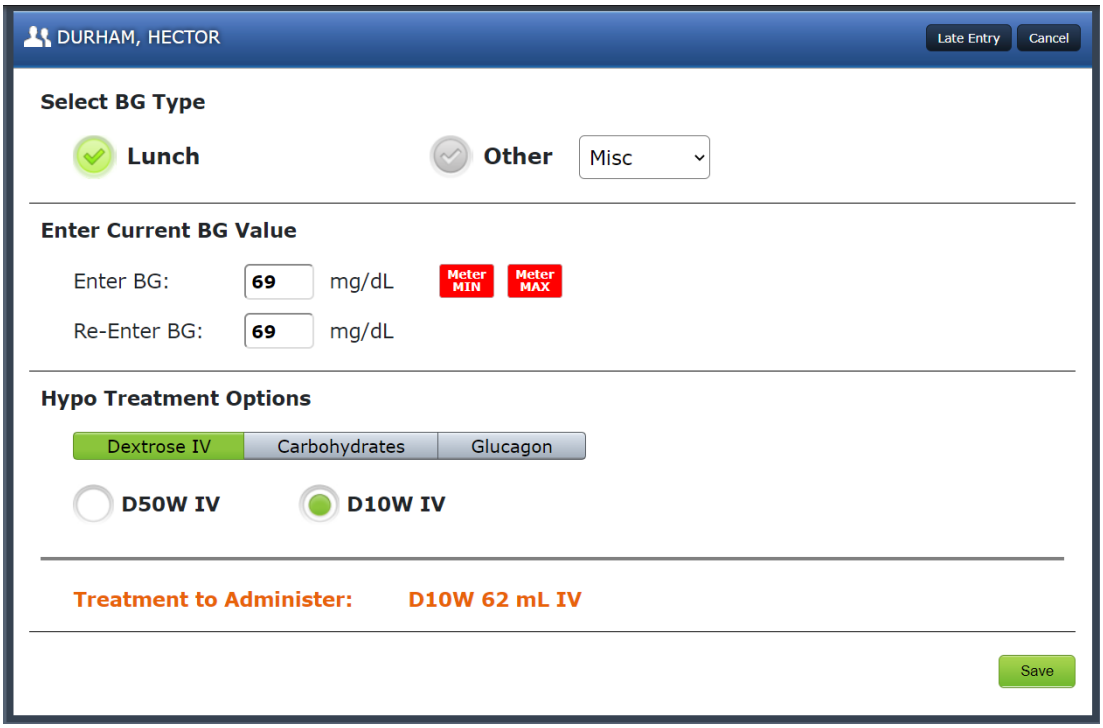
6. If your installation of Glucommander is:
   a. Configured for the Medication Confirmation integration feature, the dose recommendation is automatically confirmed in Glucommander after the message is received that the dose was administered on the MAR.
   b. Not configured for Medication Confirmation integration feature, the dose recommendation needs to be manually confirmed in Glucommander after the dose has been administered. When it is time to confirm the insulin dose, click **Enter BG** and then proceed to *Confirm SubQ or Hypoglycemia Dose on Reconciliation Page*.

SubQ Hypoglycemia BG

Hypoglycemia treatment options can vary based on your hospital's configuration settings.

When you enter a BG value that is below the hypoglycemia (hypo) threshold value (BG < 70 mg/dL):

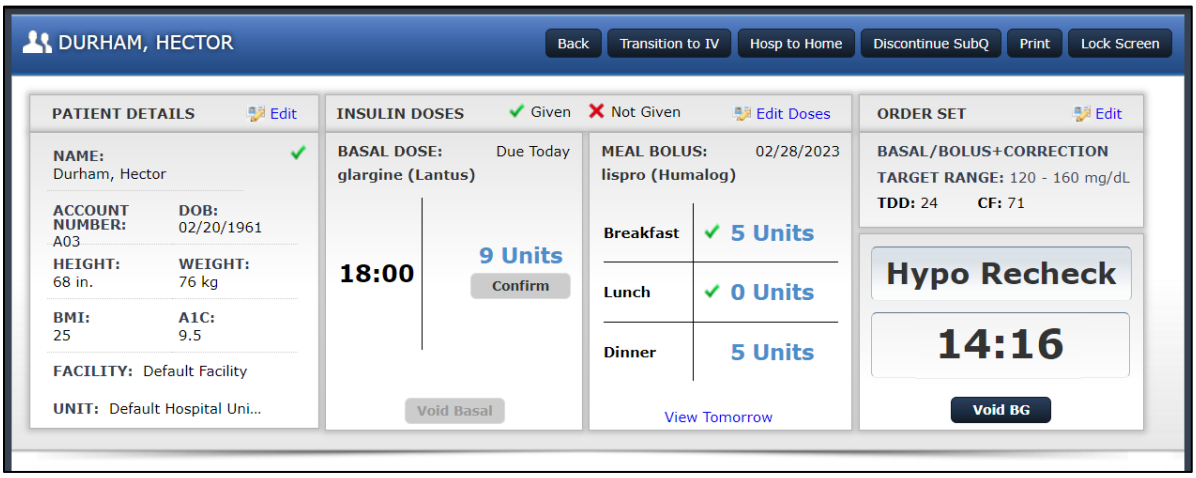
1. Select one of the hypo treatment options (Dextrose IV, Carbohydrates, or Glucagon):



If your hospital has set up a custom hypo message for SubQ insulin dosing, that message will display instead of the standard system messages shown above.

2. If you select:
   - **Dextrose IV**, the D50W IV and D10W IV radio buttons display below the toggle switch. Select one of the radio buttons to continue.
     - Glucommander will recommend a D50W IV or D10W IV dose.
   - **Carbohydrates**, note that:
     - 15 grams of carbohydrates will be recommended if the BG is between 54-69 mg/dL
     - 30 grams of carbohydrates will be recommended if the BG < 54 mg/dL
   - **Glucagon**, note that glucagon:
     - Is given in a standard 1 mg dose
     - Is not allowed (disabled) for patients weighing < 20 kg
     - Cannot be given more than twice in 24 hours, and the 24-hr period starts when the last dose was administered. When given twice in 24 hours, it must be given "twice in a row" (that is, with consecutive BG checks).
3. Click **Save**.

After confirmation of hypo treatment, Glucommander starts a 15-minute countdown timer for the patient. You are prompted to enter a “hypo recheck” BG within 15 minutes.

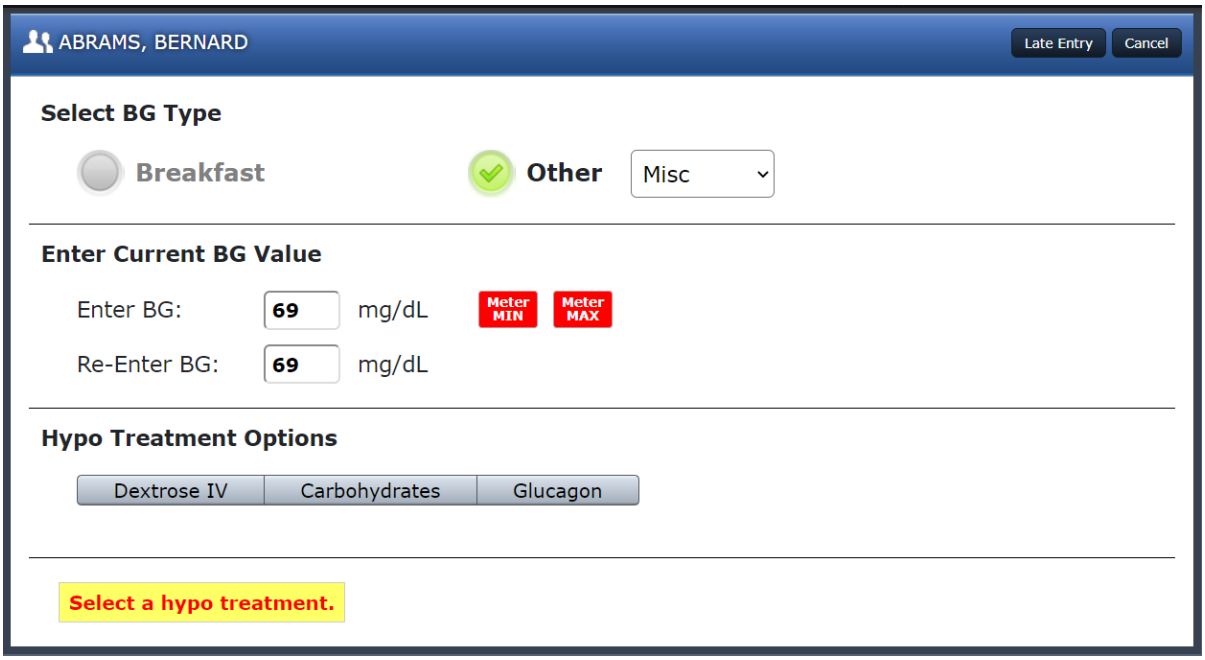


The hypo treatment will be repeated until a BG greater than the configured hypo threshold is entered for the patient. However, if a BG value that is more than the initial hypo BG is entered less than 15 minutes into the Hypo Recheck period, this message displays, “Hypo treatment was administered less than *xx* minutes ago. You must wait 15 minutes for the full effect of treatment to be reached.” When you respond to the 15-minute timer with a non-hypo BG, normal treatment resumes.

SubQ Hypoglycemia Misc BG After Meal

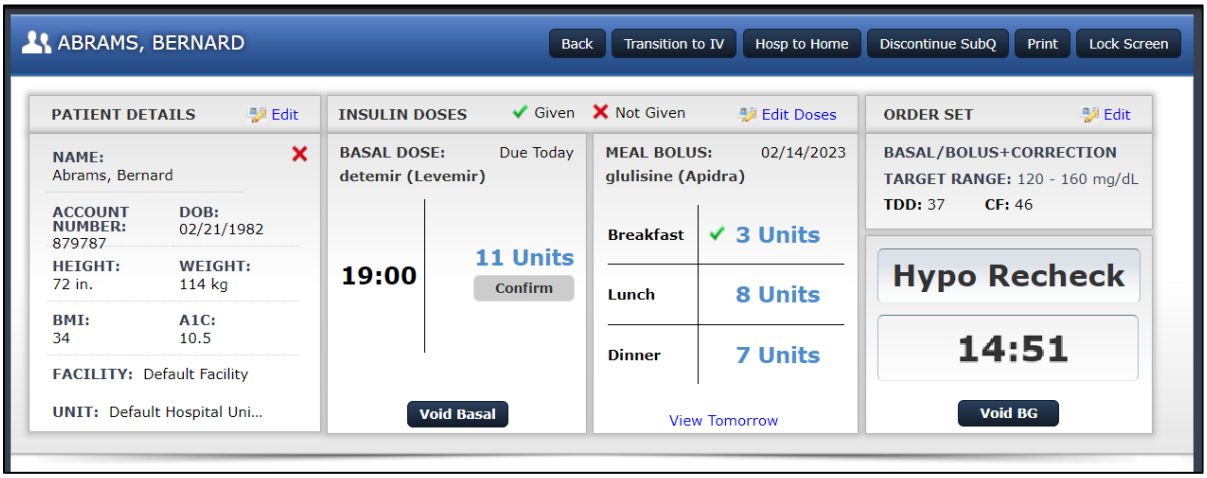
For patients on the Basal/Bolus+Correction order set, when a Misc BG reading < 70 mg/dL is taken after a meal has been administered, Glucommander:

1. Displays the hypoglycemia (hypo) treatment recommendations and requires you to select a hypo treatment option (Dextrose IV, Carbohydrates, Glucagon).



2. Starts a 15-minute countdown timer for the patient.

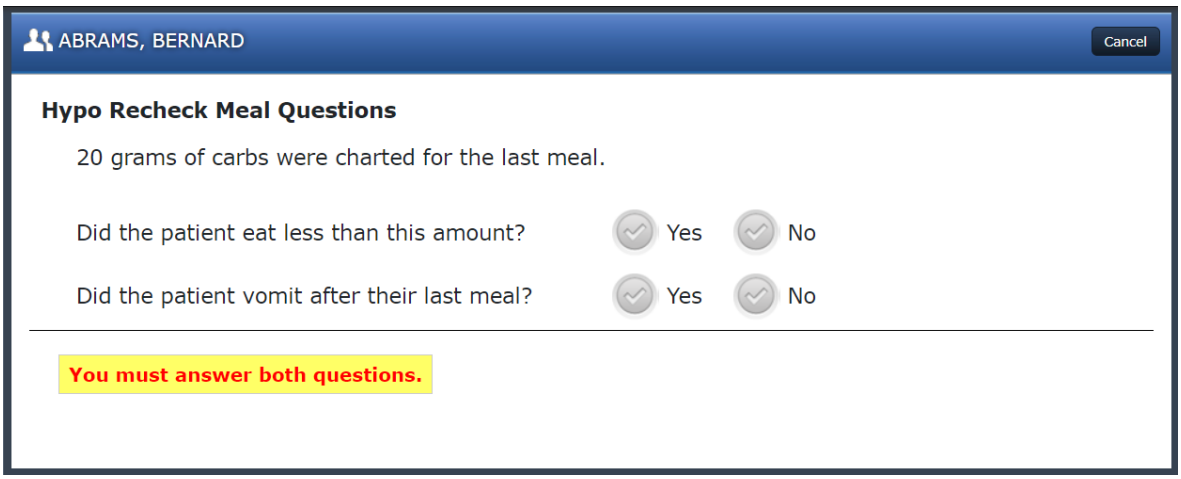
   You are prompted to enter a "hypo recheck" BG within 15 minutes by clicking the timer or **BG DUE**.



3. Displays the amount of carbohydrates the patient consumed during the previous meal after the timer or **BG DUE** is clicked.

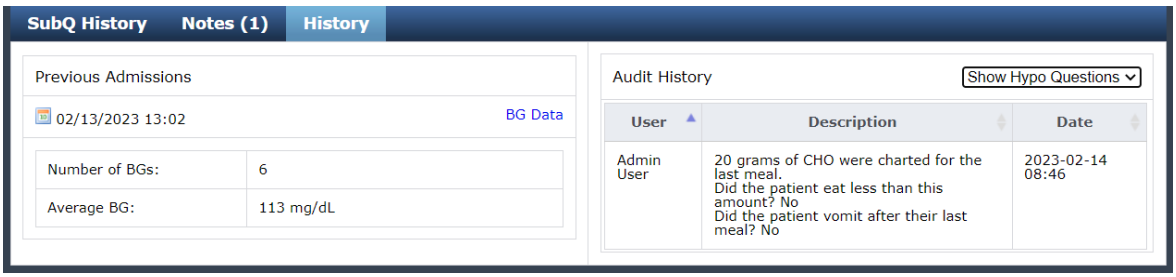
4. Prompts you to answer two questions – "*Did patient eat less than this amount?*" and "*Did the patient vomit after their last meal?*"

   - If you select **Yes** to either question and then click **Save**, the hypo Misc BG will not impact the insulin dose adjustment.
   - If you select **No** to both questions and then click **Save**, the hypo Misc BG will impact tomorrow's insulin dose adjustment for the previous meal.



5. Prompts you to enter the patient's current BG value and then displays the patient detail page.

   On the patient detail page, click the **History** tab and then under Audit History select **Show Hypo Questions** to view the hypo receck meal questions and answers.



Confirm SubQ or Hypoglycemia Dose on Reconciliation Page

If your installation of Glucommander is not configured to work with the Medication Confirmation integration feature, you will have to manually confirm every SubQ and hypoglycemia treatment dose in Glucommander.

Also, if your installation of Glucommander is configured to work with the Medication Confirmation integration feature and you administered the dose and confirmed it on the MAR, but the confirmation fails to be delivered to Glucommander via the interface with the MAR, you must manually confirm the dose in Glucommander.

On the SubQ History tab, the values in the **Meal Bolus Dose**, **Correction Bolus Dose**, and **Total Bolus Dose** columns are displayed in *italics* when the dose has not been confirmed.

Example of SubQ Dose Not Confirmed

IV History | SubQ History | Notes (1) | History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
05/03/2023 09:10	152 mg/dL	Breakfast	N/A	*4 Units of glulisine (Apidra)*	*0 Units of glulisine (Apidra)*	*4 Units of glulisine (Apidra)*	30	Admin User
05/03/2023 09:03	N/A	Basal	4 Units of detemir (Levemir)	N/A	N/A	N/A	N/A	Admin User

Example of Hypoglycemia Dose Not Confirmed

IV History | SubQ History | Notes (1) | History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Hypo Treatment	Meal
05/03/2023 11:00	68 mg/dL	Lunch	N/A	0 Units of glulisine (Apidra)	0 Units of glulisine (Apidra)	0 Units of glulisine (Apidra)	*64 mL of D10*	
05/03/2023 09:10	152 mg/dL	Breakfast	N/A	4 Units of glulisine (Apidra)	0 Units of glulisine (Apidra)	4 Units of glulisine (Apidra)	N/A	

When it is time for the patient's next meal, on the patient detail page:

1. Click **Enter BG**.

   The Reconciliation page displays.

   SubQ Dose Reconciliation Page

BARTON, BROOKE — Cancel

Recommended Insulin Dose

Date/Time: 05/03/2023 09:10
Meal Type: Breakfast
Bolus: 4 units
Correction: 0 units
Total: 4 units of glulisine (Apidra)

Confirm Insulin Dose

Dose confirmation was either not received or did not match the recommendation. Confirm dose that was administered to patient.

Date/Time: 05/03/2023 09:10
Total: 4 units

Save

Hypoglycemia Dose Reconciliation Page

2. As necessary, adjust the:

   a. Date/Time the dose was given

> The date/time the dose was given cannot precede the start of the patient's treatment on Glucommander. When invalid times are entered, a yellow notification box displays as shown below.

SubQ Dose Reconciliation Page

BARTON, BROOKE Cancel

Recommended Insulin Dose

Date/Time: 05/03/2023 09:10
Meal Type: Breakfast
Bolus: 4 units
Correction: 0 units
Total: 4 units of glulisine (Apidra)

Confirm Insulin Dose

Dose confirmation was either not received or did not match the recommendation. Confirm dose that was administered to patient.

Date/Time: 05/03/2023 08:10
Total: 4 units

Date/Time cannot be before the dose was recommended

Hypoglycemia Dose Reconciliation Page

BARTON, BROOKE Cancel

Recommended Hypo Treatment

Date/Time: 05/03/2023 11:00
D10W IV: 64 mL

Confirm One Hypo Treatment

Dose confirmation was either not received or did not match the recommendation. Confirm dose that was administered to the patient.

Date/Time: 05/03/2023 10:00

Dextrose IV | Carbohydrates | Glucagon

D50W IV D10W IV

D10W IV: 64 **mL**

Time cannot be before the time it was recorded

b. Number of units administered

Units field cannot be blank. If zero (0) units were administered, enter "0."

3. Click **Save**.

The Enter Current BG Value page displays.

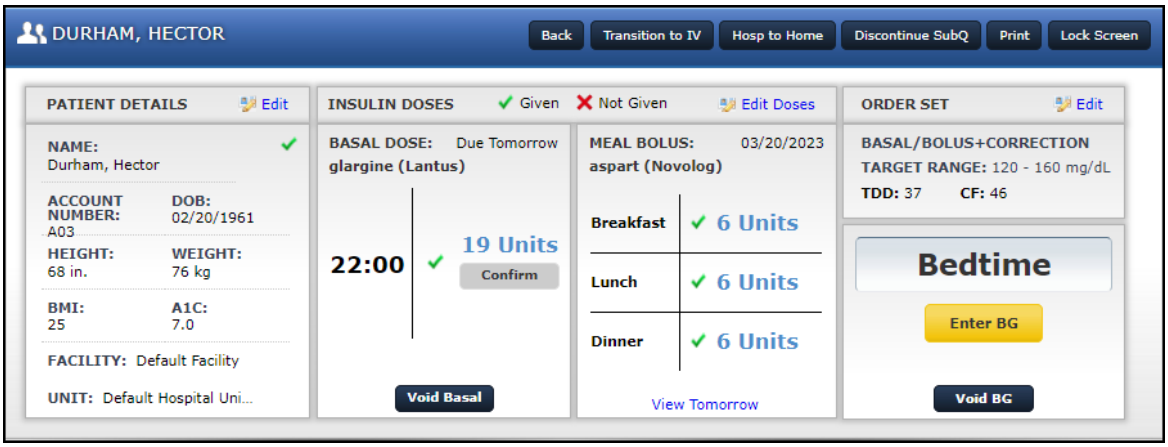
4. Proceed to *Next SubQ BG Reading Due*.

Give a Snack

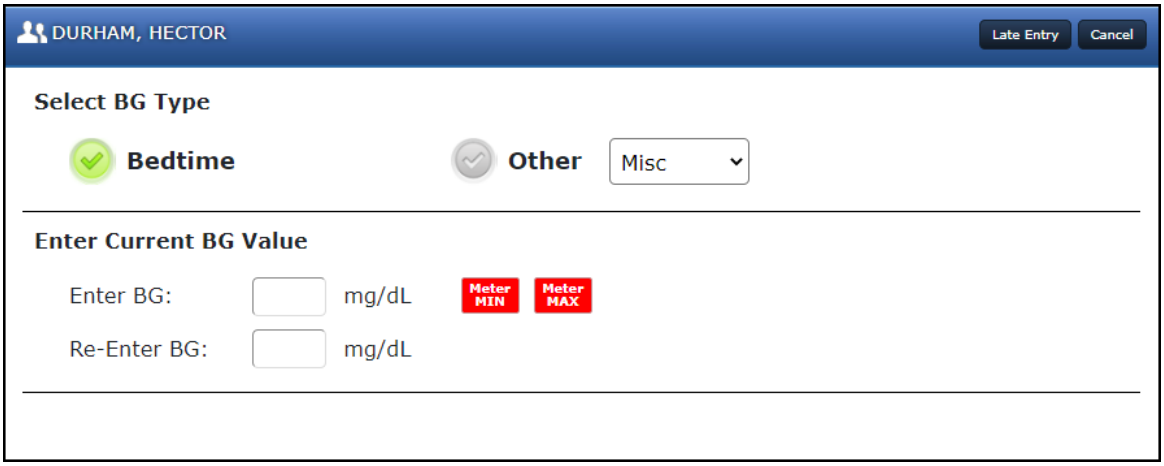
The snack option is available only at Bedtime. Also, to be available, the snack option must be enabled.

On the patient detail page, when it is time for the patient's Bedtime snack:

1. Click **Enter BG**.



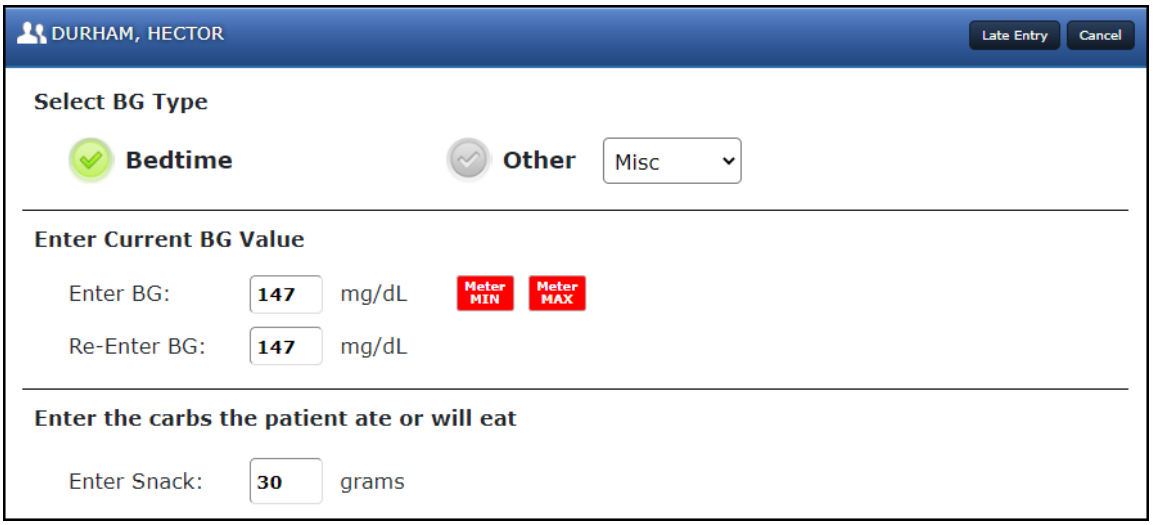
2. Select the blood glucose (BG) type. The next BG type that is due — in this case, Bedtime — should be selected by default.



3. Enter the current BG value twice and then respond to the prompt, "Enter the *carbs the patient ate or will eat.*"

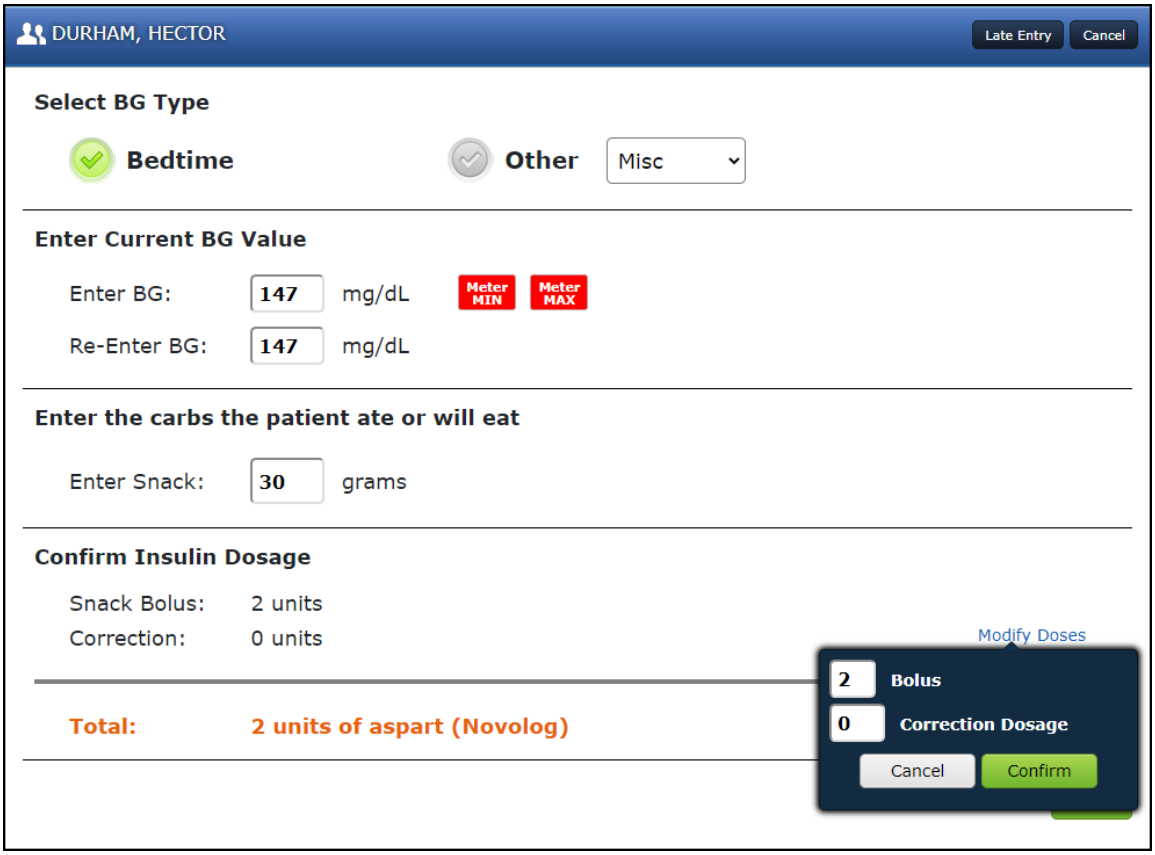
   The snack must be at least 1 gram and no more than:

   - 30 grams – for Basal/Bolus+Correction
   - 100 for adults and 150 for pediatric patients



There is no By Percent option for entering carbohydrates for snacks.

4. Review the dose recommendation. The recommendation is based on a number of factors, including the snack amount, the patient's weight, and the patient's current total daily dose (TDD). Depending on the BG value, you may also receive a recommended correction dose.



5. If you want to change either the snack or correction dose amount, click **Modify Doses** to open a dialog that enables you to change either or both amounts. Click **Confirm** to save the dose modification. The changed dose amount will be saved as the new Total dose recommendation.

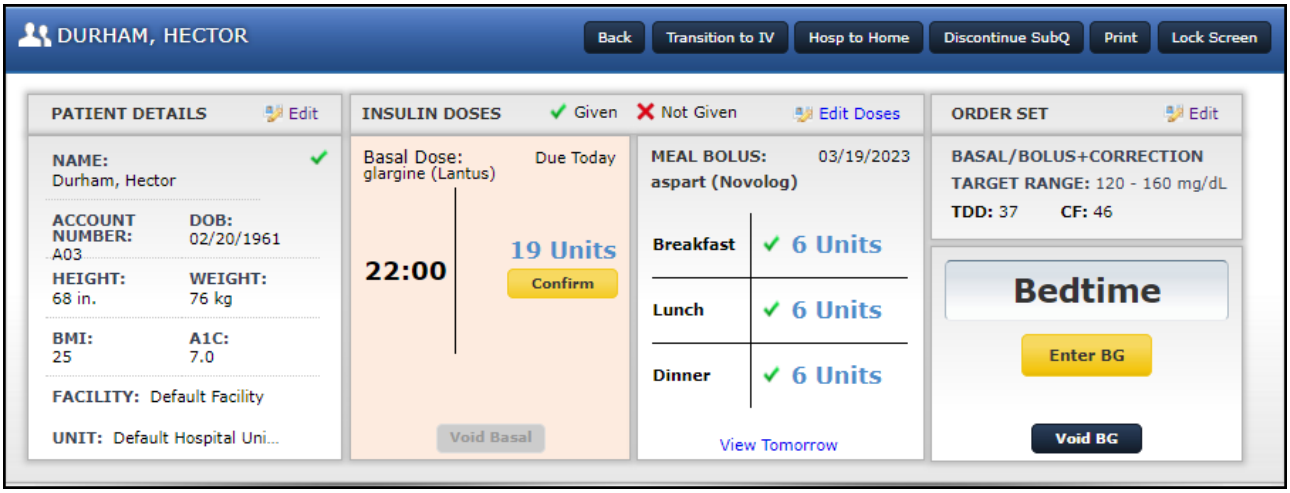
   Note: The correction bolus cannot be edited in the following scenarios: a negative correction dose is recommended, or the BG is entered during the correction stacking window.

   If a snack bolus of any amount is administered, a Midsleep check is automatically prompted for the patient to evaluate the effect of the snack bolus.

6. Click **Save**.

Give Basal

The patient detail page displays the time the basal dose is due. When the basal dose can be given, the background of the Basal Dose box starts flashing an amber color. The **Confirm** button, displayed below the number of basal units, turns yellow (is enabled) and remains yellow until the dose is given.



The **Confirm** button is enabled:

- Two hours before the basal dose is due.
  - For example, if the basal dose is due at 10:00, the **Confirm** button becomes active at 08:00.
- If the scheduled basal dose falls within a 4-hour period preceding the start of treatment.
  - For example, a patient starts SubQ treatment at 13:00 and the basal is scheduled at 10:00. That basal dose can be given at the start of treatment until 14:00; the patient does not have to wait until 10:00 the next day to receive the first basal dose.

    In this case, the background of the Basal Dose box does not flash an amber color. After the 4-hour window expires, the **Confirm** button is disabled (grayed out) and the basal dose due label advances to the next due time.

If your installation of Glucommander is:

- Configured for the Medication Confirmation integration feature, the basal dose recommendation is automatically confirmed in Glucommander after the message is received that the dose was administered on the MAR.
  - If Glucommander does not receive the message that the basal dose was administered on the MAR or the dose administered does not match the recommendation, follow the steps below to manually confirm it in Glucommander.

- Not configured for Medication Confirmation integration feature, the basal dose recommendation needs to be manually confirmed in Glucommander after the dose has been administered. When it is time to confirm the basal dose, follow the steps below.

To administer the basal dose:

1. Click **Confirm**.
2. As necessary, adjust the **Date/Time** the basal dose was given and the number of units in the **Total** field.

The date/time the basal dose was given cannot precede the start of the patient's treatment on Glucommander. When invalid times are entered, as shown above, a yellow notification box displays valid times for the basal dose.

3. Administer the recommended amount and click **Save**.

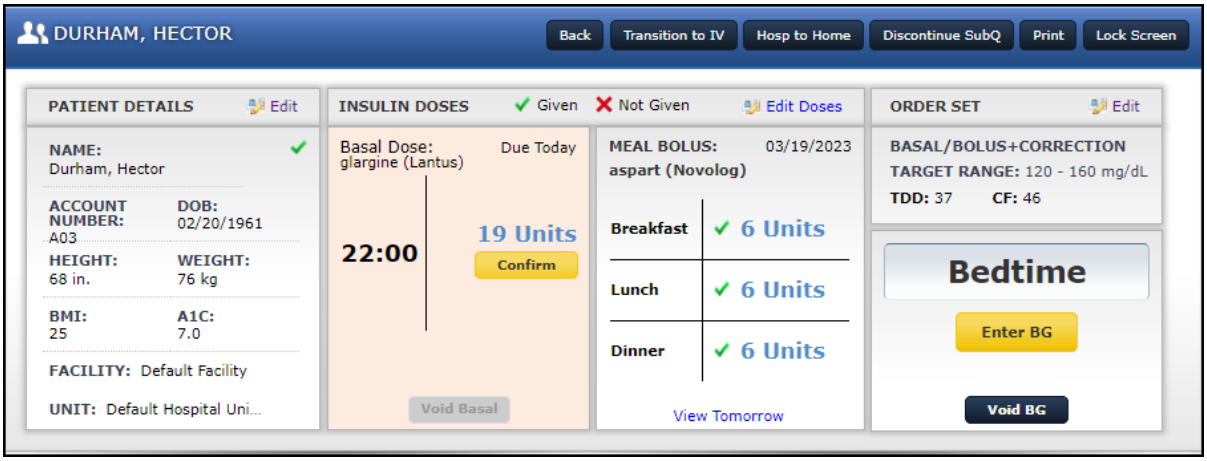
   The patient detail page displays.

The recorded basal dose will display on the **SubQ History** tab at the bottom of the patient detail page. A green check mark (✔) will display next to the basal amount to indicate that the basal dose has been administered to the patient.

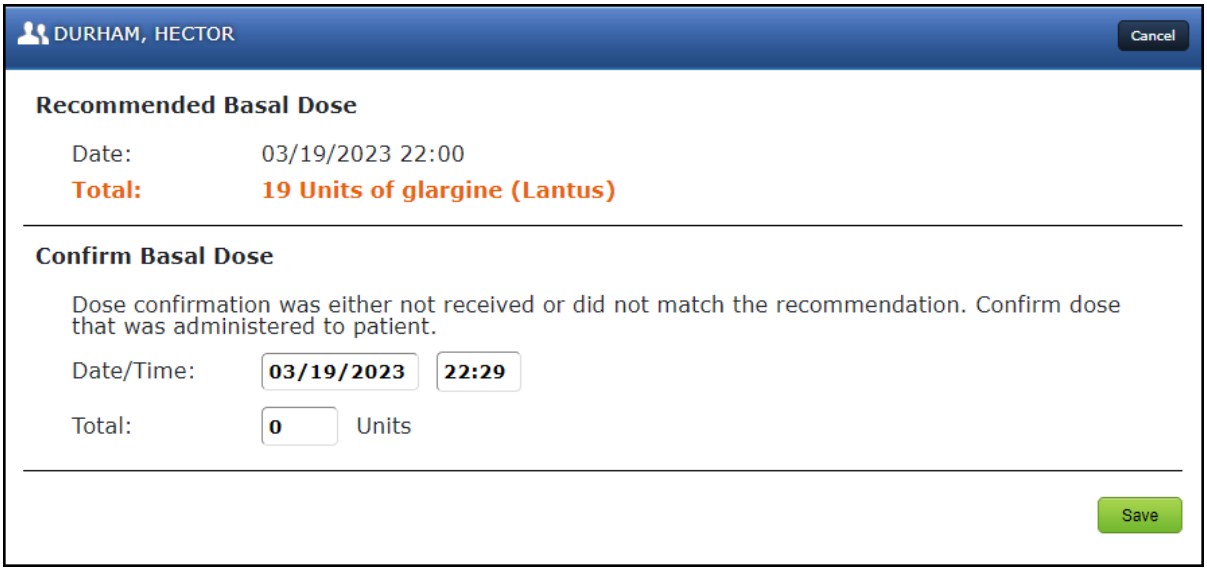
Record Basal as Not Given

To record the basal dose as not given:

1. Click **Confirm**.

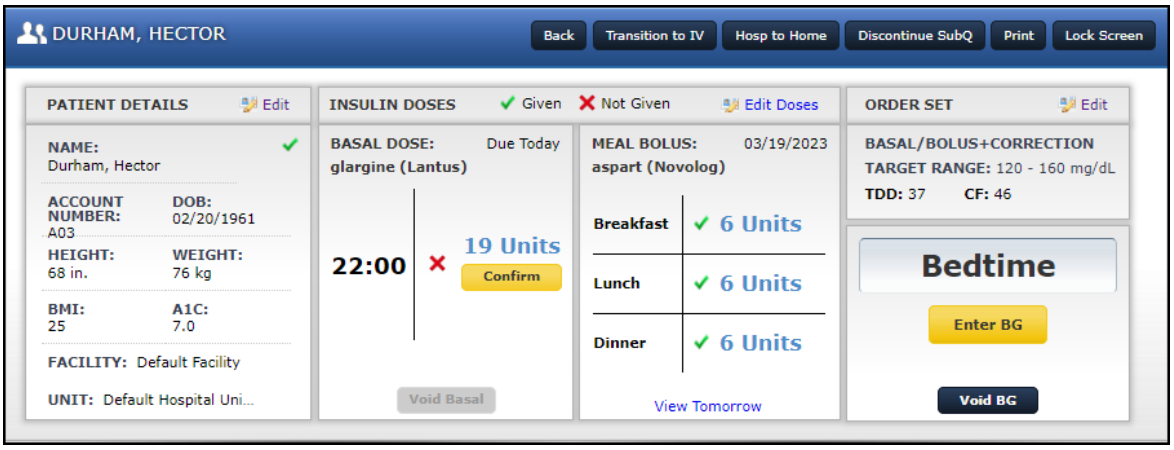


2. Enter a valid **Date/Time** and "0" in the **Total** field.



3. Click **Save**.

On the patient detail page in the **Basal Dose** box, a red (✕) will display next to the number of basal units, indicating that the dose was not given.



The **Confirm** button remains enabled and you can give the same dose any time up until 2 hours before the next basal dose is due.

The basal dose will also be recorded on the **SubQ History** tab at the bottom of the patient detail page.

SubQ History | Notes (1) | History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Hypo Treatment	Mea
03/19/2023 22:29	N/A	Basal	0 Units of glargine (Lantus)	N/A	N/A	N/A	N/A	
~~03/19/2023 22:27~~	~~N/A~~	~~Basal~~	~~19 Units of glargine (Lantus)~~	~~N/A~~	~~N/A~~	~~N/A~~	~~N/A~~	
03/19/2023 17:41	159 mg/dL	Dinner	N/A	6 Units of aspart (Novolog)	0 Units of aspart (Novolog)	6 Units of aspart (Novolog)	N/A	
03/19/2023 11:39	156 mg/dL	Lunch	N/A	6 Units of aspart (Novolog)	0 Units of aspart (Novolog)	6 Units of aspart (Novolog)	N/A	
03/19/2023 06:37	167 mg/dL	Breakfast	N/A	6 Units of aspart (Novolog)	1 Units of aspart (Novolog)	7 Units of aspart (Novolog)	N/A	

Enter Late Entry Basal Dose

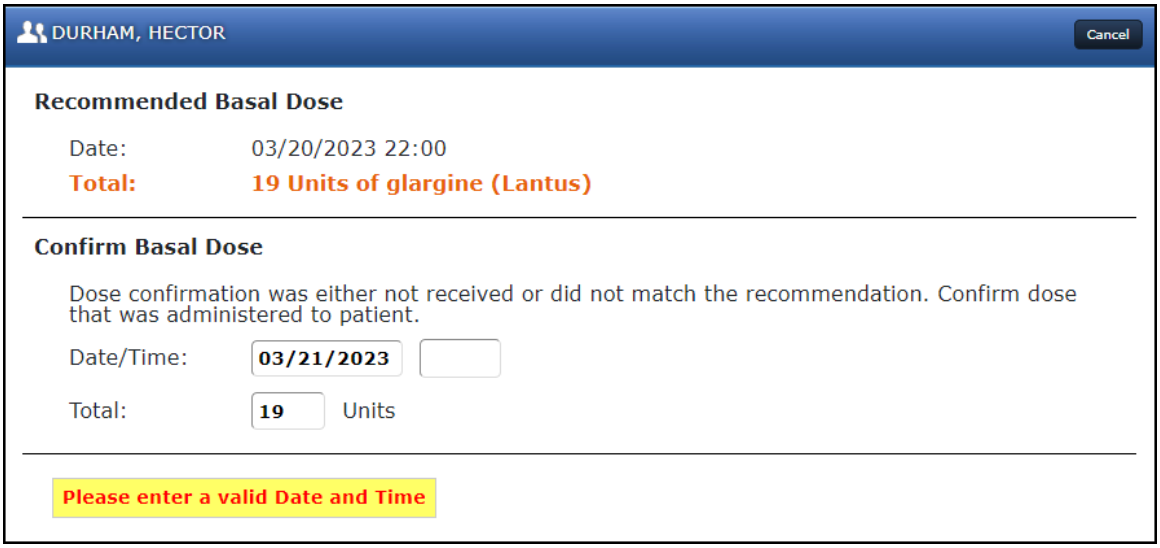
If the basal dose is not recorded within 4 hours of the distribution time, the Confirm Basal Dose page displays when you attempt to access the patient detail page (see below). You are required to record the basal dose before proceeding with the next entry.

The audible alarm and visual alerts will continue until the basal dose is recorded. For more information, see *Alerts in SubQ*.

To record a patient's basal dose as a late entry:

1. In the **Date/Time** field, enter the date and time the basal dose was administered.
2. In the **Total** field, enter the number of units administered to the patient.

To record the dose as not given, enter "0.".



3. Click **Save**.

4. Review the table for information on how the late entry will adjust future basal doses and how Glucommander will record the dose.

Dose distribution	If the basal dose is recorded…	Then…
1 dose per day	Up to 8 hours after it is due	The dose amount adjusts normally
	More than 8 hours after it is due	The next scheduled dose is skipped and the next scheduled dose after that adjusts using the skipped day's early morning BGs. (e.g., Day 1 dose given late, Day 2 dose skipped, Day 3 dose adjusts using Day 2's early morning BGs).
2 doses per day	More than 4 hours after it is due	When the patient detail page is opened, Glucommander automatically displays the Confirm Basal Dose page and requires the user to confirm, or edit and confirm, the dose administered to the patient. New BG values cannot be entered until the dose is confirmed.

Void Basal

The **Void Basal** button appears on the patient detail page in the Basal Dose box after the basal dose is administered and remains active up until the next basal dose is available to be administered. A basal dose can be voided by any user with access to the patient's unit. Only the last basal entry for

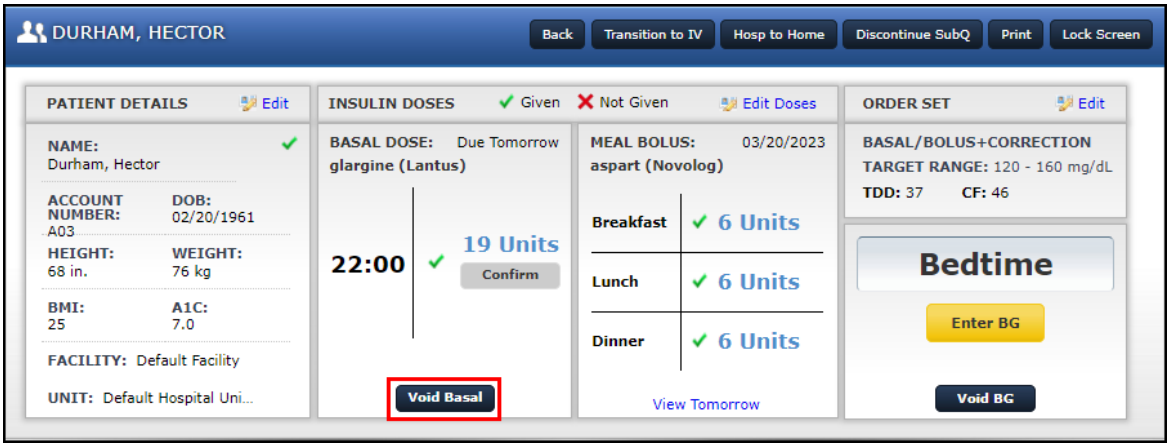
the patient may be voided. After a basal dose is voided, the **Void Basal** button will become disabled (grayed out).

The **Void Basal** button is also disabled if:

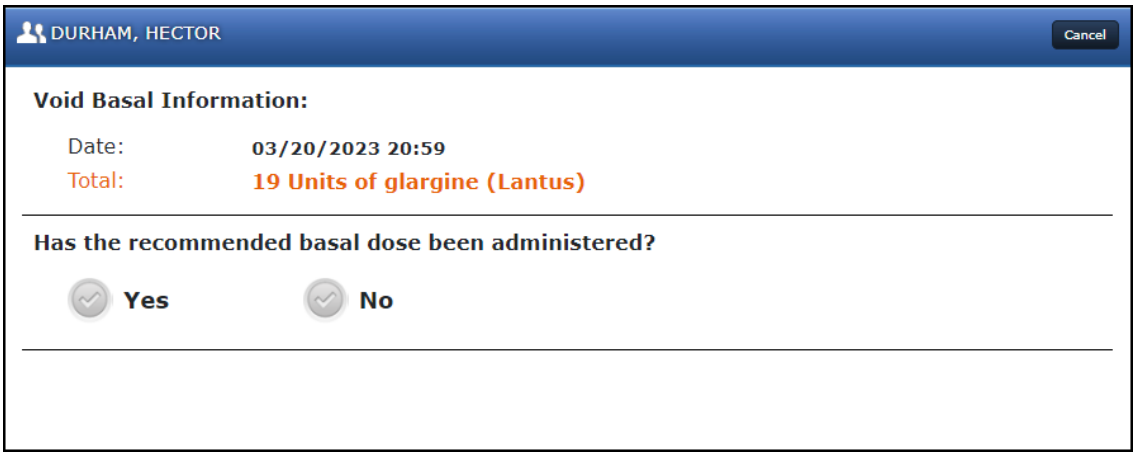
- Any modifications are made to the basal dose amount, daily distribution, or distribution time (by clicking the **Edit Doses** button in the **Insulin Doses** section or the **Edit** button in the **Order Set** section on the patient detail page).
- The basal dose was already confirmed automatically by a confirmation message from the Medication Confirmation integration feature. If you need to void the basal dose and it has already been charted on the MAR but not administered to the patient, you can un-chart the dose on the MAR.

To void a basal entry:

1. Click **Void Basal**.

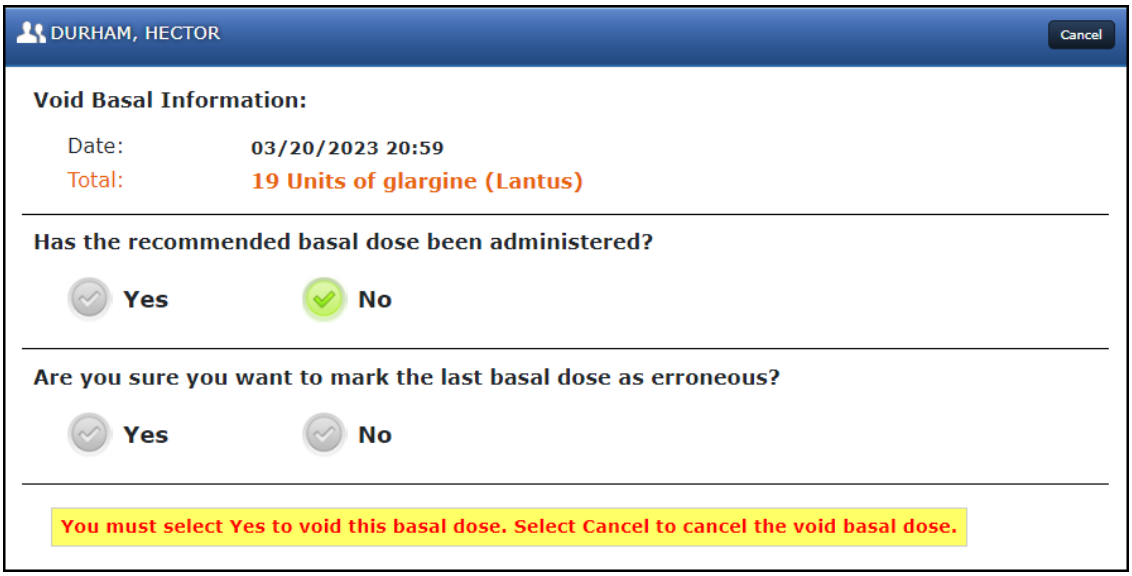


2. Select the "No" check mark in response to the question, "*Has the recommended basal dose been administered?*"



If the basal dose you want to void has already been administered to the patient, the dose cannot be voided.

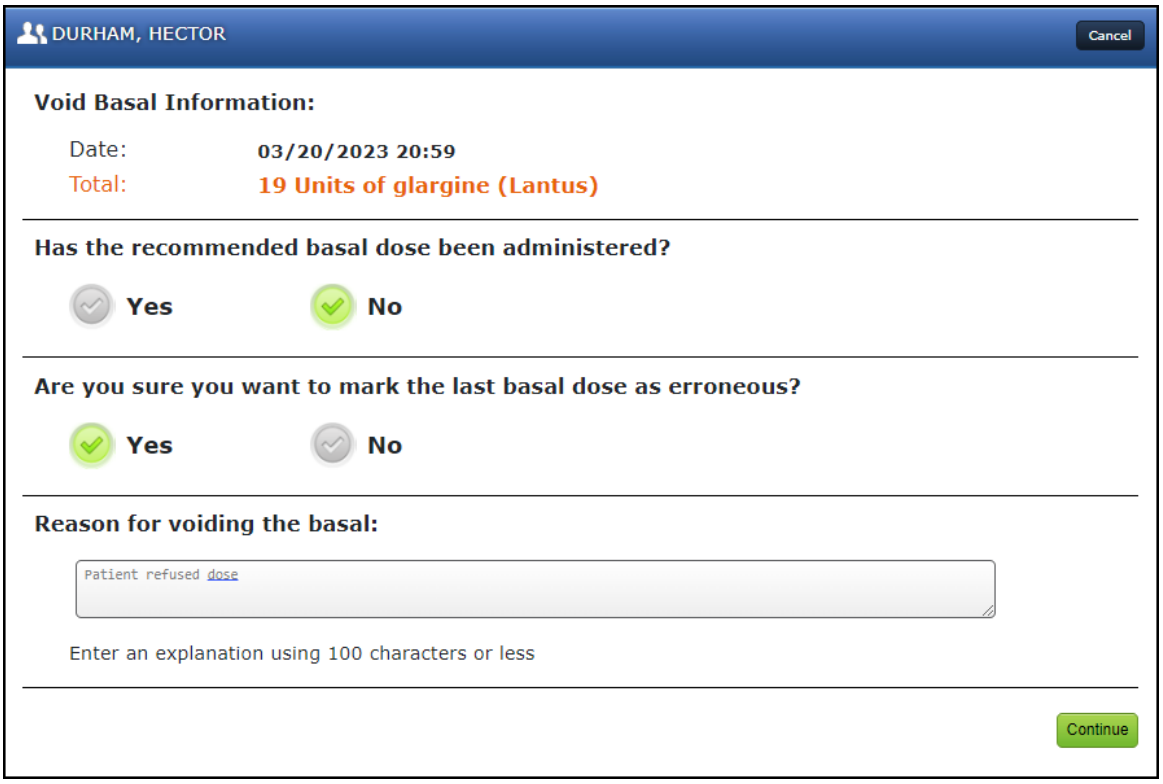
3. Select the "Yes" check mark in response to the question, "*Are you sure you want to mark the last basal dose as erroneous?*"



If you want to stop the void basal process, click **Cancel**. Selecting "No" will not allow you to stop the process.

4. In the **Reason for voiding the basal** field, enter your reason for voiding the basal.

   For example, you might type “Patient refused dose.”



5. Click **Continue**.

   The patient detail page refreshes, displaying the basal dose as available to be administered. If the basal dose is voided 4 hours or more after the dose was due, the Confirm Basal Dose page displays.

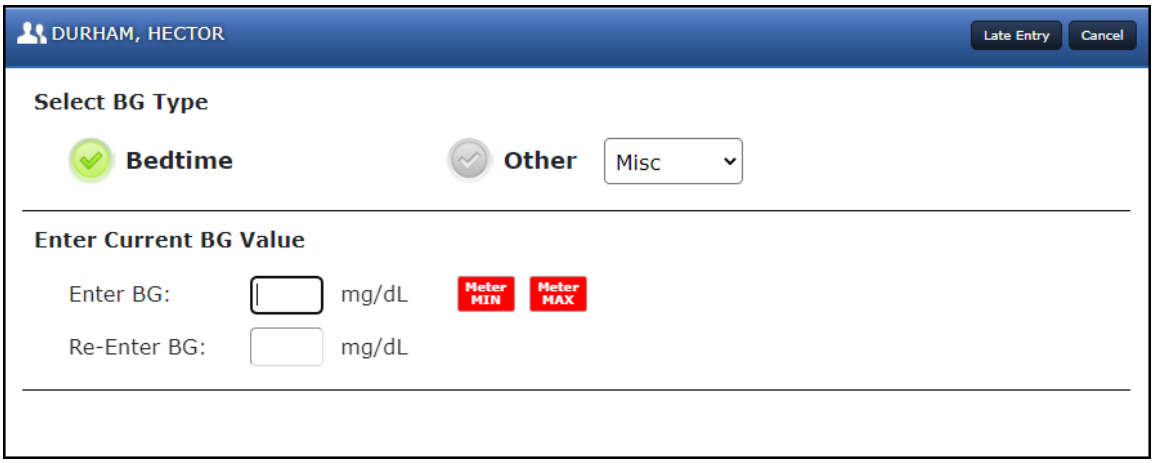
Enter Late Entry BG Value

When a patient's blood glucose (BG) value is not entered in Glucommander at the scheduled time, you can still record the patient's BG after that time has passed.

You will not be able to chart a BG Type prior to the start of treatment.

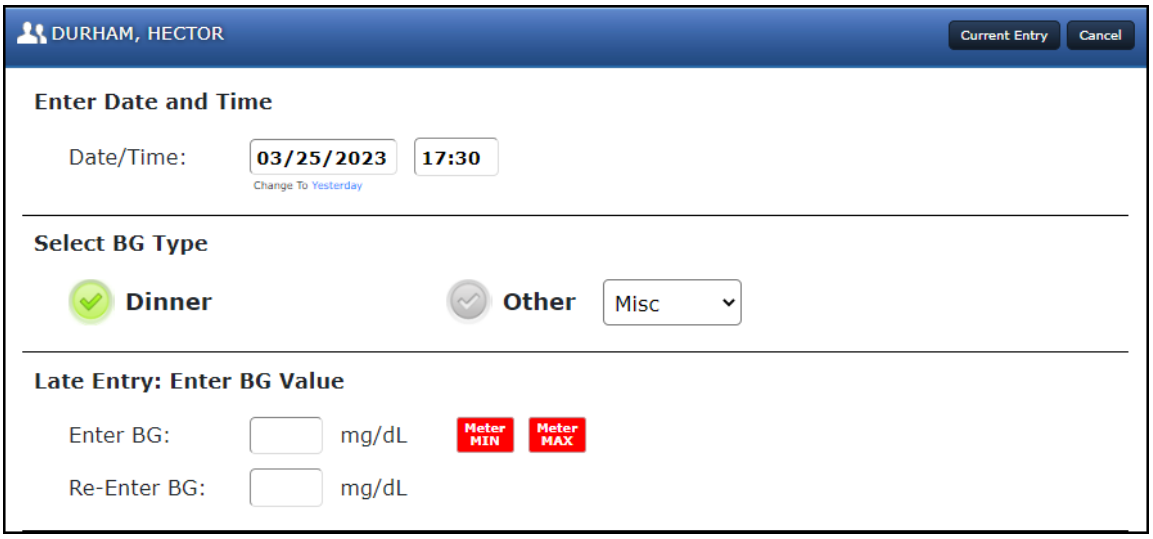
To record a patient's subcutaneous (SubQ) BG as a late entry, on the patient detail page:

1. Click **Enter BG**.
2. Click the **Late Entry** button in the upper-right hand corner.



3. In the **Date/Time** field, specify a date and time corresponding to the earlier BG result.

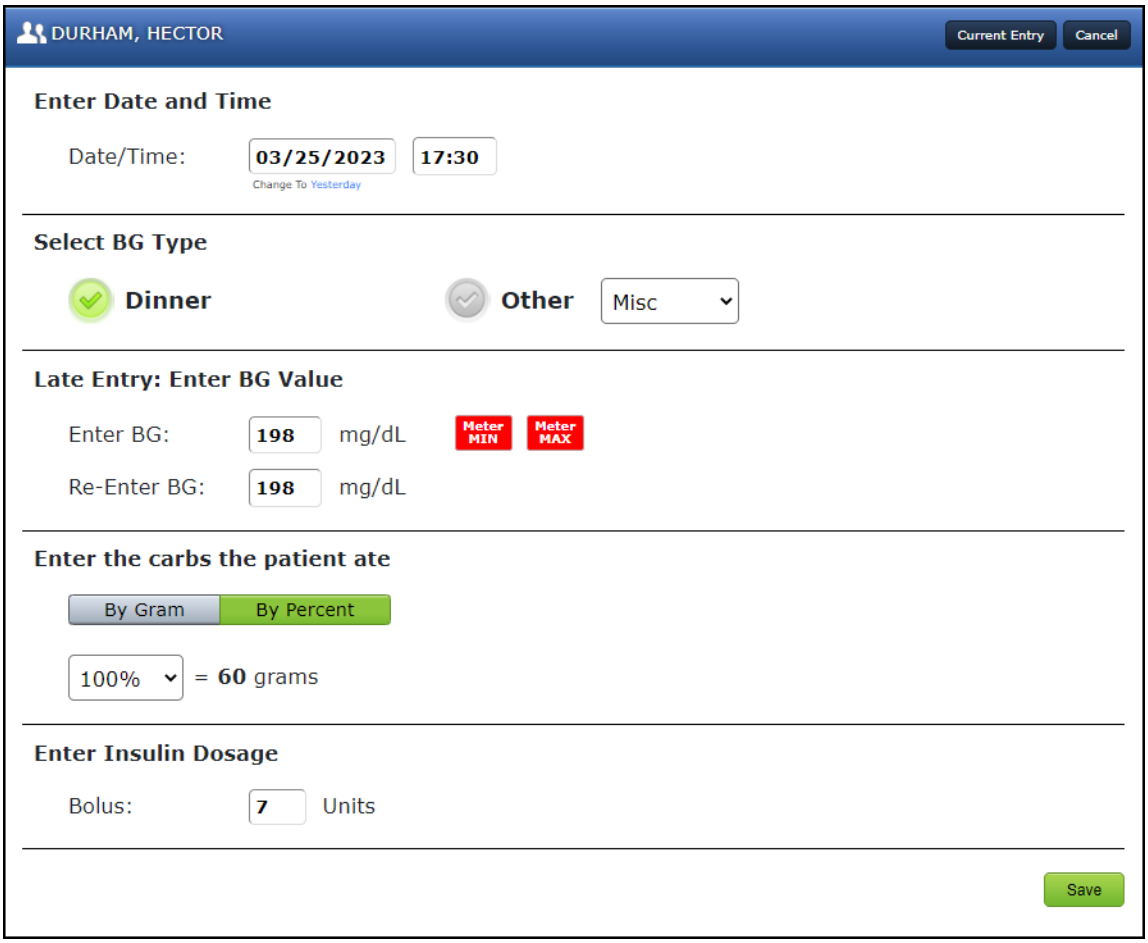
When the Select BG Type section displays, the label for the corresponding mealtime will automatically be selected based on the time you enter.



4. In the Late Entry: Enter BG Value section, in the **Enter BG** and **Re-Enter BG** fields, enter the BG value for the patient.

5. Respond to the prompt, "*Enter the carbs the patient ate*" by clicking By Grams to specify the actual number of carbs that the patient ate. For patients on the Basal/Bolus+Correction order set, you can also click **By Percent** to select from a dropdown field the percentage value (0%, 25%, 50%, 75%, or 100%) that reflects the number of carbs eaten. Glucommander automatically converts the percentage to the number of carbs in grams. For example, if the ordered carbohydrate amount was 60 gm and you select 25%, 15 grams is displayed. If 50% is selected, 30 grams is displayed.

6. In the Enter Insulin Dosage section, enter the number of Bolus units administered to the patient. If none were administered, enter “0.” The Save button displays.



7. Click **Save**.

The patient detail page displays. On the **SubQ History** tab, in the Date column, “Late Entry” is displayed below the date.

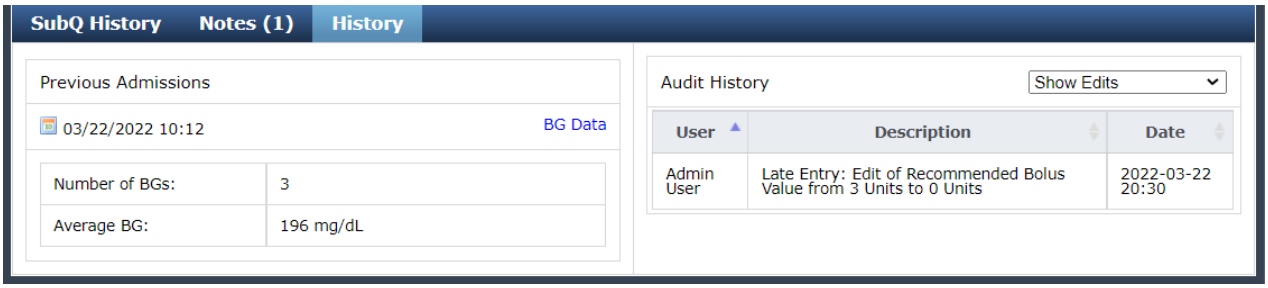
SubQ History | Notes (1) | History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
03/25/2023 22:00	N/A	Basal	19 Units of glargine (Lantus)	N/A	N/A	N/A	N/A	Gloria Fraeme
03/25/2023 17:30 Late Entry	198 mg/dL	Dinner	N/A	6 Units of aspart (Novolog)	1 Units of aspart (Novolog)	7 Units of aspart (Novolog)	60	Gloria Fraeme
03/25/2023 12:28	190 mg/dL	Lunch	N/A	6 Units of aspart (Novolog)	1 Units of aspart (Novolog)	7 Units of aspart (Novolog)	60	Gloria Fraeme
03/25/2023 08:27	200 mg/dL	Breakfast	N/A	6 Units of aspart (Novolog)	1 Units of aspart (Novolog)	7 Units of aspart (Novolog)	60	Gloria Fraeme

Clicking the **Current Entry** button in the upper-right hand corner stops the process for entering a late entry BG and takes you to the Enter Current BG Value workflow for the current mealtime. Any data you entered will not be saved.

Bolus Editing for Late Entry BG Value

When a late entry BG is recorded and the number of bolus units administered to the patient differs from the amount Glucommander recommended, a note is added in the **Audit History** section under Show Edits.



Late entry MISC Hypo BGs are not recorded in the **Audit History** section under Show Edits.

Void SubQ BG Entry

After a blood glucose (BG) value is entered and a recommended dose is saved from the Enter BG pathway, the **Void BG** button is enabled on the patient detail page. Any user with access to the patient's unit can void a BG, and only the last BG entry for the patient may be voided.

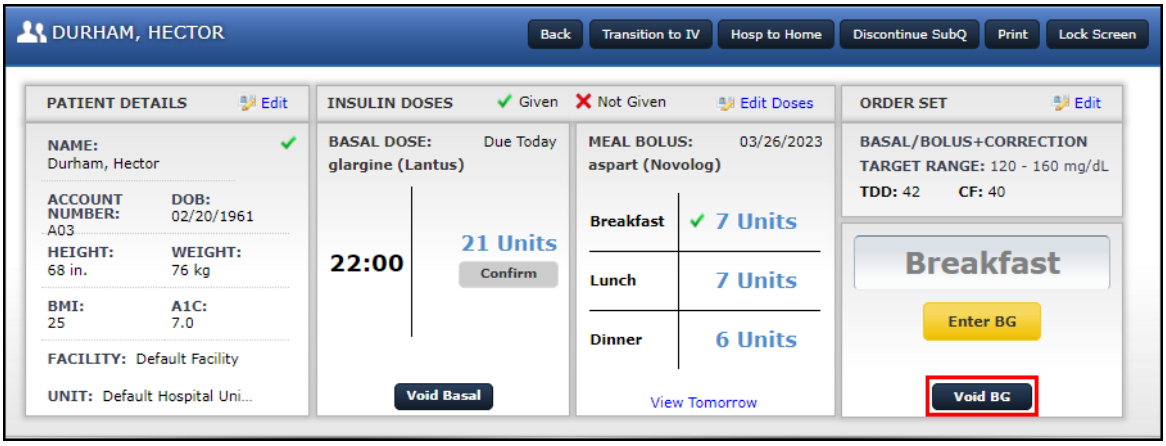
After a BG value is voided, the **Void BG** button is disabled (grayed out). When a subsequent BG entry is made, the **Void BG** button is enabled.

The BG that starts a patient on SubQ treatment cannot be voided. This includes the first BG on SubQ treatment following transition from IV treatment.

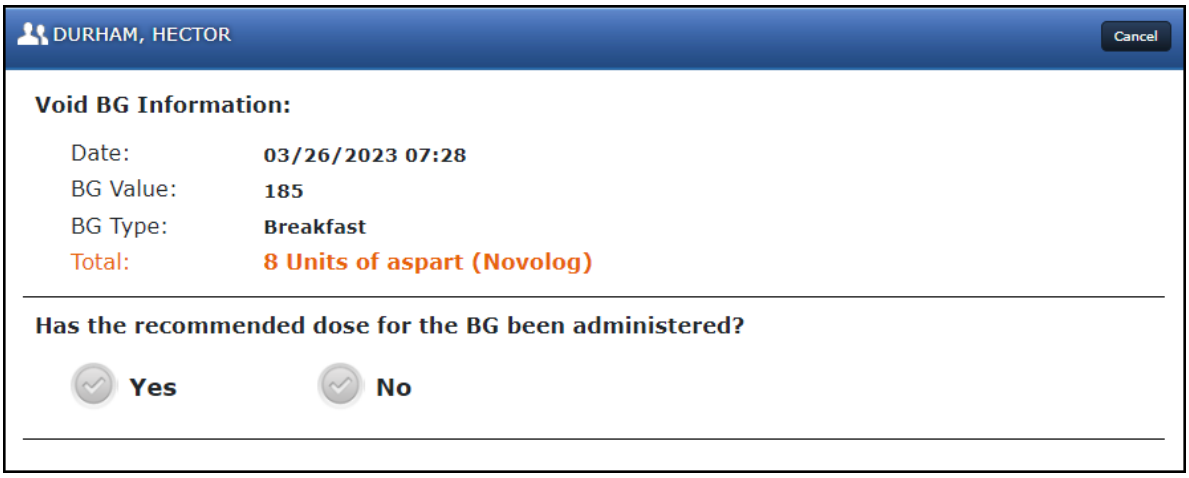
The **Void BG** button is disabled if the dose has already been confirmed by a message from the Medication Confirmation integration feature ("The BG/treatment is already voided or confirmed by the MAR"). If you need to void a BG for a dose that has already been charted on the MAR but not yet administered to the patient, you can un-chart the dose on the MAR.

To void a SubQ BG entry that has **not** already been administered to the patient:

1. Click **Void BG**.

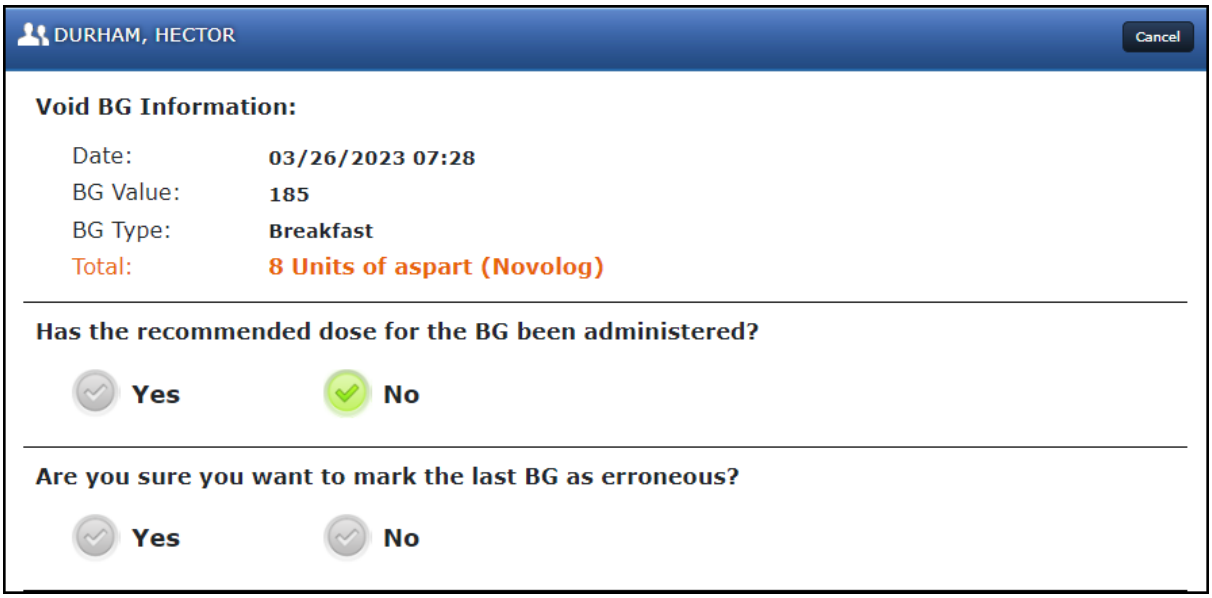


2. Select the "No" check mark in response to the question, "*Has the recommended dose for the BG been administered?*"



If the dose for the BG you want to void has already been administered to the patient, the dose cannot be voided.

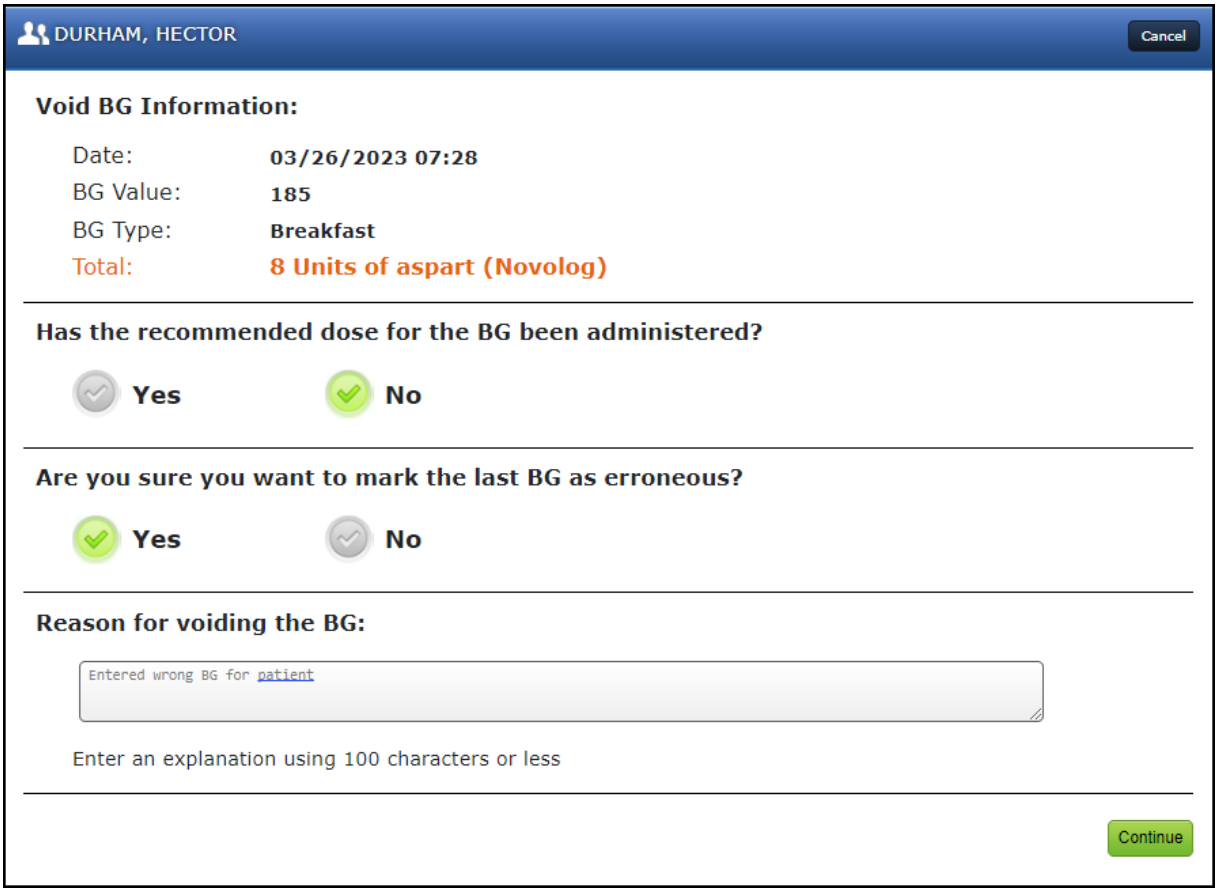
3. Select the "Yes" check mark in response to the question, "*Are you sure you want to mark the last BG as erroneous?*"



If you want to discontinue the void BG process, click **Cancel**. Selecting "No" will not allow you to end the process.

4. In the **Reason for voiding the BG** field, enter your reason for voiding the BG.

   For example, you might type "Entered wrong BG for patient" or "Entered wrong value for patient (173 instead of 137)."



5. Click **Continue**.

   The patient detail page refreshes, showing the patient's treatment state prior to entry of the just-voided BG.

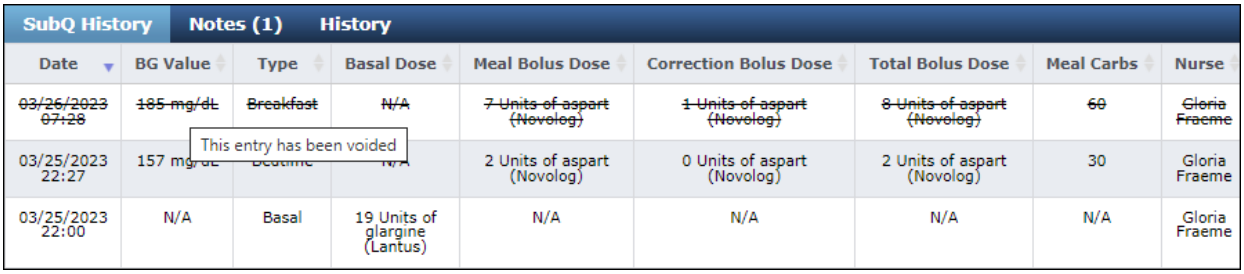
   If the voided BG was entered when:

   - A particular mealtime was displayed (e.g., Lunch, q4hr), that mealtime is displayed again
   - "BG DUE" was displayed (after post-hypo countdown expires), "BG DUE" is displayed again
   - Post-hypo countdown timer was in progress, the countdown timer resumes where it was when the voided BG was entered

In the SubQ History, the voided BG is marked with a strikethrough line:

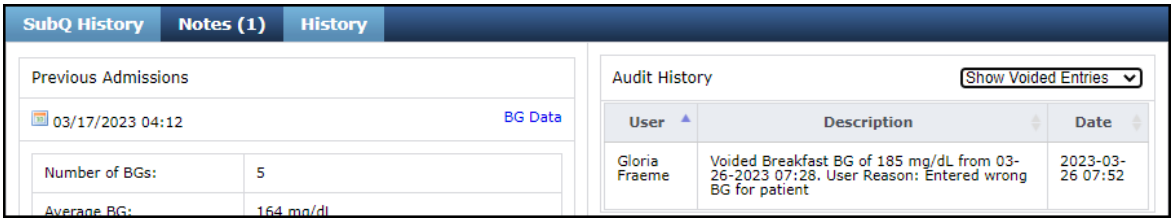
Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
~~03/26/2023 07:28~~	~~185 mg/dL~~	~~Breakfast~~	~~N/A~~	~~7 Units of aspart (Novolog)~~	~~1 Units of aspart (Novolog)~~	~~8 Units of aspart (Novolog)~~	~~60~~	~~Gloria Fraeme~~
03/25/2023 22:27	157 mg/dL	Bedtime	N/A	2 Units of aspart (Novolog)	0 Units of aspart (Novolog)	2 Units of aspart (Novolog)	30	Gloria Fraeme
03/25/2023 22:00	N/A	Basal	19 Units of glargine (Lantus)	N/A	N/A	N/A	N/A	Gloria Fraeme

A tooltip also displays when you hover over the voided BG with your cursor: “This entry has been voided.”



Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Meal Carbs	Nurse
~~03/26/2023 07:28~~	~~185 mg/dL~~	~~Breakfast~~	~~N/A~~	~~7 Units of aspart (Novolog)~~	~~1 Units of aspart (Novolog)~~	~~8 Units of aspart (Novolog)~~	~~60~~	~~Gloria Fraeme~~
03/25/2023 22:27	157 mg/dL	Bedtime	N/A	2 Units of aspart (Novolog)	0 Units of aspart (Novolog)	2 Units of aspart (Novolog)	30	Gloria Fraeme
03/25/2023 22:00	N/A	Basal	19 Units of glargine (Lantus)	N/A	N/A	N/A	N/A	Gloria Fraeme

Lastly, on the **History** tab, you can select Show Voided Entries to view the voided BG entry.



Edit SubQ Patient Information

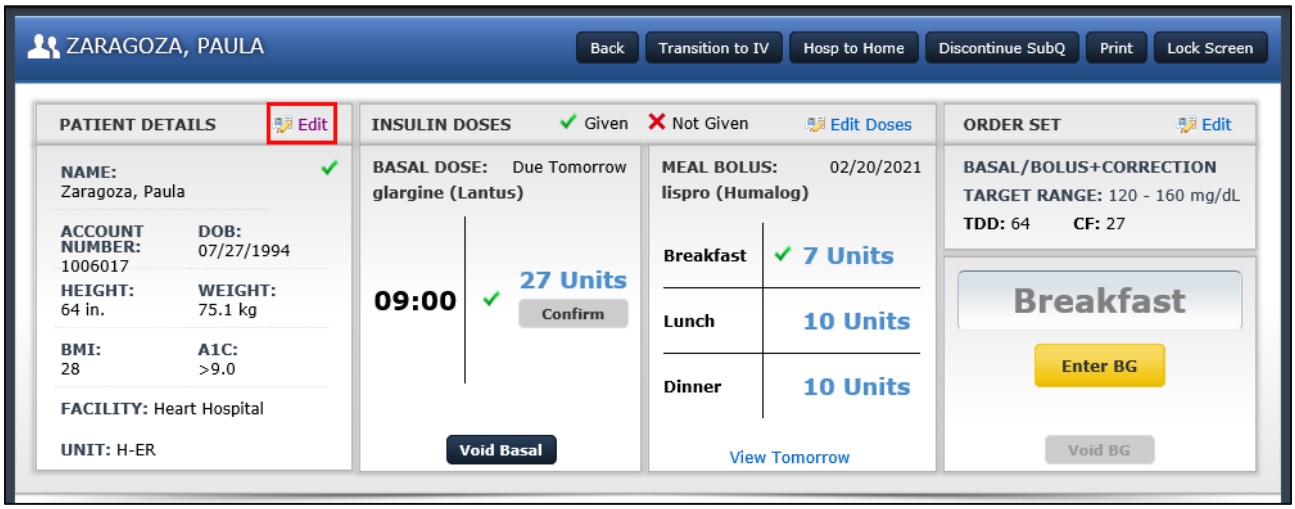
From the top half of the SubQ patient detail page, you can edit:

- Patient Details
- Insulin Doses
- Order Set

Changes to fields in the insulin doses or insulin order set require a provider's order.

Edit Patient Details

The patient's demographic information is either obtained through Glucommander's HL7 interface with the hospital information system or input on the Add page in Glucommander. This information can be edited by clicking **Edit** in the **Patient Details** section.



If the Edit Patient Information setting is disabled, the Edit function will allow editing of only the patient's height, weight, A1C value, A1C resulted date, and insulin order set.

EDIT PATIENT DETAILS

PATIENT INFORMATION

First Name:*	Paula
Last Name:*	Zaragoza
Account Number :*	1006017
MRN :*	2006017
DOB:*	07/27/1994 (EX: mm/dd/yyyy)
Room Number:	11
Gender:*	Female
Hospital Unit:*	Heart Hospital : H-ER

PATIENT DEMOGRAPHICS

Height:*	64 in
Weight:*	75.1 kg
A1C:	>9.0
A1C Resulted Date:	02/18/2021 (EX: mm/dd/yyyy)
Physician:	Dr. Bennett Jenkins

PATIENT TYPE

Patient Type:*	SubQ

Cancel | Save and Continue

In the **A1C** field, values containing greater than (>) or less than (<) symbols can be used in the following instances:

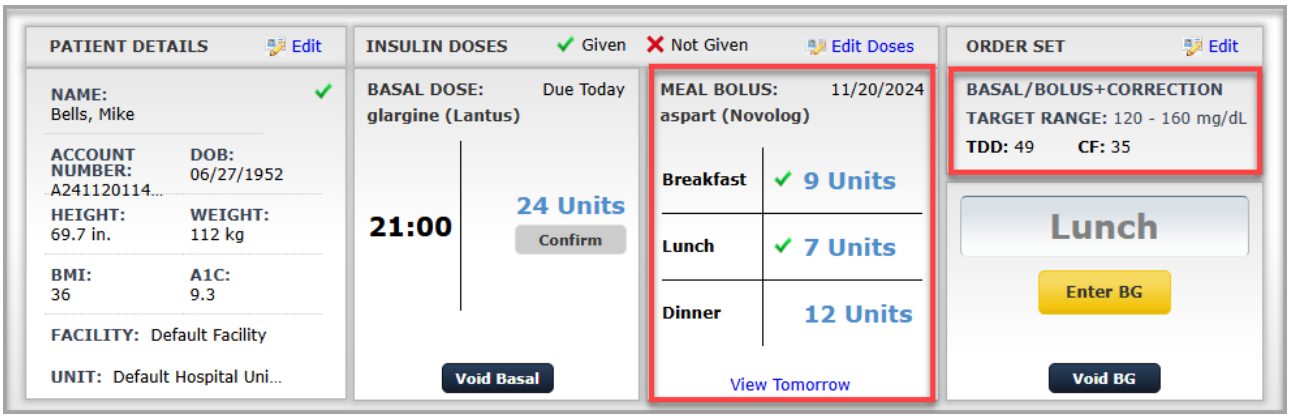
- < with values 1-7
- > with values 9 or above

Edit Insulin Doses: Meal Bolus Adjustment

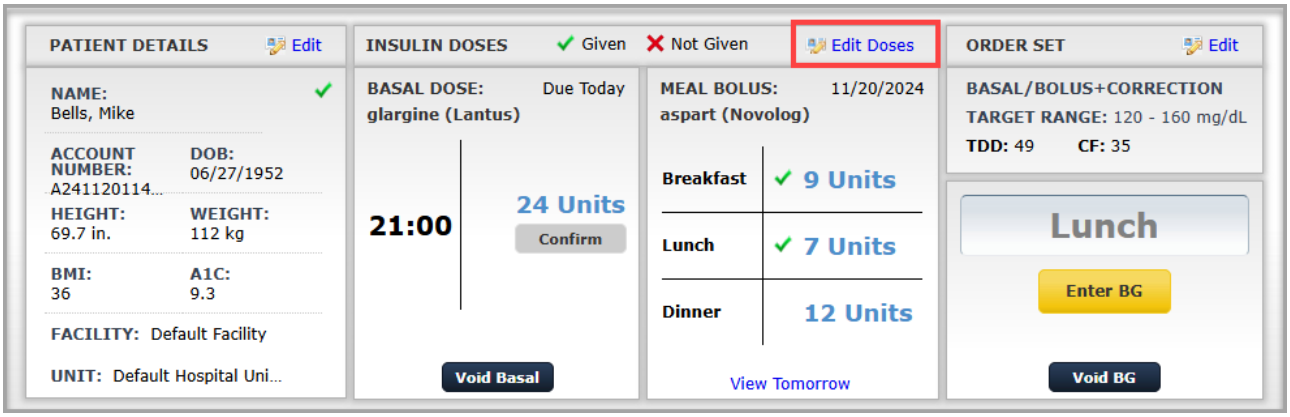
On the Basal/Bolus+Correction order set type, initial meal bolus amounts are based on the provider's order. Glucommander can adjust the amounts daily as needed in response to BG entries recorded, insulin given, and meals consumed.

The recommended meal bolus amounts are displayed in units in the **Meal Bolus** section of the patient detail page. To the right of that section, the active order set type is displayed, along with the patient total daily dose (TDD) and correction factor (CF).

As patients proceed through the meal bolus regimen, Glucommander uses the latest BG entries and its own adjustment factor (AF) to calculate new meal bolus amounts for the next day's dosing.

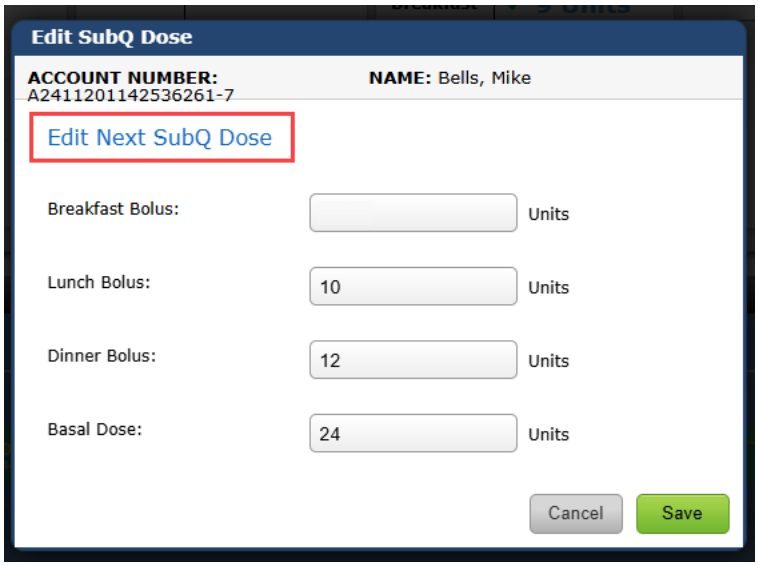


In the **Insulin Doses** section:



- Click **View Today** or **View Tomorrow** to see the indicated day's bolus amounts. Because the next day's dosing is based in part on the current day's bolus amounts, it is helpful to be able to toggle between today's and tomorrow's dosing amounts.
- Click **Edit Doses** to access the patient's basal-bolus amounts for editing.

- Doses can be edited before a recommendation is calculated by entering a dose into the blank field.
- If a dose is calculated, a value will display in the field. To edit, delete the value and replace with the edited dose value.
- Click Save.



If the edit will be applied to a dose for tomorrow, once the value is entered in the input field a message will be displayed: "[Meal] bolus edit will be applied to tomorrow's dose"

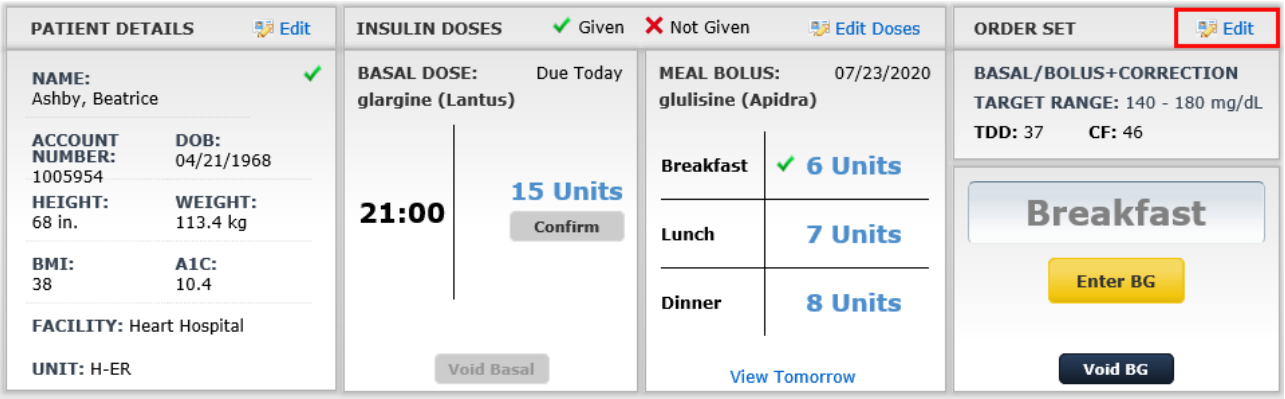
Edits made from the MEAL BOLUS area of the SubQ patient detail page are recorded in Audit History with the phrasing, "Edit Today's/Tomorrow's SubQ *dosing value*."

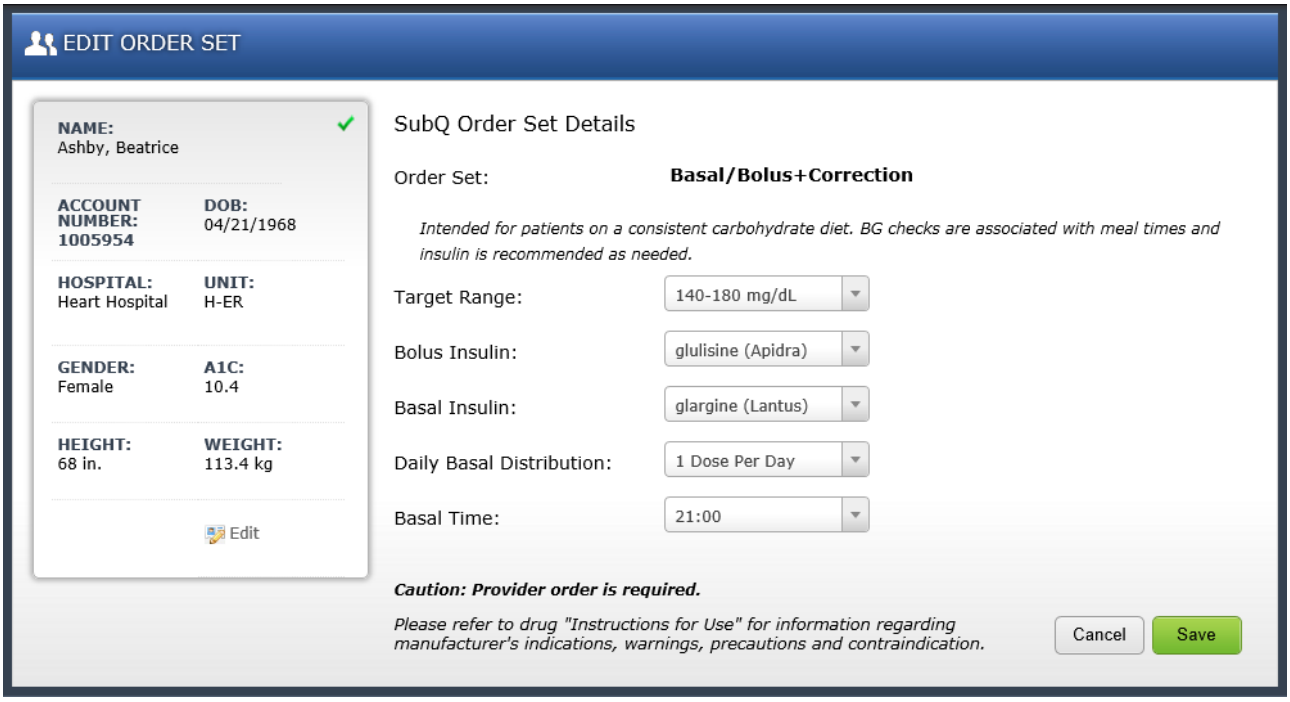
If the dose is edited before a recommendation is calculated, the message will display "Edit Today's / Tomorrow's [Meal bolus] dose to XX unit(s) prior to system calculation."

Meal bolus doses that are skipped or not recorded in Glucommander will not adjust. Recommendations for the next day will be the same as today's dose.

Edit Order Set

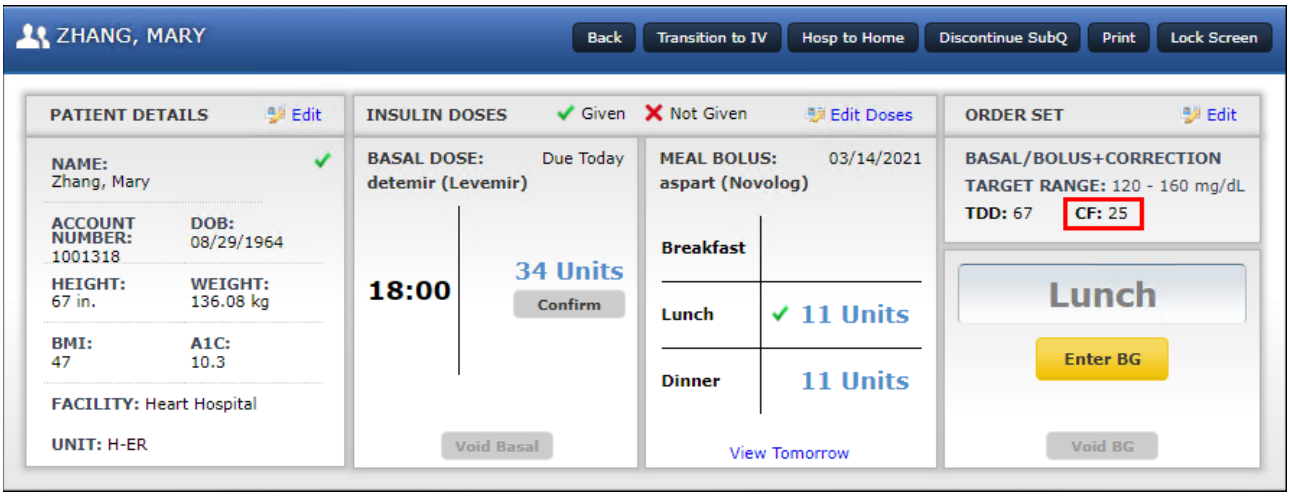
In the **Order Set** section, click **Edit** to access the patient's SubQ insulin order set for editing.





Correction Bolus and Downward Adjustment

Correction Factor (CF)



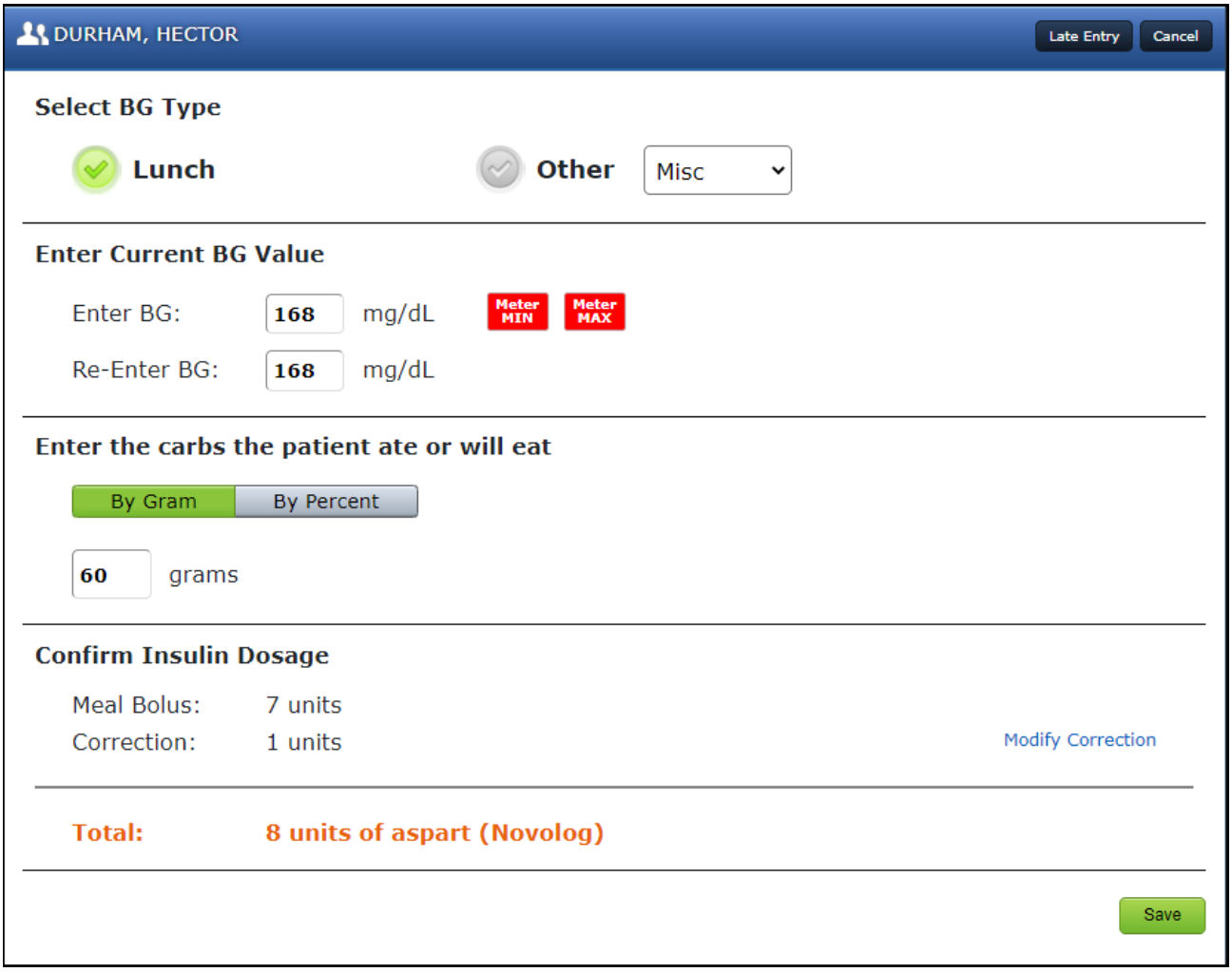
The correction factor (CF) denotes how much one unit of insulin will lower a patient's blood glucose (BG) level. The CF is also used to calculate the subcutaneous correction dose, when BG levels deviate from the midpoint of a patient's assigned target range.

Correction Bolus

In the example below, Glucommander recommends a correction dose. The patient is on SubQ treatment on the Basal/Bolus+Correction order set.

With a Lunch BG of 168 mg/dL, the patient eats 60 grams of the carbohydrates on the tray.

Glucommander recommends administering 7 units for the meal bolus and 1 unit for the correction dose. To modify the correction dose, click **Modify Correction**.



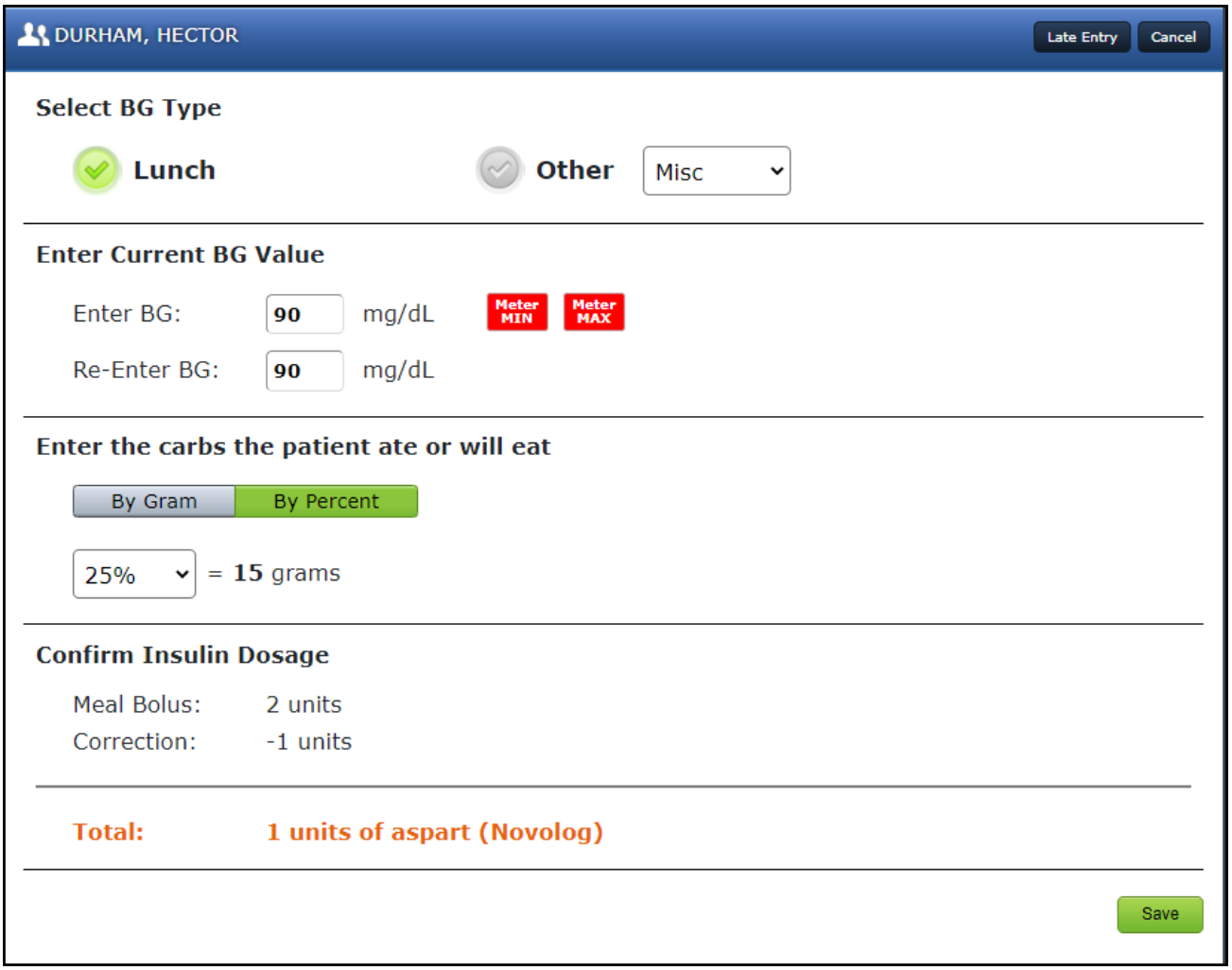
Downward Adjustment

For patients on the Basal/Bolus+Correction order set, a downward adjustment (reverse correction) may be recommended when the BG value is *below* mid-target of the assigned target range. The meal bolus dose will be reduced, and the correction dose will display as a negative value. If the total dose (meal bolus and correction) is a negative value, the recommended dose will be 0 units.

Downward adjustment values (e.g., -2 Units of aspart) cannot be modified; therefore, the **Modify Correction** link will not display.

At Breakfast, the patient's BG is 90 mg/dL. The patient eats 25% of the carbohydrates on the tray, or 15 grams.

Glucommander recommends a downward adjustment of the meal (-1 units) since the patient's Lunch BG (e.g., 90 mg/dL) is *below* mid-target of the assigned target range (e.g., 120 – 160 mg/dL). The total dose is 1 unit because the correction dose is subtracted from the meal bolus amount.



Also, in the patient's Audit History, the downward adjustment is recorded under Show Adjustments:

SubQ History | Notes (1) | History

Previous Admissions

03/17/2023 04:12 BG Data

Number of BGs:	5

Audit History Show Adjustments

User	Description	Date
System	Lunch bolus dose of 2 units adjusted down by 1 unit	2023-03-26 13:48

Basal Adjustments

As with bolus insulin, the initial basal amount is based on parameters ordered by the provider. The basal insulin may be distributed once or twice daily depending on provider order, hospital protocol, and/or insulin type.

Basal insulin doses are adjusted automatically according to the early morning blood glucose (BG) values. For the Basal/Bolus + Correction order set, basal insulin doses are adjusted according to the Midsleep (if enabled), early morning Misc, Recovered BG or Breakfast BG value – whichever is lowest. For the Basal + Correction order set, basal insulin doses are adjusted according to the 06:00 BG value (q6hr schedule), the 04:00 and 08:00 BG values (q4hr schedule), early morning Misc or Recovered BGs – whichever is lowest

For all order sets, if an early morning BG value is not available to adjust the basal insulin dose, Glucommander checks for hypoglycemia BGs (less than 70 mg/dL) since the last basal dose was given. If hypoglycemia BGs were recorded, the dose adjusts according to the lowest hypoglycemia BG.

If no early morning BGs or hypoglycemia BGs are available, the basal dose remains unadjusted.

Basal schedules also adjust automatically to avoid stacking insulin when a provider order changes the distribution from 1 to 2 doses per day, or vice versa.

SubQ BG Recovery

When the SubQ BG Recovery feature is enabled, integrated SubQ BG values received through the interface that meet the criteria will be recovered automatically and can be used to adjust basal insulin dose recommendations. SubQ BG values that qualify:

- Resulted between 10 p.m. the day before the next basal dose is due and 10 a.m. the day the basal dose is due
- Are at least 45 minutes old
- Are less than or equal to the high-end of the patient's target range

Recovered SubQ BG values are not used to adjust bolus insulin doses.

BGs will be recovered only if the basal dose can be adjusted. For example, if the previous basal dose was not administered, BGs will not be recovered.

Recovered SubQ BGs are	Recovered SubQ BGs are not

• Used in the algorithm for basal adjustment if the candidate criteria are met.
• Indicated as black dots on the BG trend graph.
• Displayed on the patient detail page on the **SubQ History** tab, without treatment details.
  o The value and date and time the BG was recorded will display along with a Type of "Recovered." All other columns will display "N/A."
  o If the recovered BG is a hypo, no hypo treatment recommendations will be made and the 15-minute timer will not display.
	• Voidable.
	• Sent back through the charting interface, similar to BGs entered as late entries.

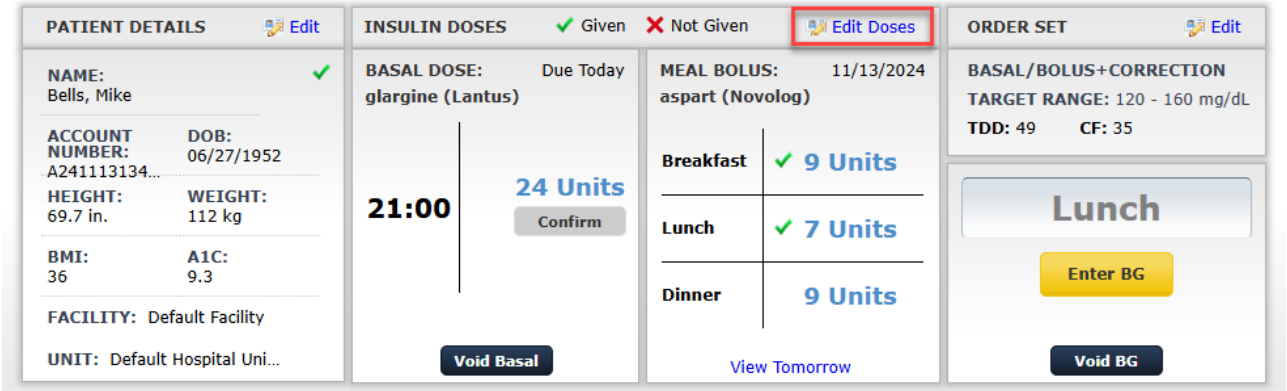
Recovered BGs are indicated by a black dot on the trend graph. The type in the **SubQ History** will be noted as Recovered.

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Hypo Treatment
03/18/2021 07:03	164 mg/dL	Breakfast	N/A	*6 Units of lispro (Humalog)*	*1 Units of lispro (Humalog)*	*7 Units of lispro (Humalog)*	N/A
03/18/2021 02:31	73 mg/dL	Recovered	N/A	N/A	N/A	N/A	N/A
03/17/2021 23:16	85 mg/dL	Recovered	N/A	N/A	N/A	N/A	N/A
03/17/2021 18:02	N/A	Basal	19 Units of glargine (Lantus)	N/A	N/A	N/A	N/A
03/17/2021 15:20	138 mg/dL	Lunch	N/A	6 Units of lispro (Humalog)	0 Units of lispro (Humalog)	6 Units of lispro (Humalog)	N/A

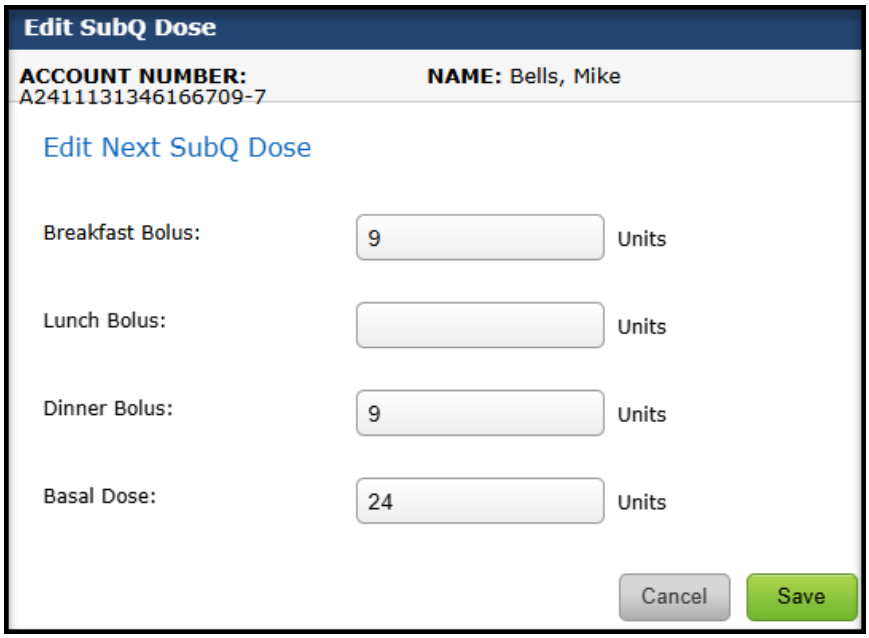
Basal Editing

Recommended Basal Amount

Again, as with meal bolus doses, the user can edit the recommended basal amount for the current day before it is administered using the **Edit Doses** link in the **Insulin Doses** section shown below.



Any changes made to the basal dose amount from this area will affect the subsequent dose calculation.



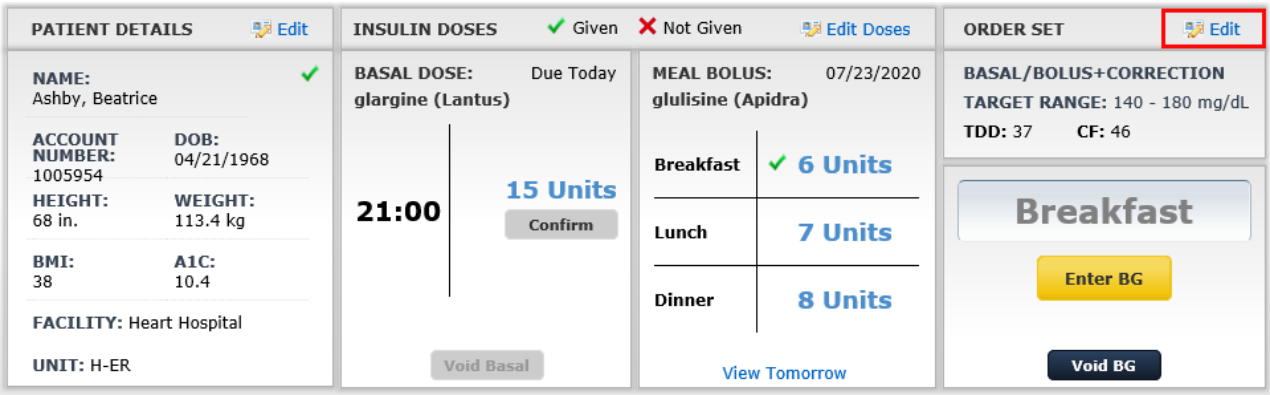
If the basal dose hasn't been calculated, the dose will be blank. The Audit history will also reflect edits that were made prior to the dose calculation. The message will display "Edit Today's / Tomorrow's SubQ Basal dose to XX unit(s) prior to system calculation."

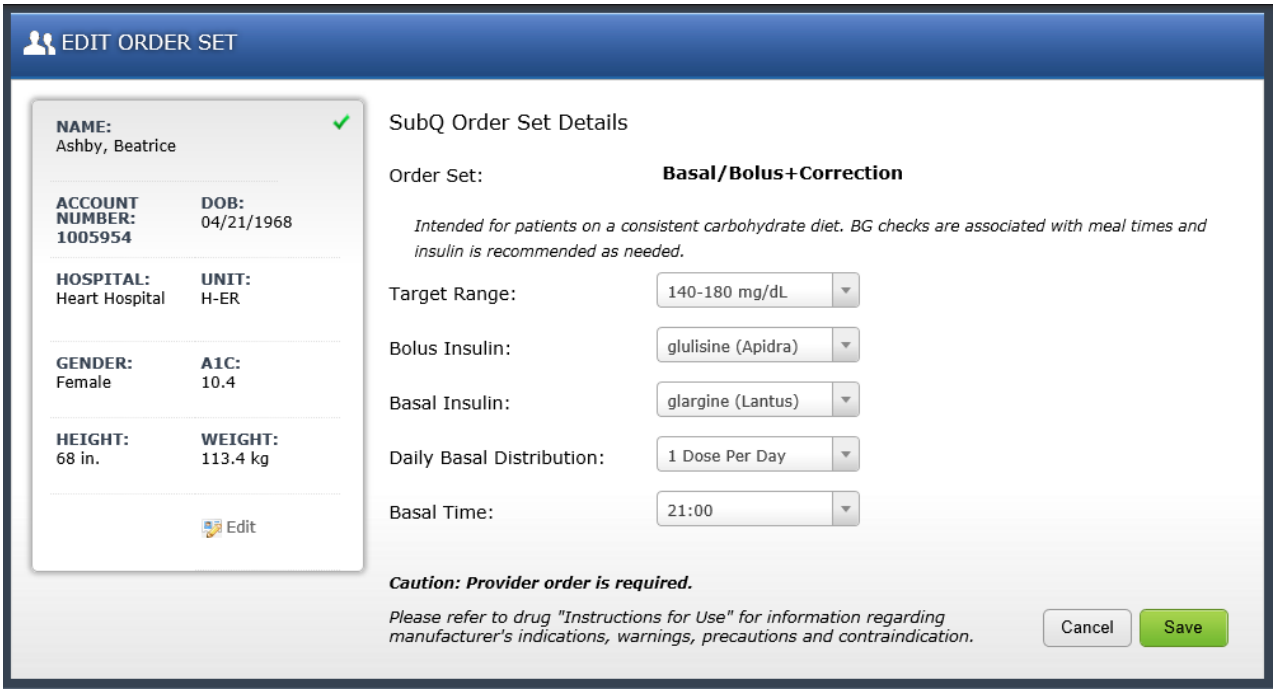
If the next basal dose is the second half of a split dose, the message "You are editing the second half of a split dose" will display. Tomorrow's full basal dose will be adjusted off twice the edited amount.

If the edit will be applied to a dose for tomorrow, once the value is entered in the input field a message will be displayed: "Basal dose edit will be applied to tomorrow's dose"

Basal Distribution and Time

The **Edit** link in the **Order Set** section provides editing access to the basal daily distribution (e.g., 1 or 2 doses per day) and the basal time (e.g., 21:00, 09:00/21:00).





The message, “Edits are currently unavailable” will display at the top of the SubQ Order Set Details page when editing is not allowed.

When changes are made to the basal time or the basal distribution and the **Void Basal** button is enabled after saving the changes, this warning message displays: “Void basal button will be unavailable if basal dose/distribution is edited.”

See the tables below for information on how editing the basal time and the basal distribution will affect subsequent doses in Glucommander.

Basal time change		Example
Time change for 1 dose per day	• There is a 16-hour stacking lockout from the time the last dose was *administered*, not scheduled. • Any doses scheduled within the 16-hour period are skipped. • The "Notify provider of *xx* hr gap in coverage of basal insulin" warning message displays when the gap is 4 hours or greater.	On 09/28/2018 at 22:00, the dose was given. At 23:00, the distribution time is changed to 10:00. The dose on 09/29/2018 is skipped and the next dose will be due at 10:00 on 09/30/2018. The "Notify provider of 12-hour gap in coverage of basal insulin" warning message displays.
Time change for 2 doses per day	• There is an 8-hour stacking lockout from the time the last dose was *administered*, not scheduled. • Any doses scheduled within the 8-hour period are skipped.	The distribution times are changed from 08:00 and 20:00 to 11:00 and 23:00. The first dose is administered at 08:00 today. The basal dose times are edited at 09:00. The next dose is due today (09/29/2018) at 23:00.

Basal distribution change		Example
1 dose per day to 2 doses per day	• There is a 16-hour stacking lockout from the time the last dose was *administered*, not scheduled. • Any doses scheduled within the 16-hour period are skipped. • The "Notify provider of *xx* hr gap in coverage of basal insulin" warning message displays when the gap between the time the last dose was given, and the time of the next scheduled dose is more than 24 hours.	• On 09/29/2018 at 22:00, the dose is given. Afterwards, the distribution is changed from 1 dose per day (22:00) to 2 doses per day (10:00 and 22:00). On 09/30/2018, the 10:00 dose is skipped and the 22:00 dose is given. • On 09/29/2018 at 11:00, the dose is not given. The distribution is changed from 1 dose per day (11:00) to 2 doses per day (10:00 and 22:00). On 09/30/2018, the next dose due is at 10:00. No dose is skipped in this example.

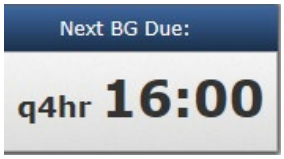
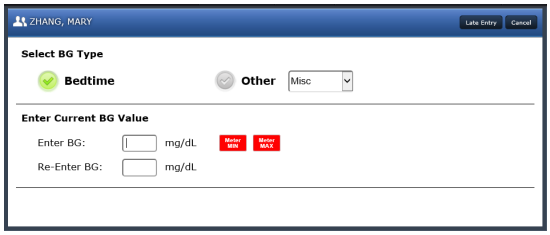
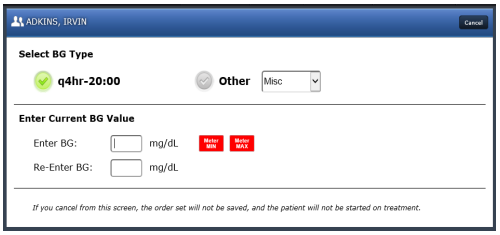
Basal distribution change		Example
2 doses per day to 1 dose per day	• There is a 16-hour stacking lockout from the time the last dose was *administered*, not scheduled. • If the distribution change causes the dose to fall: *Within the 16-hour period*: ○ A half dose is given at the new distribution time and the full dose will start the next day and will be unadjusted from the half dose. *Outside the 16-hour period*: ○ The full dose is given at the new distribution time. • If a dose is edited after the distribution change and the next dose is a half dose, the edit is a one-time dose. The full dose on the subsequent dose is based on the pre-edited amount.	*Less than 16 hours since last dose*: • On 09/29/2018 at 08:00, the dose is given. Afterwards, the distribution is changed from 2 doses per day (08:00 and 22:00) to 1 dose per day (22:00). On the same day, 09/29/2018, a half dose is given at 22:00. On 09/30/2018 at 22:00, the full unadjusted dose is given. • On 09/29/2018 the 09:00 and 21:00 doses were given. Afterwards, the distribution is changed from 2 doses (09:00 and 21:00) to 1 dose per day (21:00). On 09/30/2018 at 21:00, the full adjusted dose is given. *More than 16 hours since last dose:* • On 09/29/2018 the 10:00 and the 22:00 doses are not given. Afterwards, the distribution is changed from 10:00/22:00 to 23:00. At 23:00 the full dose is given.

Basal+Correction and Basal/Bolus+Correction Order Sets

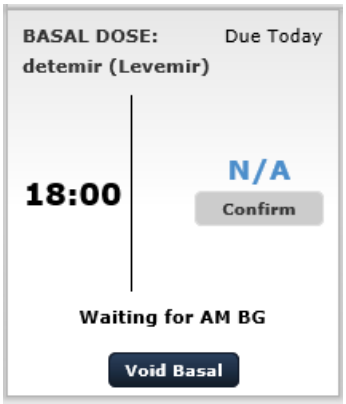
When you start a patient on subcutaneous (SubQ) treatment or begin transitioning a patient to SubQ from IV treatment, one of the possible options is the Basal/Bolus+Correction order set. This order set ensures the patient is on a dosing schedule that supports regular mealtimes (Breakfast, Lunch, etc.) complemented by 1–2 daily doses of basal insulin delivered at preset times, plus correction doses available as needed.

Basal+Correction is another order set available for SubQ treatment. The typical patient assigned the Basal+Correction order set is NPO. Because the patient is not eating food, a different dosing schedule is required. The q4hr and q6hr scheduling options associated with Basal+Correction ensure the patient has regular blood glucose (BG) checks and receives scheduled correction doses if needed.

Here are the main differences between the Basal/Bolus+Correction and Basal+Correction order sets:

	Basal/Bolus+Correction	Basal+Correction
Dosing Schedule	 The mealtime for the next BG reading appears on both the dashboard and patient detail page.	 The q4hr or q6hr time for the next BG reading appears on both the dashboard and patient detail page.
BG Types	 The Basal/Bolus+Correction patient has BG types to accommodate meal bolus and correction doses.	 The Basal+Correction patient has BG types to accommodate q4hr or q6hr scheduled and unscheduled correction doses.
Basal/Bolus Percentage	 In weight-based calculation, basal and bolus make up 100% of the starting TDD. As the basal % increases, the bolus % decreases, and vice versa.	 The basal % of starting TDD is variable (40–100%) but has no effect on bolus %, which is always 0% because there are no meal boluses.

	Basal/Bolus+Correction	Basal+Correction
Weight-based	Based On: Weight TDD Multiplier: 0.50 Total Daily Dose: 40 Units Basal % of TDD: 50% Bolus % of TDD: 50% Weight-based: The TDD multiplier and patient's weight are used to calculate the initial TDD. In this example, 40 units.	Based On: Weight TDD Multiplier: 0.50 Total Daily Dose: 40 Units Basal % of TDD: 50% Weight-based: The TDD multiplier and patient's weight are used to calculate the initial TDD. After initiation on therapy, GM calculates the TDD by doubling the basal dose.
Custom	Based On: Custom Dose Total Basal Dose: 21 Units Breakfast Bolus Dose: 7 Units Lunch Bolus Dose: 7 Units Dinner Bolus Dose: 7 Units Custom Dose: Custom basal and bolus doses are combined to equal the starting TDD — in the example, 42 units.	Based On: Custom Dose Total Basal Dose: 21 Units Custom Dose: Basal dose is doubled to equal the starting TDD —in the example, 42 units.

	Basal/Bolus+Correction	Basal+Correction
Basal Adjustment		
	Today's basal amount is calculated only after the candidate BG values (Midsleep; if enabled; an early morning Misc; and/or Breakfast) have been entered. An exception is when the previous day's basal dose is skipped or missed; then the basal amount stays the same, and a Breakfast BG is not required.	Today's basal amount is calculated only after the candidate BG values (early morning BG for the q4hr or q6hr time) have been entered. An exception is when the previous day's basal dose is skipped or missed; then the basal amount stays the same, and a q4hr or q6hr time is not required.

A patient on the Basal/Bolus+Correction order set cannot be switched over to the Basal+Correction order set or vice versa.

Alerts in SubQ

- **Timer type** – Instead of the countdown timer used in the intravenous (IV) module, the subcutaneous (SubQ) module uses a meal timer. The meal timer manages a sequence of mealtime intervals (Breakfast, Lunch, Dinner, Bedtime, Midsleep) for the accurate recording of subcutaneous (SubQ) blood glucose (BG) entries. If the order set type selected is Basal+Correction, another type of timer is used based on q4hr or q6hr schedules.

- **Alerting** – Unlike IV, the SubQ module does not issue reminder alerts when a BG reading is overdue.

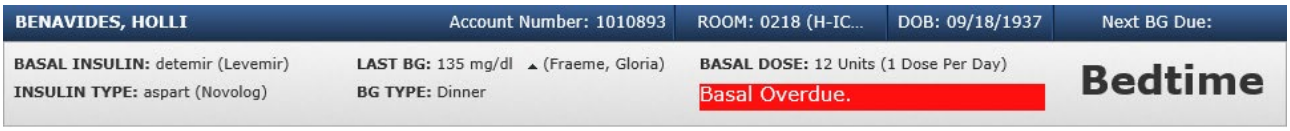
  In two cases, the subcutaneous module does issue alerts:

  - Following entry of a hypoglycemic BG value (< 70 mg/dL), the SubQ module initiates a 15-minute countdown timer. If this timer expires before another BG value is entered, Glucommander issues a "BG DUE!" alert similar to IV.

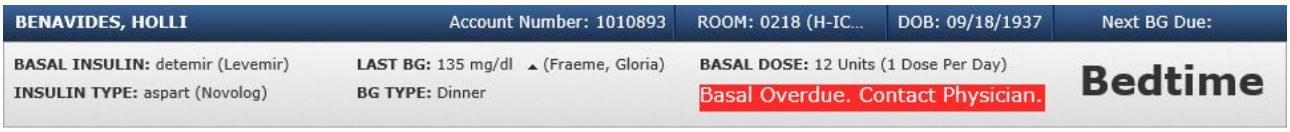
  - Like meal bolus doses, basal doses are supposed to be given on a preconfigured schedule within Glucommander. When a basal dose is overdue, Glucommander issues a series of reminder messages

As soon as the basal dose is one minute late – for example, at 22:01 – an audible alarm starts. On the dashboard (Current Patients page), a series of messages display as the basal dose gets progressively later. These messages are accompanied by an audible alarm:

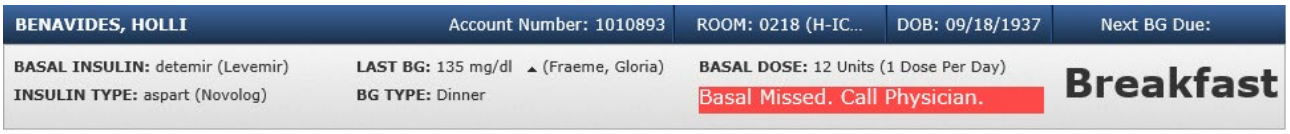
Basal Overdue. – The basal dose was not given within 2 hours after the scheduled basal time.



Basal Overdue. Contact Physician – More than 3 hours have elapsed since the basal was due.



Basal Missed. Call Physician – The basal dose was late by more than half the time to the next scheduled basal. For example, the patient has basal doses scheduled for 08:00 and 20:00, and the 08:00 basal is not given by 14:00.

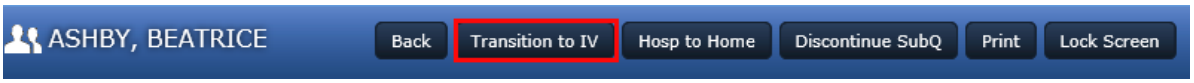


Transition to IV

On occasion, when a patient is on subcutaneous (SubQ) therapy, it may be necessary to transition the patient to intravenous (IV) insulin. Use the **Transition to IV** option to move a patient from SubQ to IV therapy.

While on the patient detail page:

1. Click **Transition to IV**.

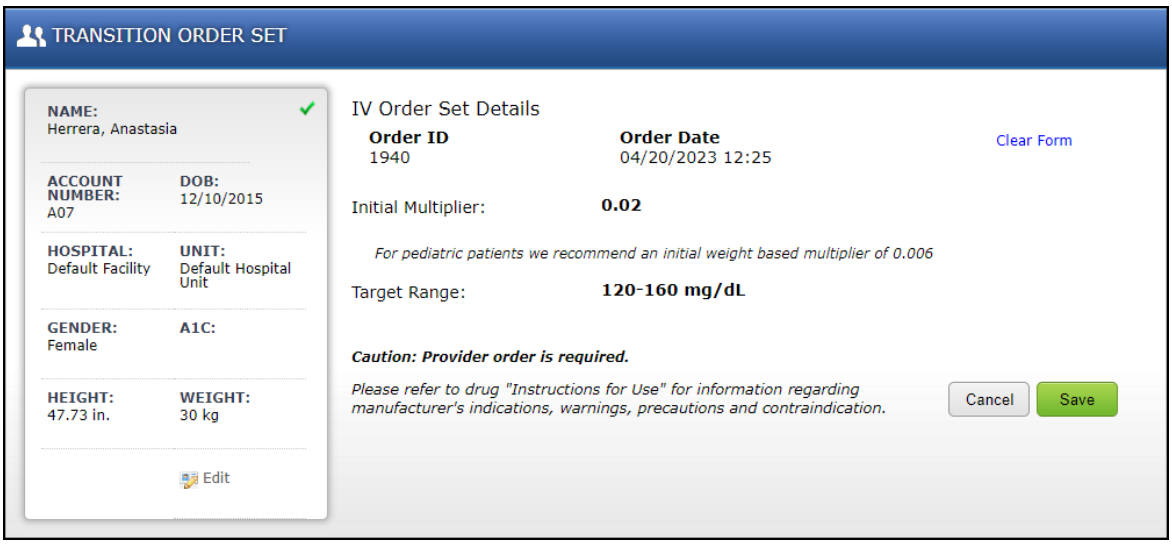


The Transition Order Set page displays.

> A provider must order the starting parameters to transition to IV.

> If Order Set Integration is enabled, Glucommander will receive order set parameters through the interface with the EMR. The Transition Order Set page displays the parameters received from the EMR in a read only format. See *Complete IV Order Set Initiated in EMR*.
>
> If Order Set Integration is disabled, Glucommander will not receive order set parameters through the interface with the EMR. See *Verify IV Order Set Manually (Order Set Integration Disabled)*.

2. Click **Save**.



3. Follow the normal IV workflow for entering a BG and determining the infusion rate. See *Enter IV BG Value*.

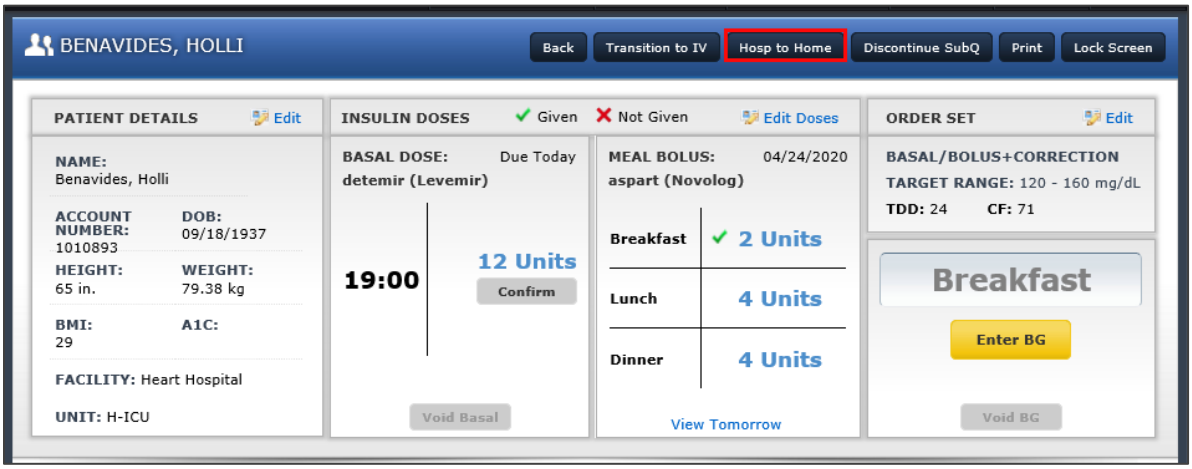
Hospital to Home (H2H®)

With the Hospital to Home (H2H®) feature, Glucommander provides at-home SubQ dosing considerations for a patient based on their SubQ treatment in the hospital. Patients brought under good glycemic control while on Glucommander SubQ treatment can benefit from dosing guidance based on that treatment to maintain control after they have returned home.

An important part of the Hospital to Home feature is the user's ability to print any of the displayed treatment considerations.

To access the Hospital to Home feature, on the SubQ patient detail page:

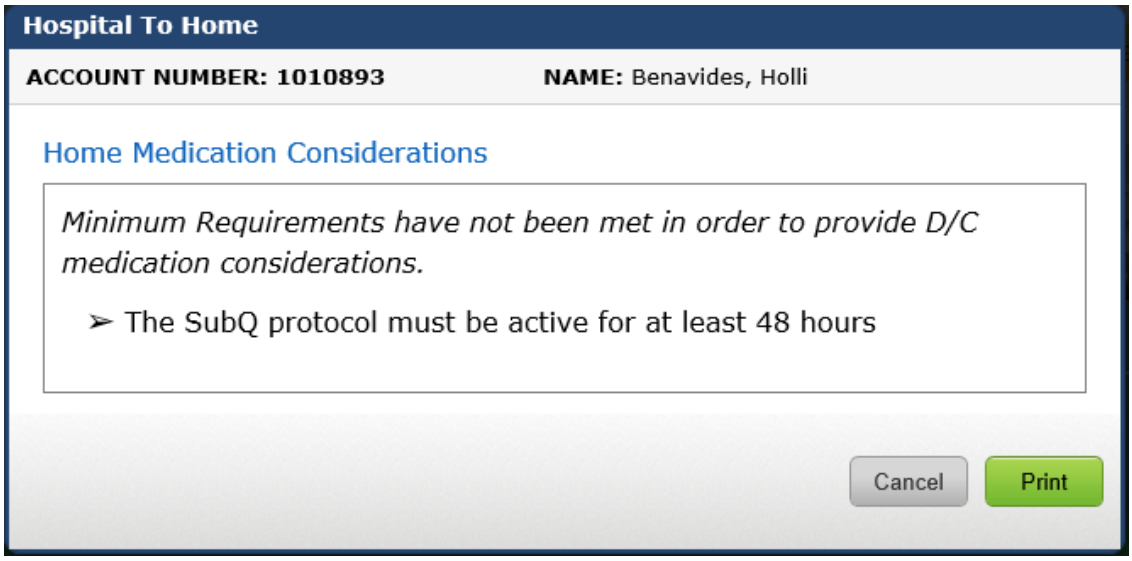
1. Click **Hosp to Home**.



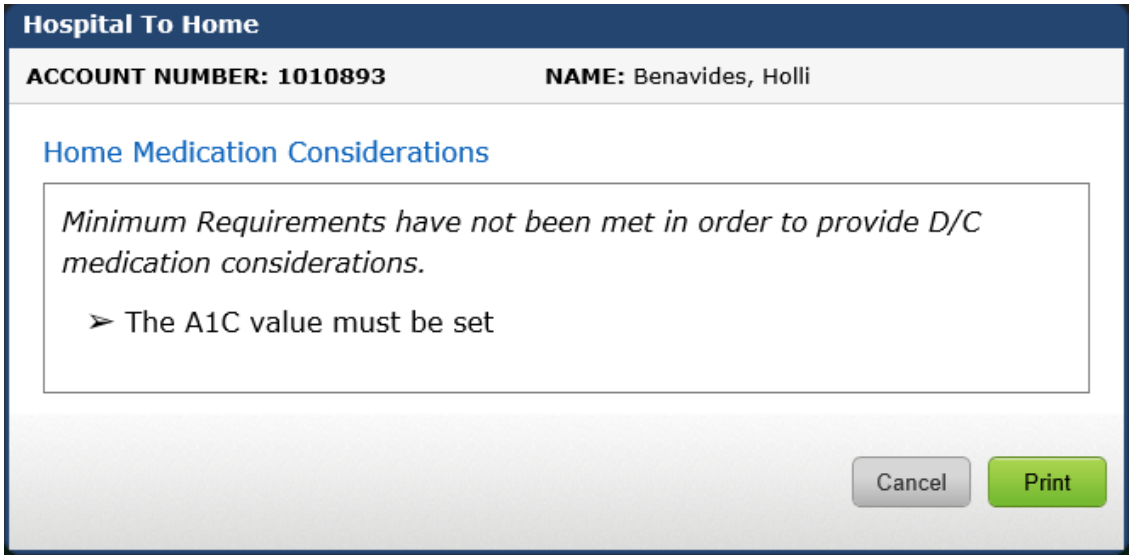
The system will determine the patient's qualification for at-home SubQ dosing considerations.

2. If the patient does not meet one or more of the prerequisite conditions, the following messages will display:

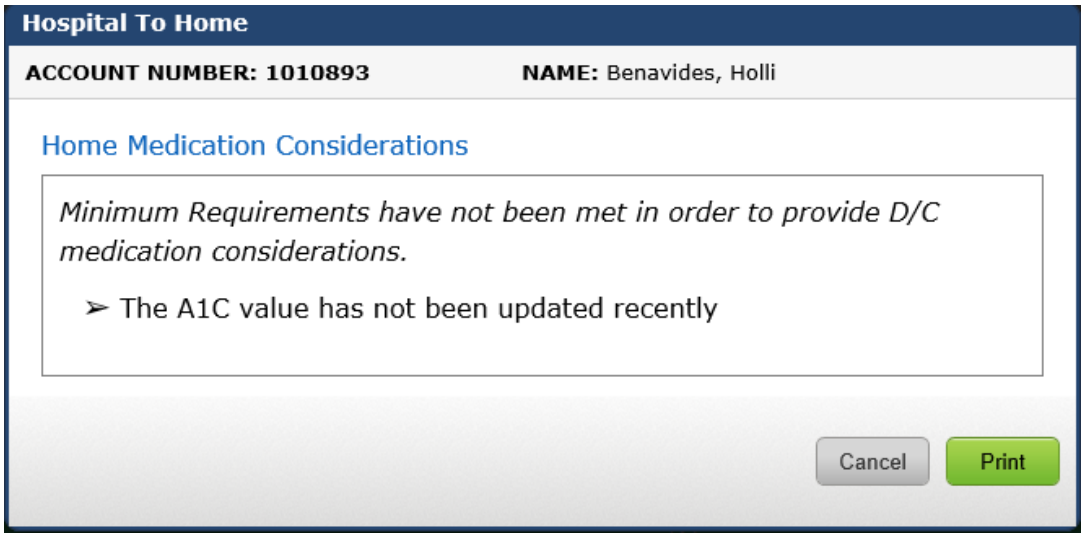
   - Patient must be active for at least 48 hours:



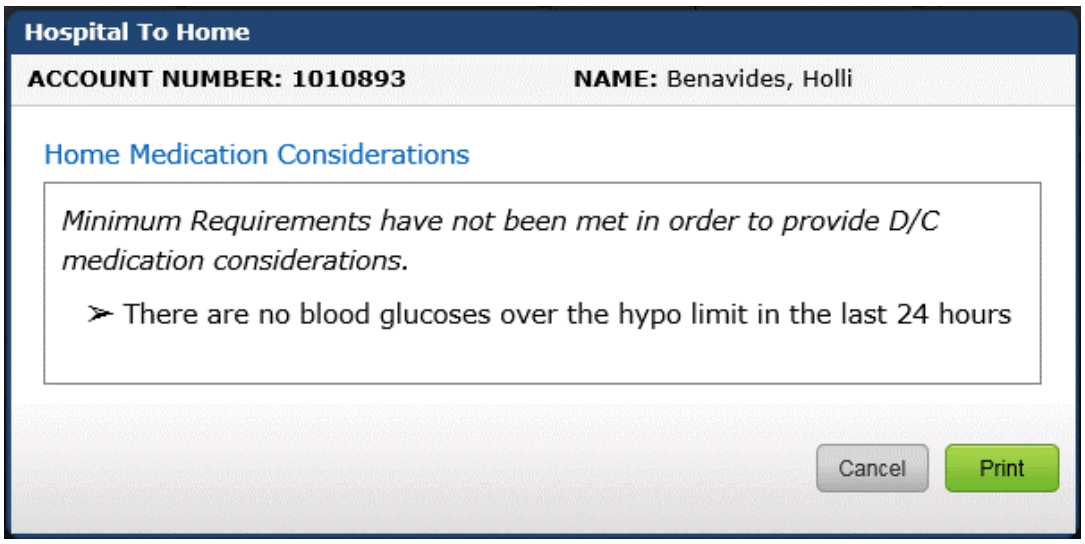
   - Patient does not have an A1c value:



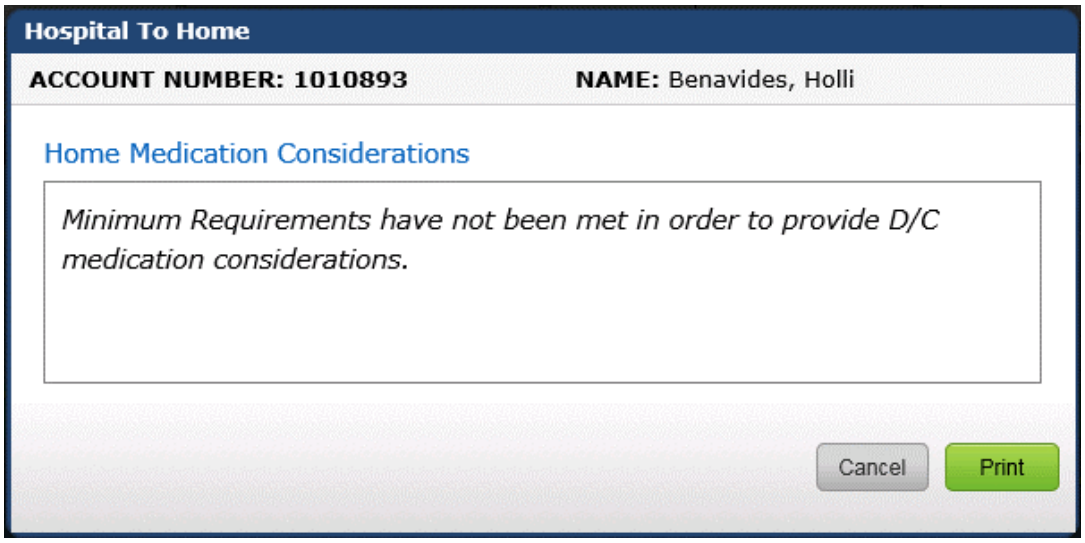
- Patient's A1c value is more than 60 days old:



- Patient has no BGs greater than 70 mg/dL over the last 24 hours:

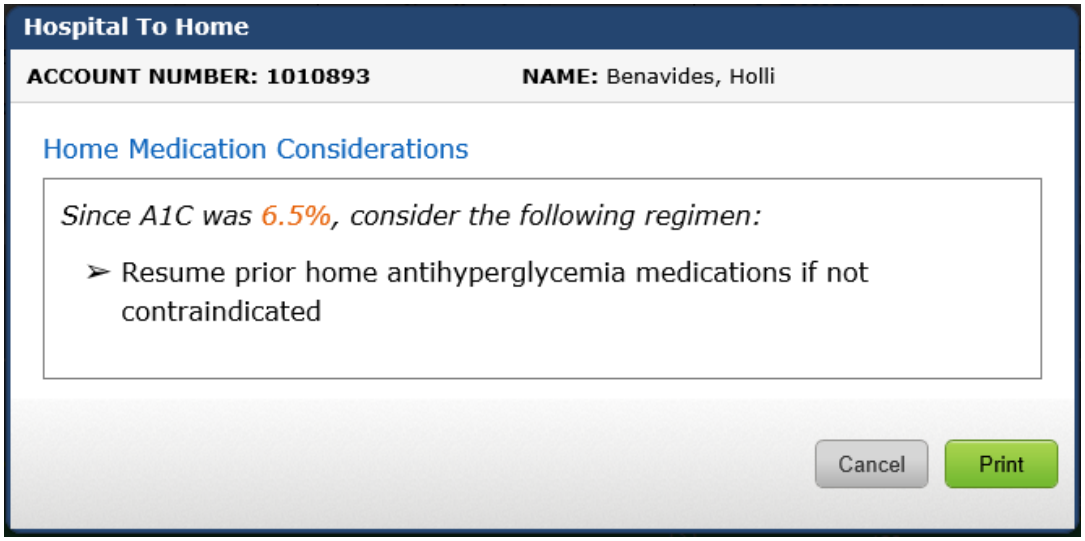


- Patient has not met two or more of the prerequisite conditions:



3. If the patient meets all the prerequisite conditions, proceed to the step below.
4. Within the last 24 hours of treatment, if the patient has at least one BG within the 70-180 mg/dL range, and the patient's A1c value is:

- Less than 7%, consider the following at-home treatment option (example shown):



A1c values containing greater than (>) or less than (<) symbols can be used in the following instances:

- < with values 1-7
- > with values 9 or above

- Between 7 and 9%, consider the following at-home treatment option (example shown):

Hospital To Home

ACCOUNT NUMBER: 1010893 **NAME:** Benavides, Holli

Home Medication Considerations

Since A1C was 8.0%, consider the following regimen:

- Resume prior home antihyperglycemia medications if not contraindicated
- Add basal insulin: 7 units at bedtime or 4 units BID

The above insulin dose is 50% of current dose on Glucommander

Cancel Print

- Greater than 9%, consider the following at-home treatment option (example shown):

Hospital To Home

ACCOUNT NUMBER: 1010893 **NAME:** Benavides, Holli

Home Medication Considerations

Since A1C was 10.0%, consider the following regimen:

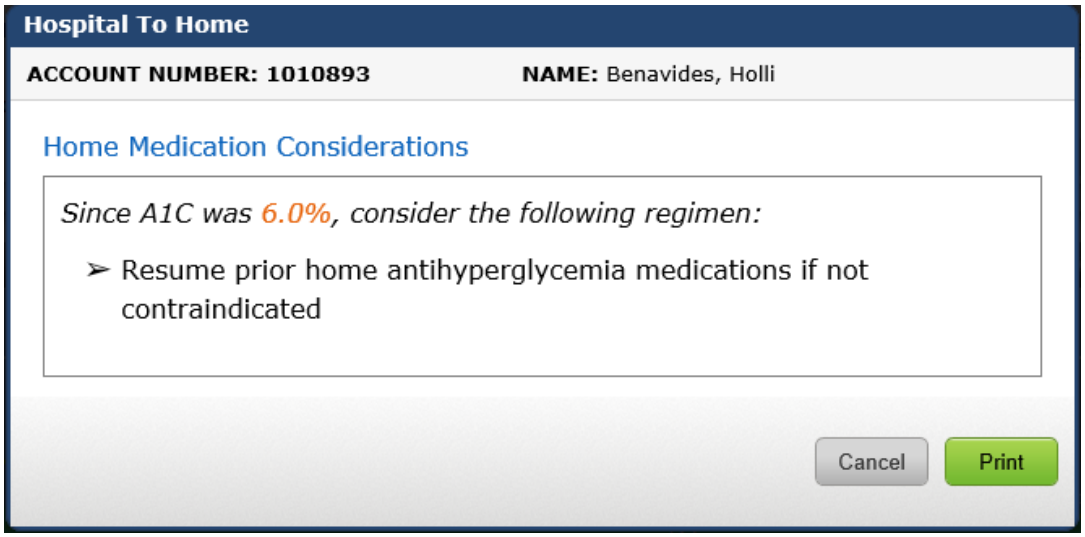
- Resume Metformin if not contraindicated
- Stop all other prior home antihyperglycemia medications
- Add basal insulin: 10 units at bedtime or 5 units BID
- Add bolus insulin:
  3 units before breakfast
  3 units before lunch
  3 units before dinner

The above insulin dose is 80% of current dose on Glucommander

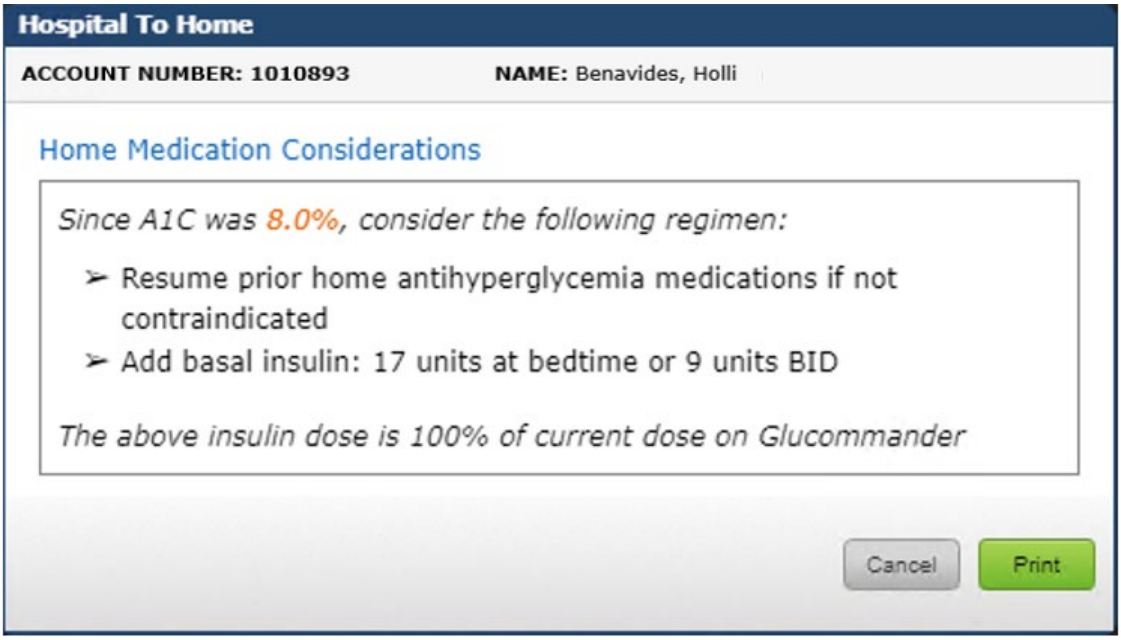
Cancel Print

5. Within the last 24 hours, if all the patient's BGs are greater than 180 mg/dL, and the patient's A1c value is:

   - Less than 7%, consider the following at-home treatment option (example shown):



   - Between 7 and 9%, consider the following at-home treatment option (example shown):



- Greater than 9%, consider the following at-home treatment option (example shown):

Hospital To Home

ACCOUNT NUMBER: 1010893 **NAME:** Benavides, Holli

Home Medication Considerations

Since A1C was 10.0%, consider the following regimen:

- Resume Metformin if not contraindicated
- Stop all other prior home antihyperglycemia medications
- Add basal insulin: 17 units at bedtime or 9 units BID
- Add bolus insulin:
  8 units before breakfast
  7 units before lunch
  6 units before dinner

The above insulin dose is 100% of current dose on Glucommander

Cancel Print

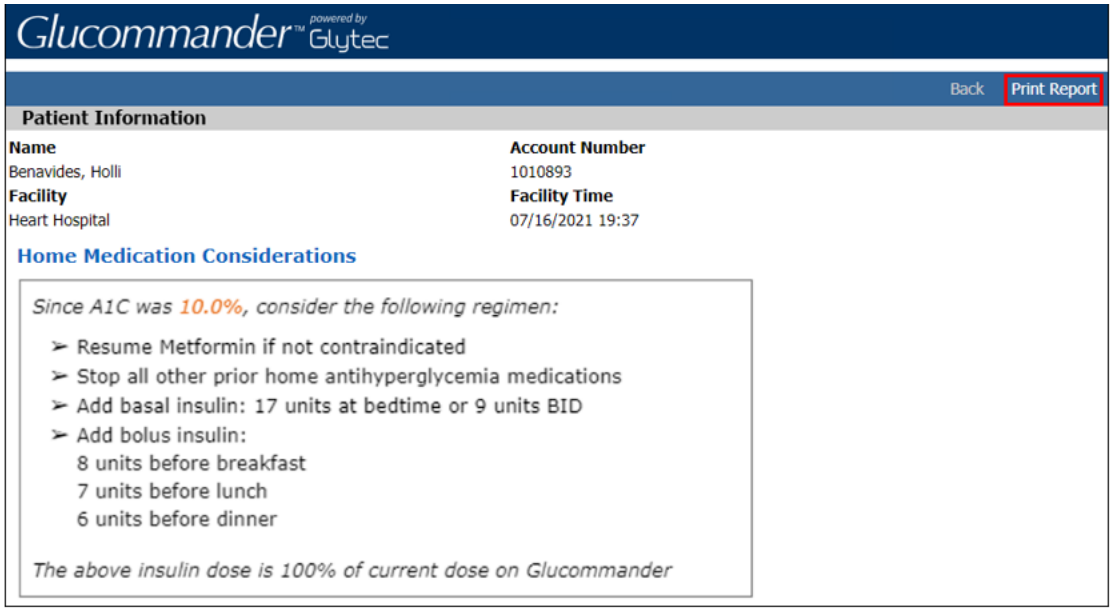
Contraindications mentioned in the Hospital to Home considerations are based on established clinical practice.[2] The provider who orders Hospital to Home should be aware of and factor in any contraindications that apply to the patient's treatment.

The patient must still be active on treatment for the Hosp to Home button to be available to access.

Hospital to Home considerations are not available for patients on the Basal+Correction order set.

[2] Umpierrez, G.E., et al. (2014). Hospital Discharge Algorithm Based on Admission HbA1C for the Management of Patients With Type 2 Diabetes. *Diabetes Care*, *37*(11), 2934-2939.

6. Click **Print** on any Hospital to Home message to view a report containing all home medication considerations information plus the time that Glucommander generated the information. The time is the local time at the patient's facility. The facility where the patient is currently located, and the time of that facility are also displayed.



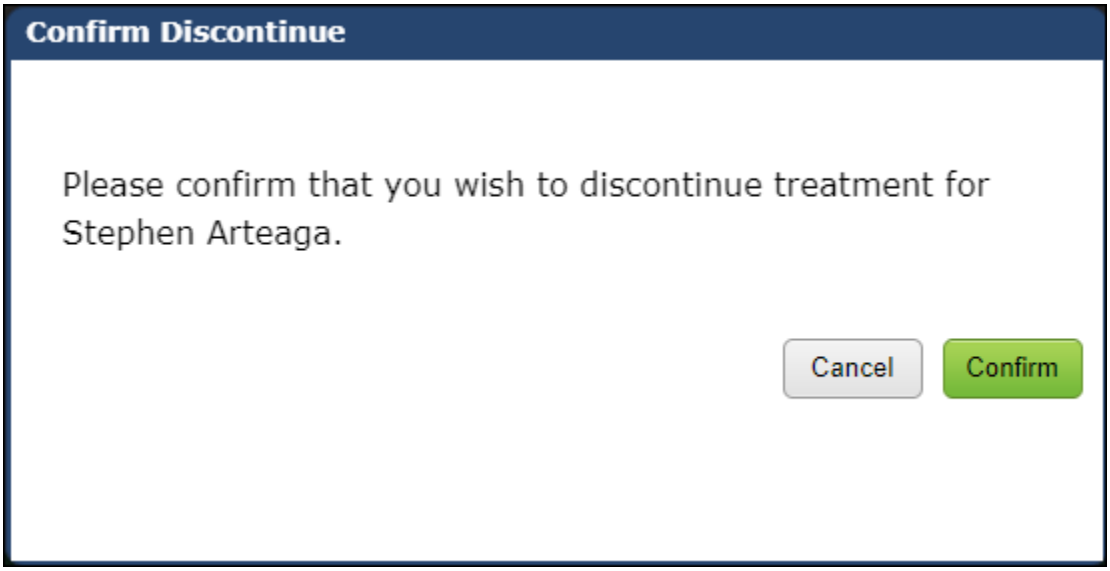
Discontinue SubQ

The Discontinue SubQ button discontinues a patient from SubQ therapy in Glucommander, but does not affect the patient's admission status within the hospital. Patients remain available for treatment until they are discharged through the hospital's Admission/Discharge/Transfer (ADT) system.

To discontinue treatment, on the patient detail page:

1. Click **Discontinue SubQ**.

2. Click **Confirm**.

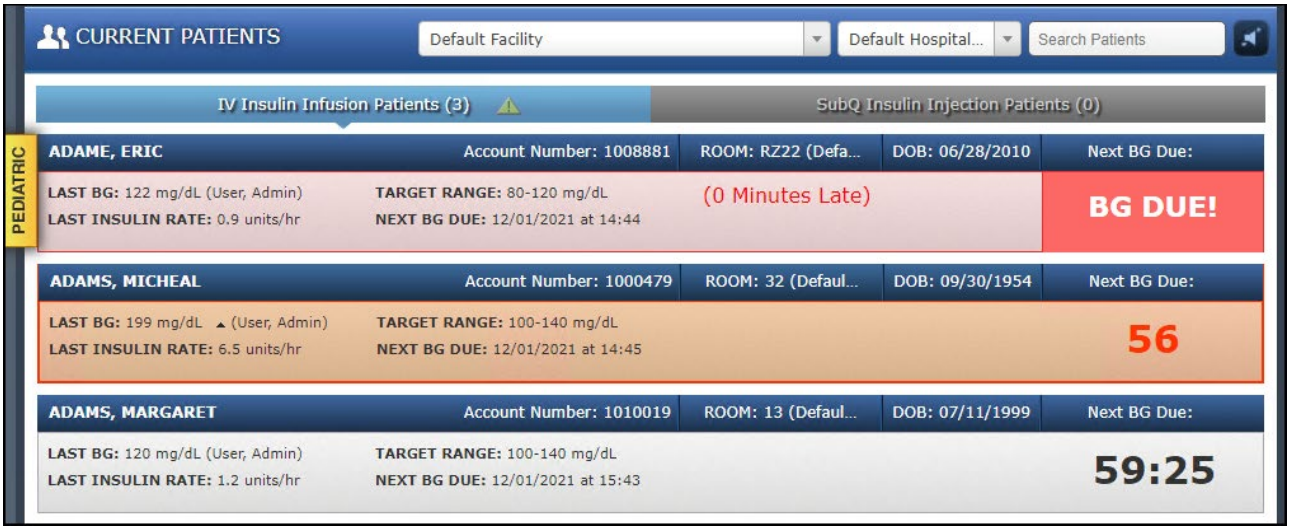


The patient is discontinued and no longer appears on the dashboard (Current Patients page).

Patient Access, Control, and Communication

Dashboard

The dashboard (or Current Patients page) lists all patients currently receiving insulin treatment within Glucommander. This includes patients on both intravenous (IV) and subcutaneous (SubQ) options, as well as pediatric patients on either option. You can tab back and forth between patients on IV and SubQ therapy. Pediatric patients are prominently identified on both tabs with a Pediatric label.



At the top of the page, two dropdown fields list facilities (hospitals) and units. Depending on your access rights, you can view patients in a facility and unit by making selections in these boxes. (For a list of user roles and access rights, see *Role Names*.) The page also has a search box where you can input a name or identifier to perform a patient search. Before searching, remember to select the appropriate hospital unit from the drop-down box.

If the Sticky Dashboard Features setting is enabled, the selections you make in the facility (hospital) or unit drop-down boxes to filter patients will remain when you navigate away from the dashboard or log out of Glucommander.

The background color of each listed patient changes depending on patient status. For example, the background is:

- White when no blood glucose (BG) entry is due
- Amber when a BG entry is due in less than 5 minutes or when IV is paused and within 15 minutes of requiring new orders
- Red when a “BG DUE!” message appears

A countdown timer indicates the time remaining until the next BG entry is due. Alternatively, for patients on subcutaneous treatment, a BG label (e.g., Breakfast, q6hr 18:00) appears in the Next BG Due area.

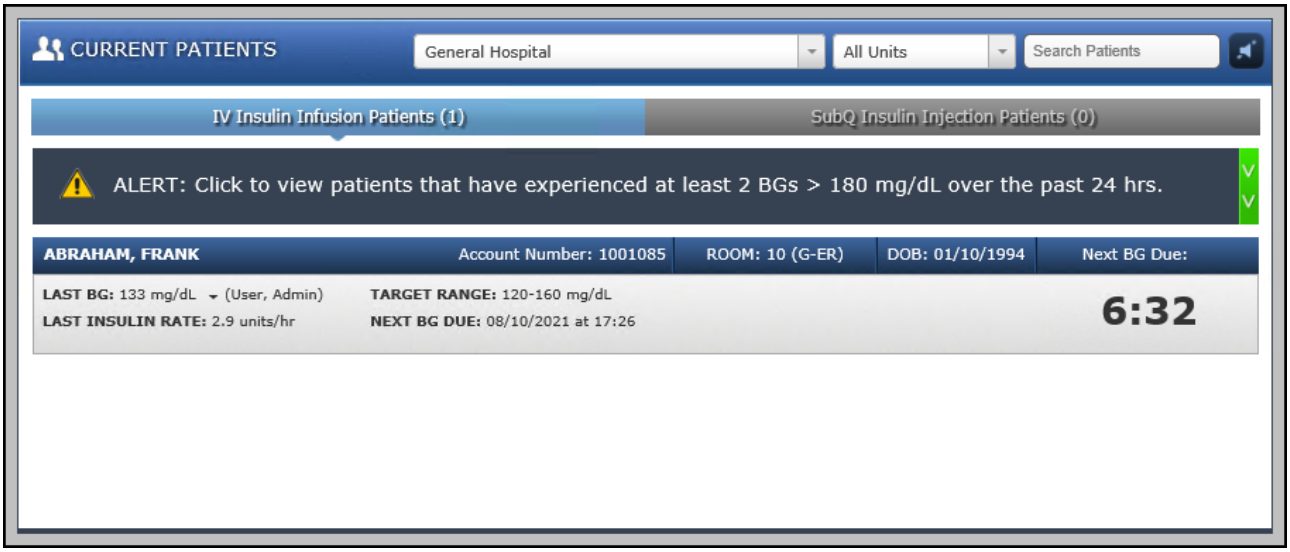
Trend arrows appear when a patient's BG is trending either up or down towards the predetermined target range. Located to the right of the last BG value, the trend arrow appears only if a patient's BG is outside the predetermined target range; in other words, it does not appear after every BG value is entered.

A configurable Silence All Alarms feature can be either enabled or disabled. If the feature is enabled, and when the Silence All Alarms button ( ) is clicked, the user is asked to confirm temporary silencing of the audible alarm for the configured interval (1–60 minutes).

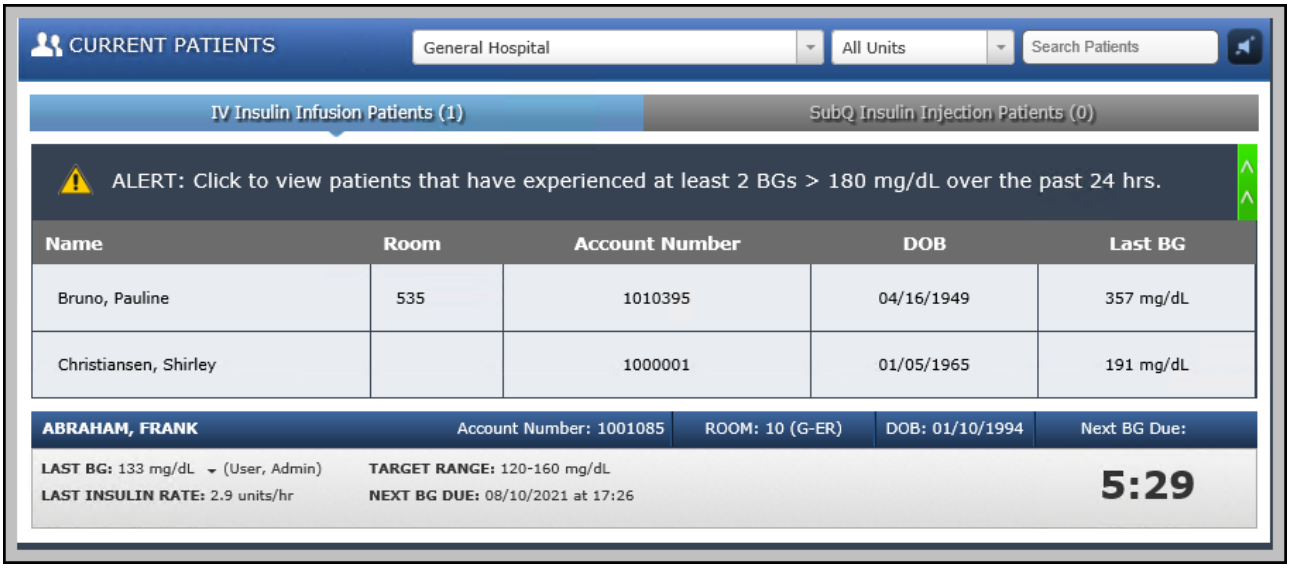
GlucoSurveillance®

GlucoSurveillance® alerts you to the existence of patients who show a predisposition to hyperglycemia and who would most benefit from insulin treatment on Glucommander. The GlucoSurveillance panel displays patients with at least 2 BGs > 180 mg/dL over the past 24 hours and is viewable from both the IV and SubQ tabs.

To use GlucoSurveillance, an ADT/LIS interface is required.

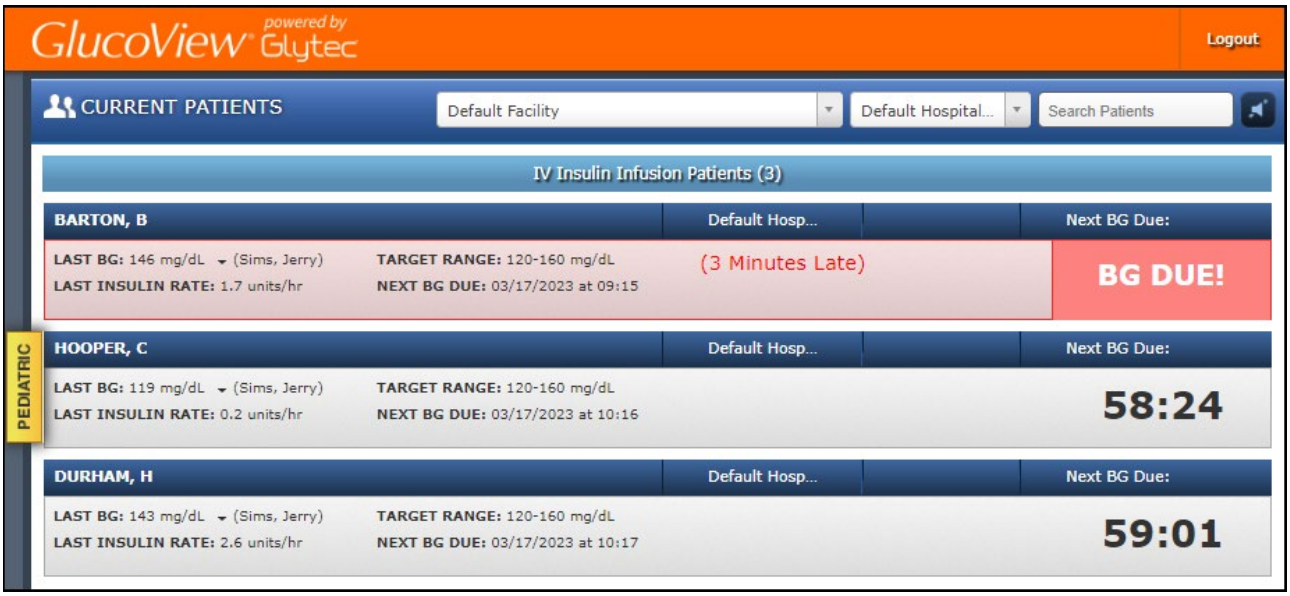


Click the green downward arrows on the right side of the alert panel to view the patients who meet the criteria. To hide the patients, click the green upward arrows.



GlucoView®

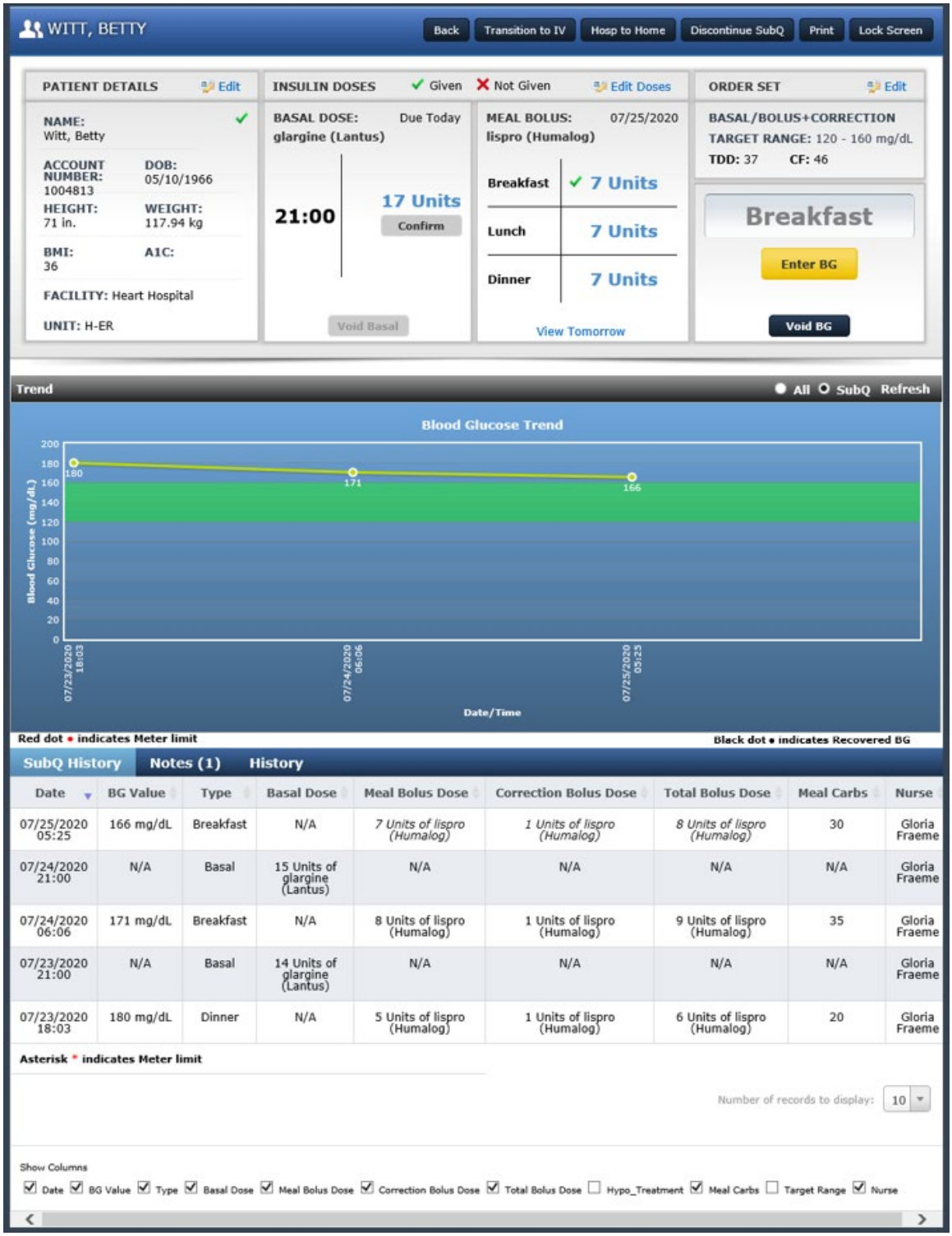
GlucoView® is a Glucommander feature that may prove useful to clinicians who have a need only to view patient status. In GlucoView, patients are identified by only a subset of information, such as last name and first initial. Also, and most importantly, users can only view patient status, not interact with or affect it. Facilities desiring an observational hub for their glycemic management efforts may wish to make GlucoView a focal point of their Glucommander configuration.



Currently, GlucoView provides a view of intravenous patients only. This includes intravenous patients transitioning to subcutaneous treatment.

Patient Detail

Each patient has an individualized patient detail page containing demographic and treatment related information. It displays a blood glucose (BG) trend graph as well as treatment history.



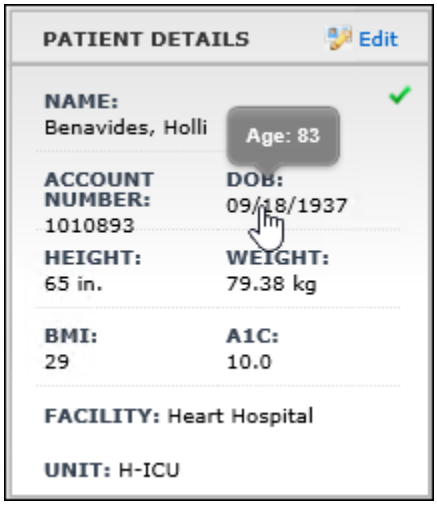
Patient Detail – Actions and Other Areas

From the patient detail, a user has the following options for interacting with patient information:

- Edit – Update patient information
- Back – Go back to dashboard (Current Patients page)
- Void BG – Withdraw BG entered for patient within last 10 minutes
- Void Basal – Withdraw last basal dose entered for patient
- Transition to SubQ, Transition to IV – Move patient to subcutaneous (SubQ) or intravenous (IV) insulin
- Hospital to Home – Provide options for at-home treatment considerations following SubQ treatment on Glucommander
- Discontinue IV, Discontinue SubQ – Take patient off IV or SubQ insulin
- Print – Print selected patient data
- Lock Screen – Lock screen used to display Glucommander
- IV History – View history of patient's IV treatment
- SubQ History – View history of patient's SubQ treatment
- Notes – View and add notes about patient
- History – View history of patient's admissions
- Audit History – View all user actions performed during patient treatment, including edits

Tooltips

Some fields on the patient detail provide information via tooltips. Hover over the fields in this area to see what information is available.



Integration Status

An integration status icon appears in the demographics sections of the order set page and patient detail page. Integration is available only for patients who have both the MRN and MRN assigning authority sent from the Electronic Medical Record (EMR). If integration is available, a green check mark (✓) is displayed in this area. If any of the patient identification information is missing, integration is not available and a red **x** is displayed. You can hover over the icon to view a tooltip indicating the patient's integration status.

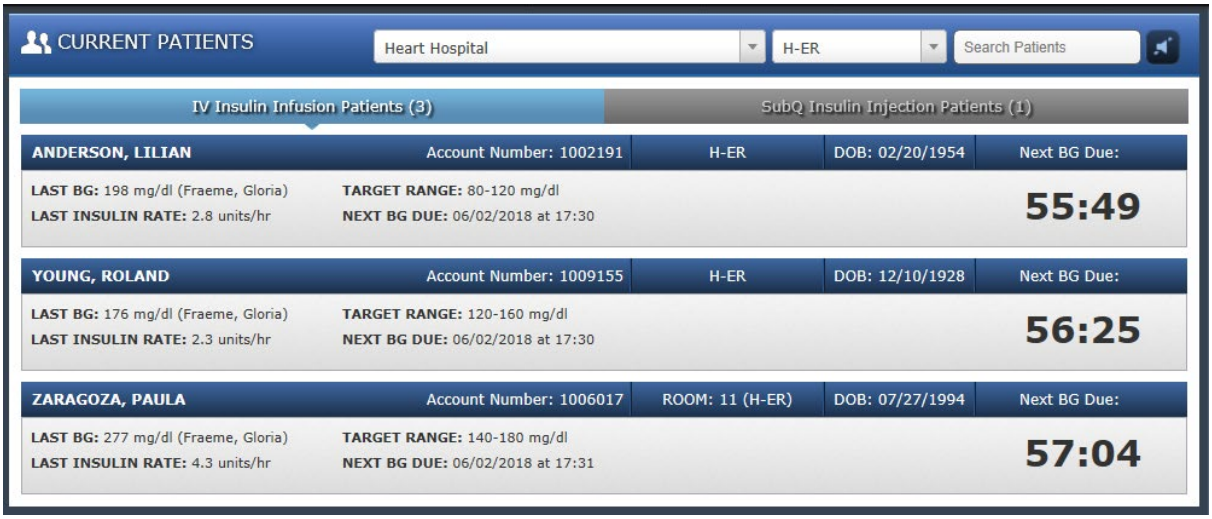
Note: The integration status icon does not indicate real-time status of the interfaces. Instead, it indicates whether the patient is eligible to receive updates to ADT, Labs, Orders, or Medication Confirmation through integration.

Back

Use the Back feature to quickly return to the dashboard (Current Patients page) from the patient detail page.

1. On the patient detail page, click **Back**.

2. You should return to either the **IV Insulin Infusion Patients** tab or **SubQ Insulin Injection Patients** tab on the dashboard (Current Patient page) — whichever tab you accessed the patient detail from.

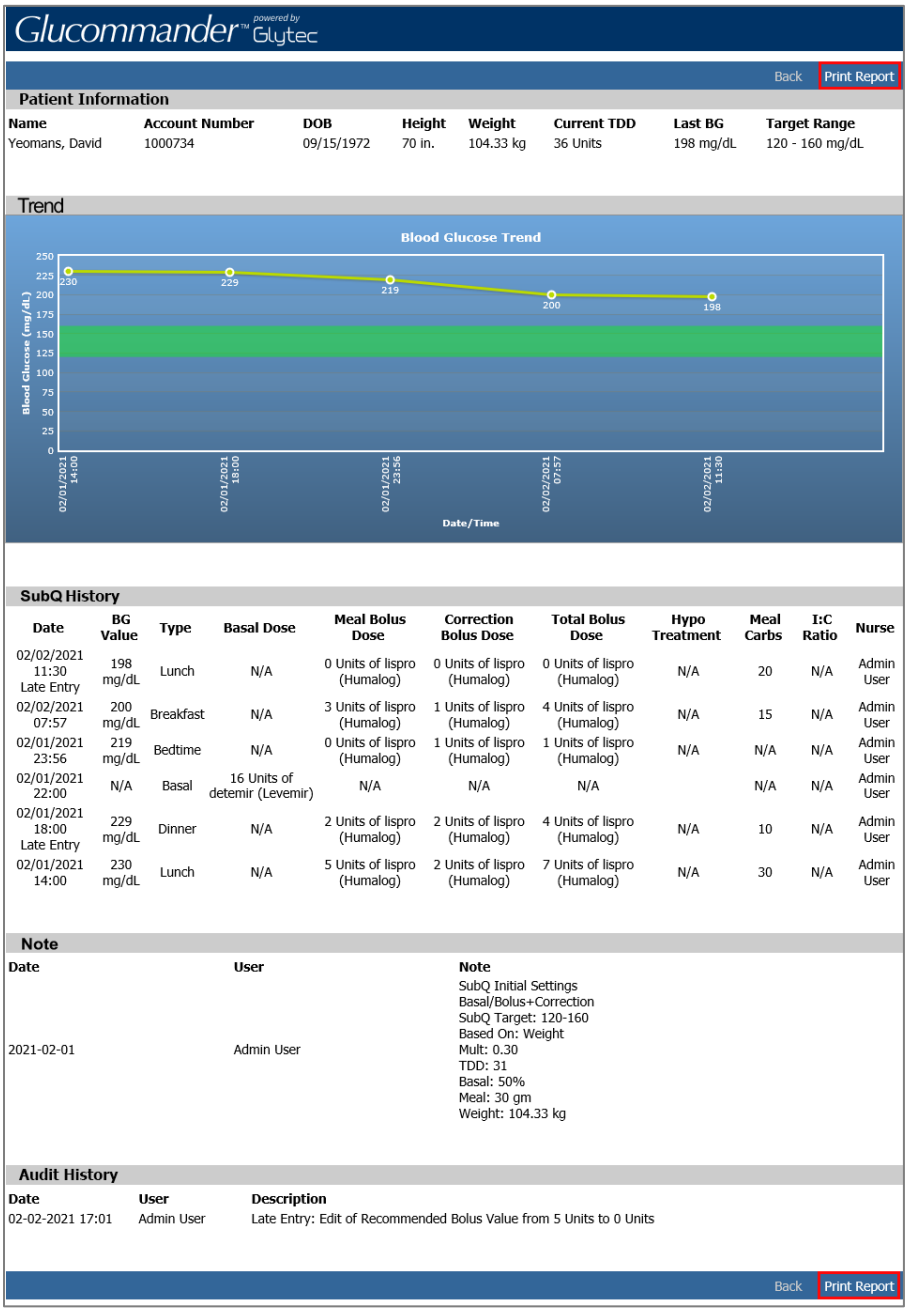


Print

Glucommander allows you to print the patient detail information.

1. Click **Print**.

2. Preview the report information.



Glucommander™ powered by Glytec

Back | Print Report

Patient Information

Name	Account Number	DOB	Height	Weight	Current TDD	Last BG	Target Range
Yeomans, David	1000734	09/15/1972	70 in.	104.33 kg	36 Units	198 mg/dL	120 - 160 mg/dL

Trend

SubQ History

Date	BG Value	Type	Basal Dose	Meal Bolus Dose	Correction Bolus Dose	Total Bolus Dose	Hypo Treatment	Meal Carbs	I:C Ratio	Nurse
02/02/2021 11:30 Late Entry	198 mg/dL	Lunch	N/A	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	0 Units of lispro (Humalog)	N/A	20	N/A	Admin User
02/02/2021 07:57	200 mg/dL	Breakfast	N/A	3 Units of lispro (Humalog)	1 Units of lispro (Humalog)	4 Units of lispro (Humalog)	N/A	15	N/A	Admin User
02/01/2021 23:56	219 mg/dL	Bedtime	N/A	0 Units of lispro (Humalog)	1 Units of lispro (Humalog)	1 Units of lispro (Humalog)	N/A	N/A	N/A	Admin User
02/01/2021 22:00	N/A	Basal	16 Units of detemir (Levemir)	N/A	N/A	N/A		N/A	N/A	Admin User
02/01/2021 18:00 Late Entry	229 mg/dL	Dinner	N/A	2 Units of lispro (Humalog)	2 Units of lispro (Humalog)	4 Units of lispro (Humalog)	N/A	10	N/A	Admin User
02/01/2021 14:00	230 mg/dL	Lunch	N/A	5 Units of lispro (Humalog)	2 Units of lispro (Humalog)	7 Units of lispro (Humalog)	N/A	30	N/A	Admin User

Note

Date	User	Note
2021-02-01	Admin User	SubQ Initial Settings Basal/Bolus+Correction SubQ Target: 120-160 Based On: Weight Mult: 0.30 TDD: 31 Basal: 50% Meal: 30 gm Weight: 104.33 kg

Audit History

Date	User	Description
02-02-2021 17:01	Admin User	Late Entry: Edit of Recommended Bolus Value from 5 Units to 0 Units

Back | Print Report

3. Click **Print Report** to print a copy of the report.

Lock Screen

Use the Lock Screen feature to keep patient information confidential.

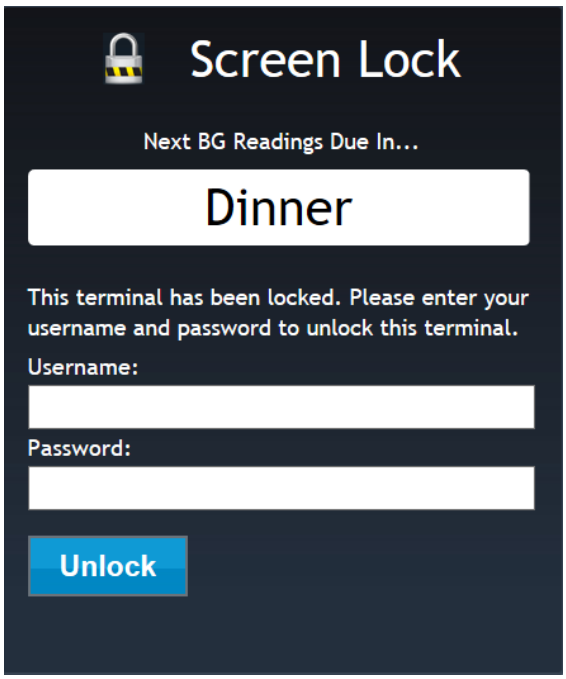
Users belonging to the same hospital unit can unlock the Glucommander screen when it is locked from the patient detail page. This screen lock differs from an inactivity timeout, triggered by the Session Lockout Time value. That screen lock can be undone by any user.

The Lock Screen feature is not applicable for SmartClick® users or for users accessing Glucommander through ADFS.

To lock the screen, on the patient detail page:

1. Click **Lock Screen**.

The Screen Lock pop-up message appears and covers the entire computer screen. It is useful to maintain patient privacy.



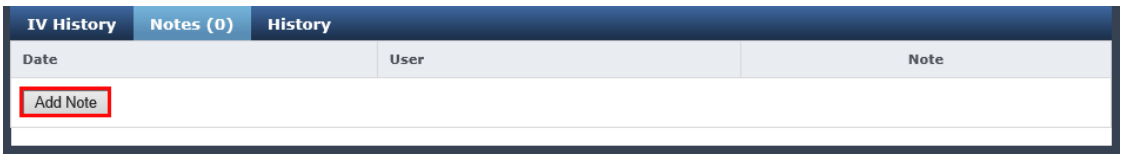
The Screen Lock message shows the Next BG Reading Due countdown timer for the patient on display when the Lock Screen button was clicked. Any warning messages regarding late blood glucose (BG) entries are also visible.

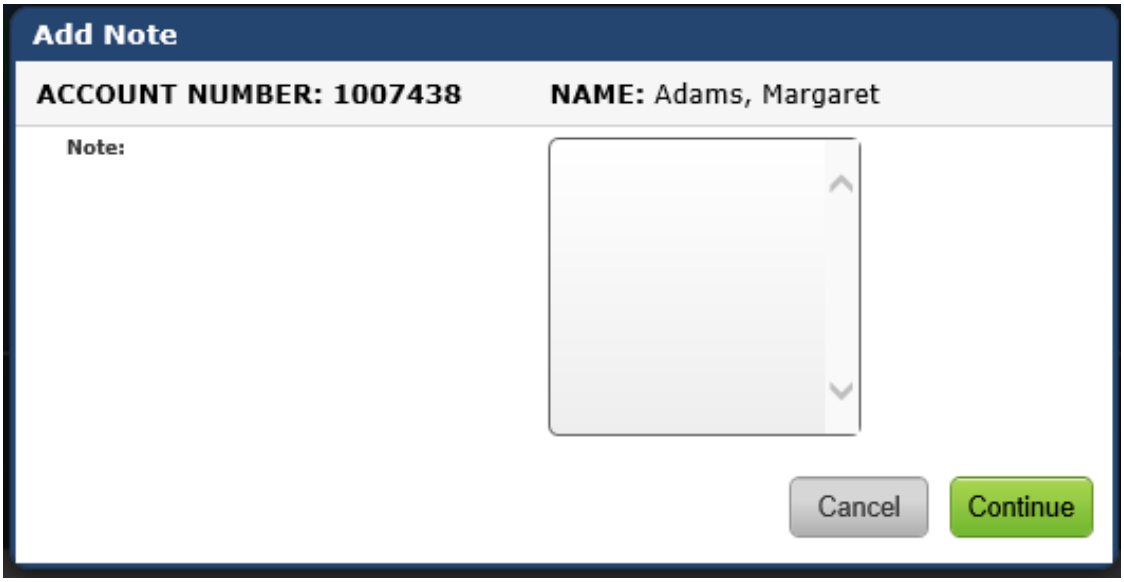
To unlock the screen:

1. Type your Glucommander username and password.
2. Click **Unlock**.

Notes

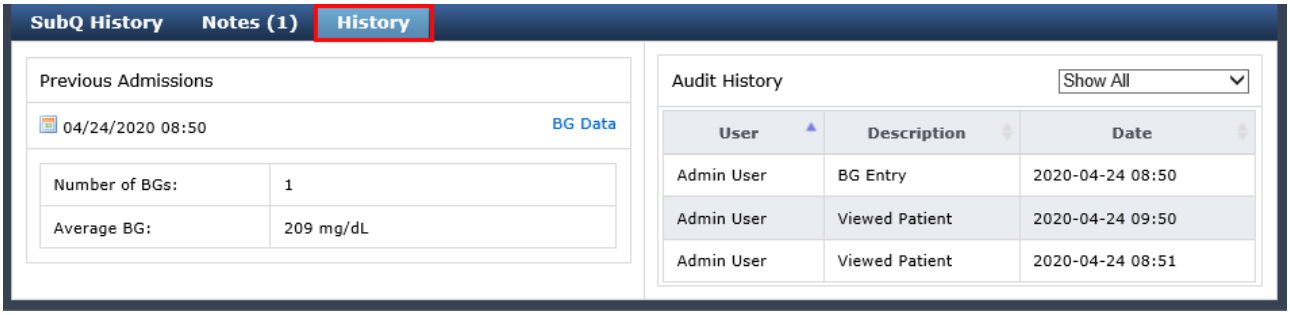
Click the **Notes** tab at the bottom of the detail display to add notes or view any notes appended to the patient's information. System-generated notes will also appear in this section. For example, notes detailing a patient's SubQ order set or H2H® considerations.





History

Click the **History** tab at the bottom of the detail display to view the complete history of the patient's admissions.

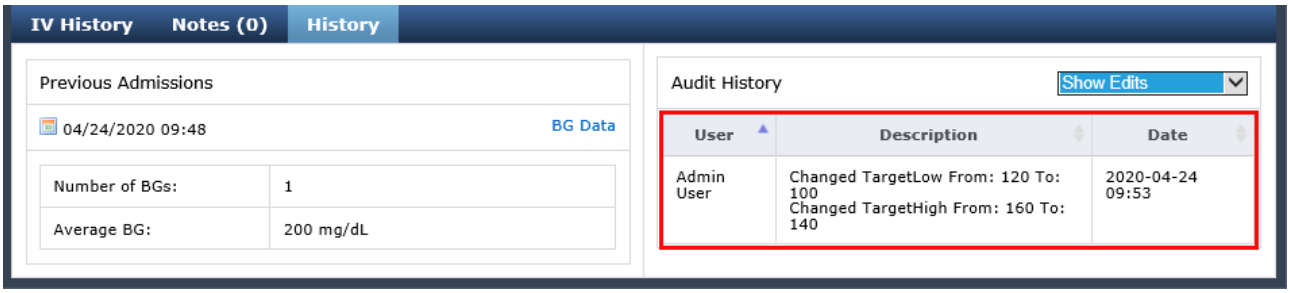


To check blood glucose (BG) entries for previous admissions, click **BG Data** opposite a specific admission date in the **Previous Admissions** section. Previous admissions can be tracked only if HL7 is implemented.

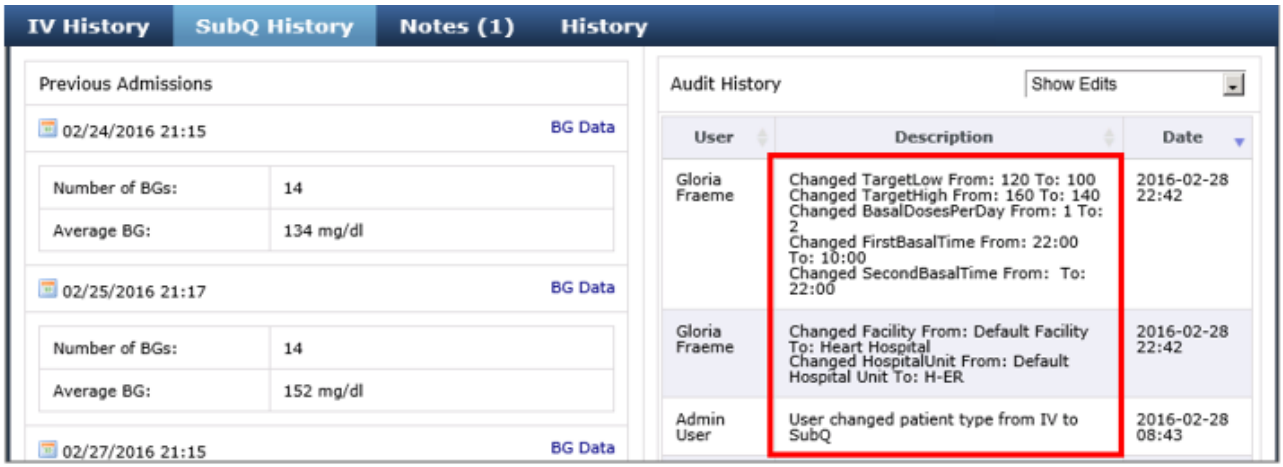
Use the dropdown list in the **Audit History** section to view the following data for the patient's current admission:

- Show All
- Show BG Entries
- Show Voided Entries
- Show Edits
- Show Adjustments
- Show Patient Views
- Show Hypo Questions
- Show Pause

The Audit History is valuable as a record of changes made during treatment. For example, the following patient had order set changes for target range and meal plan carbs during IV therapy:



This patient transitioned from IV to SubQ therapy, transferred hospital units, and then had order set changes to target range and basal dose distribution while on SubQ therapy:



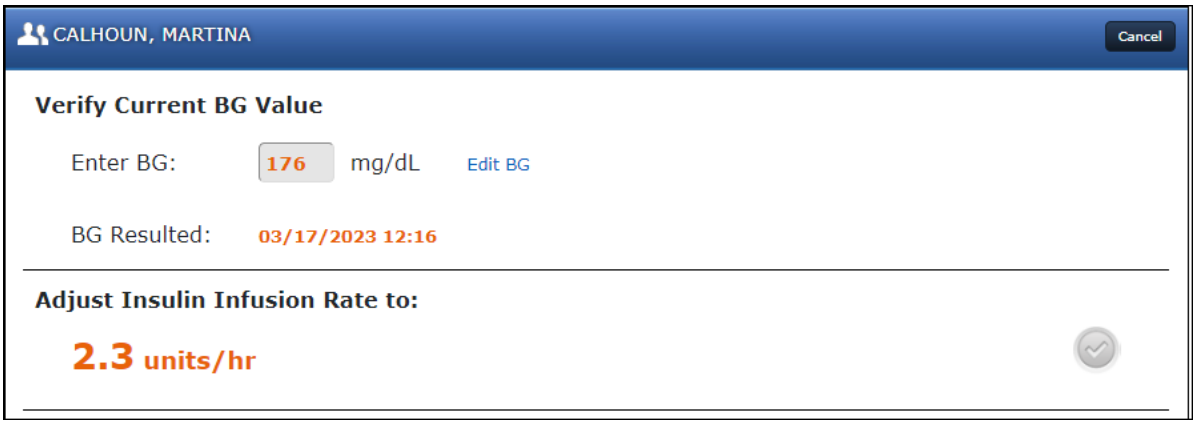
Enter Integrated BG Value

If your hospital has the Laboratory Information System (LIS) interface, Glucommander will accept integrated blood glucose (BG) results as input for its dosing recommendations. Integrated BG results are typically recorded using glucose meters or other devices integrated with the hospital's LIS. Integrated BG results are available for both IV and SubQ treatment.

To be considered current and usable for a patient, an integrated IV BG value must have resulted within the previous 10 minutes. Similarly, an integrated SubQ BG value must have resulted within the previous 45 minutes. BGs outside these times are flagged as having "exceeded" the requisite limit for IV or SubQ treatment.

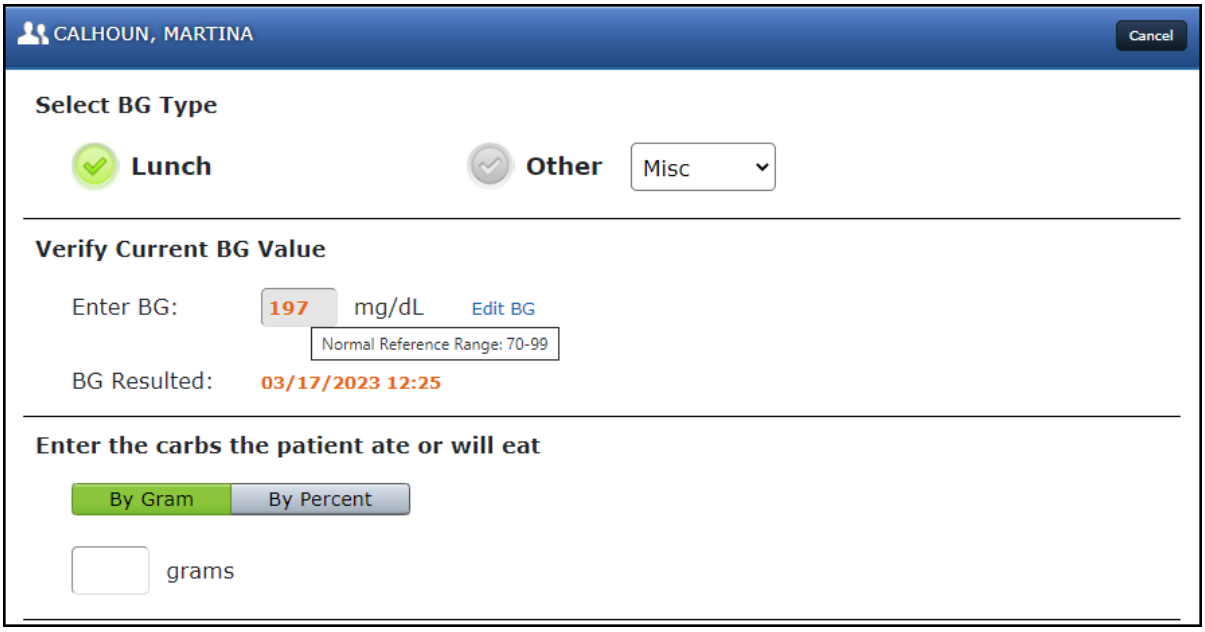
1. If an integrated BG value is available for the patient, it is displayed in orange in the **Enter BG** field. Its resulted time is displayed immediately below, in the **BG Resulted** field.

   In the example below, an integrated BG value for an IV patient is displayed.



In the example below, an integrated BG value for a SubQ patient is displayed.

To view the reference range for a BG value, hover the cursor over the value. A tooltip displays the range if one is available. This normal reference range is determined by your facility. If a range is not available, the tooltip displays "N/A."



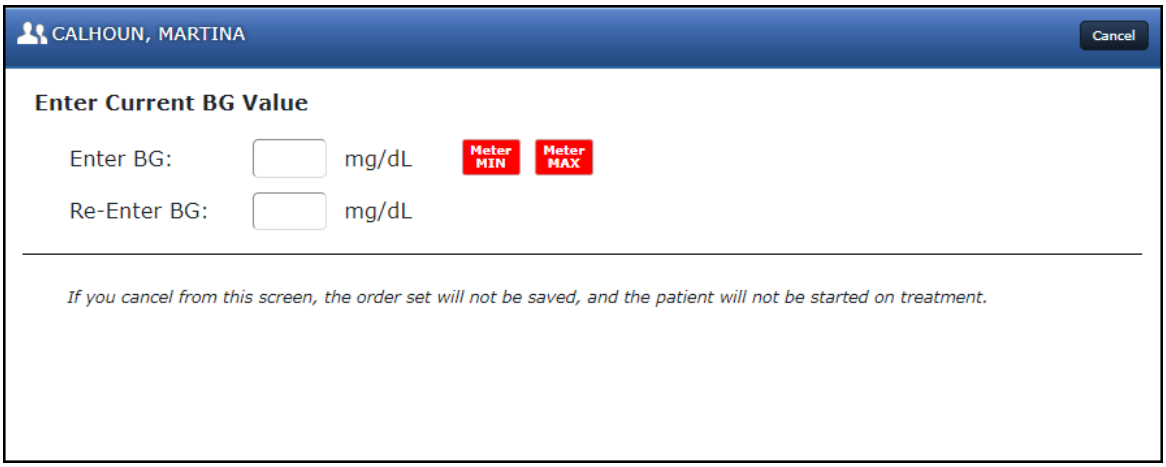
2. The integrated BG value will be used unless the **Edit BG** link is selected.
3. For SubQ mealtime BGs, enter the number of carbohydrates in the **Grams** field in response to the "*Enter the carbs the patient ate or will eat*" prompt.

Alternatively, for patients on the Basal/Bolus+Correction order set, click **By Percent** and then select a percentage value of carbohydrates (i.e., 0%, 25%, 50%, 75%, or 100%) from the dropdown field. When you select a percentage, Glucommander automatically displays the number of carbs in grams based on the percentage selected. For example, if the Number of Carbs Per Meal value specified on the SubQ order set was 60 grams and you select 25% here, 15 grams is displayed. If 50% is selected, 30 grams is displayed.

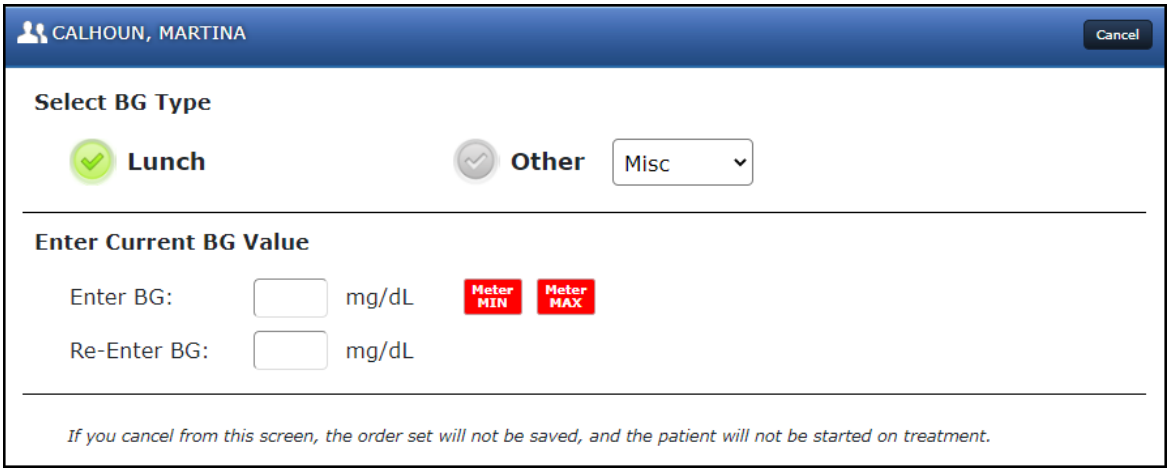
4. Complete the BG entry process as you would normally. See *Enter IV BG Value* or *Enter SubQ BG Value*.

   If you do not want to use the integrated BG value, click the **Edit BG** link next to the **Enter BG** field. The display resets to allow you to enter a BG value manually:

   For IV patients, the screen displays as:



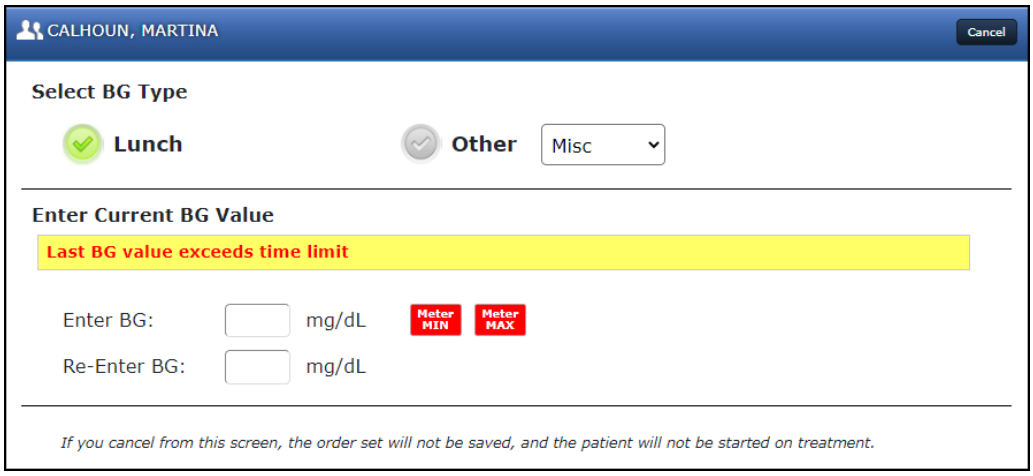
   For SubQ patients, the screen displays as:



5. If an integrated BG is available but is:

   a. Past the 10-minute limit for IV, the following message displays:

   b. Past the 45-minute limit for SubQ, the following message displays:



   When you receive a message like this, you can enter a BG manually and then proceed as you would normally.

Enter Minimum/Maximum BG Value

When a patient's blood glucose (BG) value exceeds the readable limits of the glucose meter, the clinician can use the **Meter MIN** and **Meter MAX** buttons on the BG entry screens to enter the appropriate value. Clicking the appropriate button populates both BG entry fields with the facility's preconfigured value for an unreadable low or high BG. These BG values are configured per facility. The **Meter MIN** and **Meter MAX** buttons are available for both IV and SubQ treatment.

The Meter MIN and Meter MAX buttons can also be activated by an unreadable low or high BG value received through the hospital's Laboratory Information System (LIS) interface. The integrated minimum and maximum values work the same as other integrated BG values. For more information, see *Enter Integrated BG Value*.

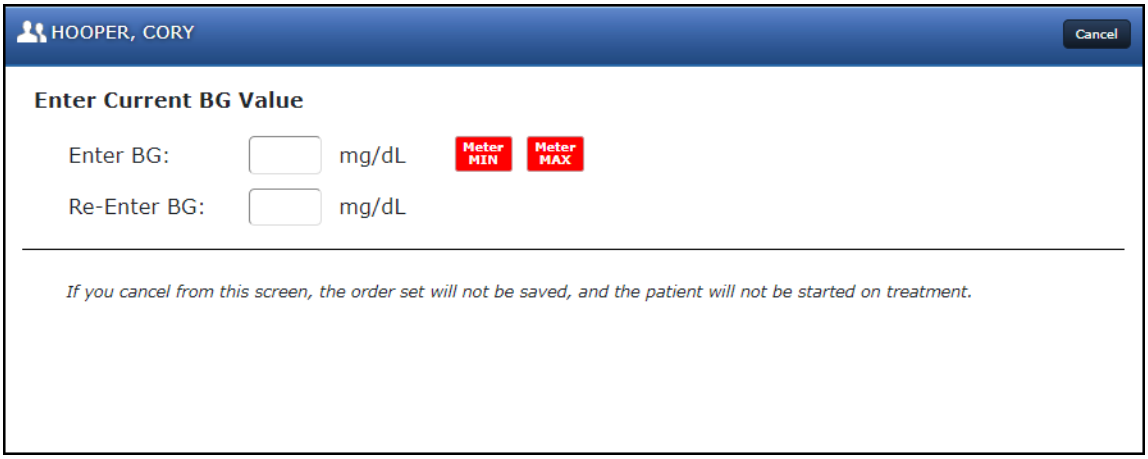
Additionally, if a BG value greater than your facility's preconfigured meter maximum is entered, a yellow notification box displays with this message, "Entry cannot be above *configured Meter MAX value*. Select Meter MAX button to proceed." You must click the **Meter MAX** button to complete the enter BG value process. Your facility's preconfigured value will display in the **Enter BG** and **Re-Enter BG** fields.

Manual Entry

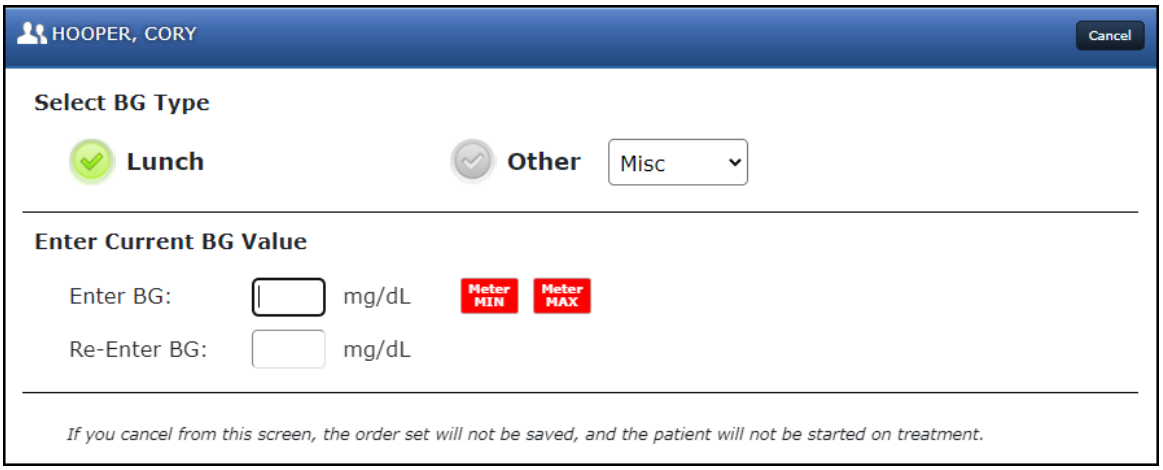
If the glucose meter in use for the patient indicates that the BG level is too low or too high to be read or if you enter a BG value greater than your facility's preconfigured meter maximum:

1. Click either the **Meter MIN** or **Meter MAX** button as appropriate.

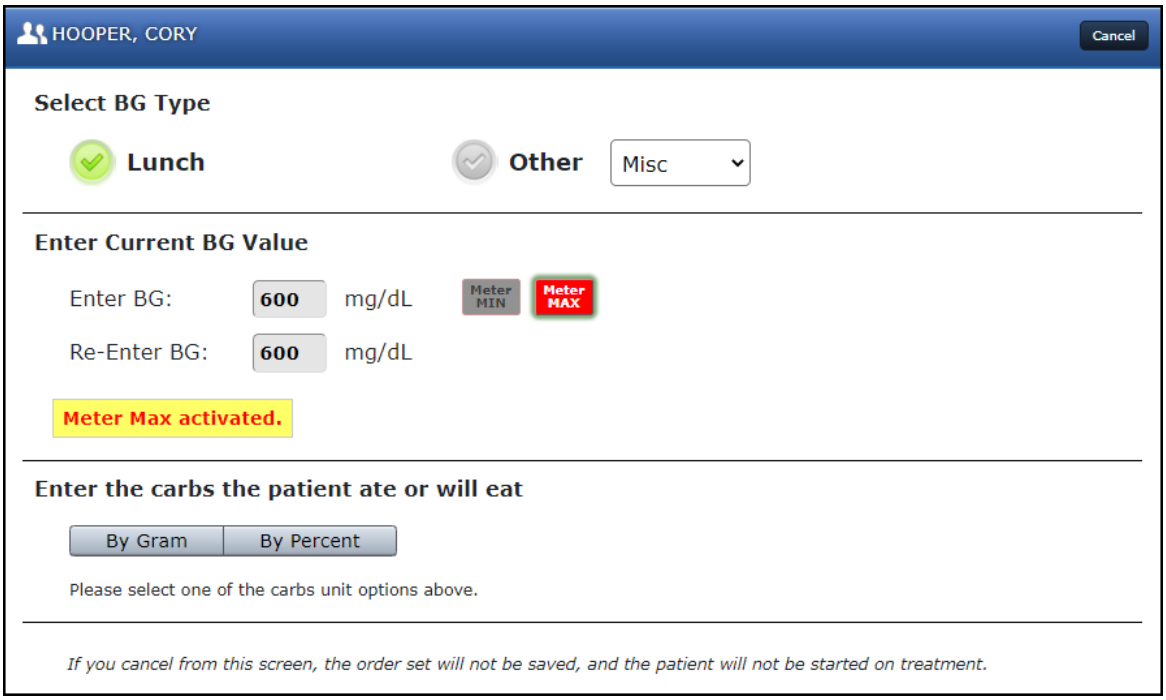
IV patient



SubQ patient



When you click either button, both BG entry fields are populated with the facility's preconfigured value for a minimum or maximum value:



Also, the activated button (**Meter MAX** in this example) appears red/enabled, whereas the button that was not selected appears gray/disabled. A yellow notification box also displays, notifying you of your selection.

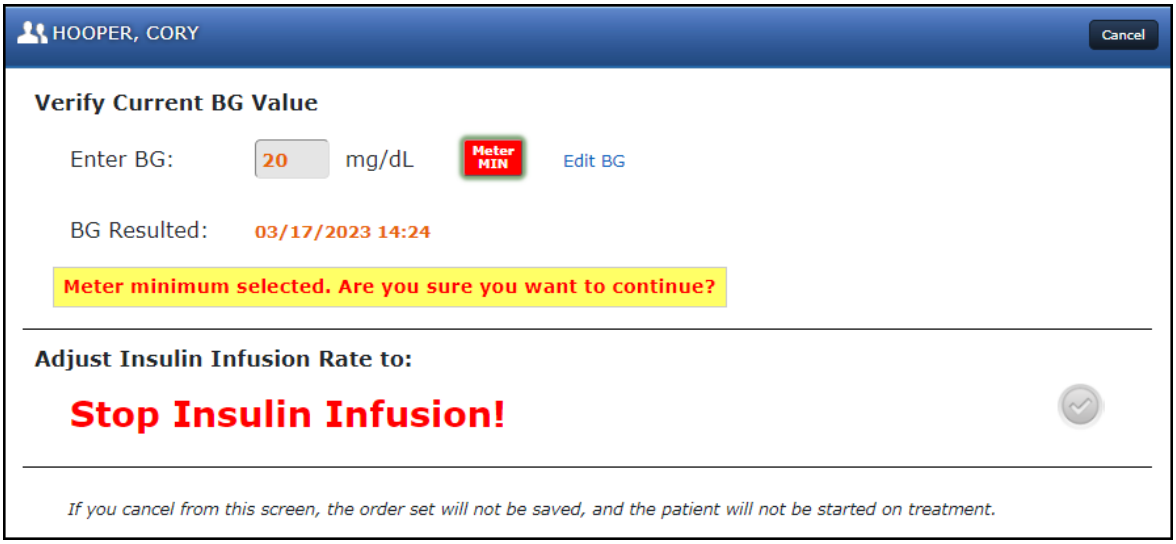
2. To reject the minimum or maximum value, click **Cancel**.
3. To accept the minimum or maximum value, follow the prompts.
4. Click **Save**.

	For SubQ patients, respond to the prompt "*Enter the carbs the patient ate or will eat*" and then click **Save**.

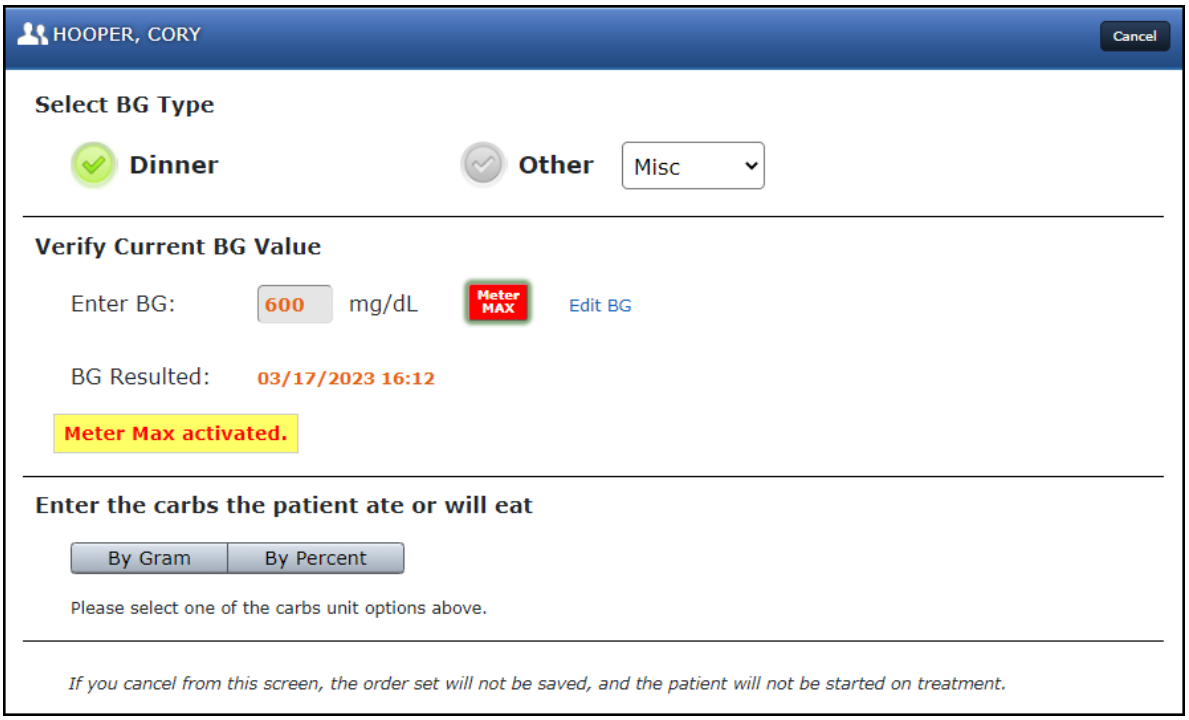
Integrated MIN/MAX Entry

1. If the hospital's LIS receives a BG value for the patient that it flags as an unreadable low or high BG, the appropriate **Meter MIN** or **Meter MAX** button in Glucommander is activated automatically:

IV patient

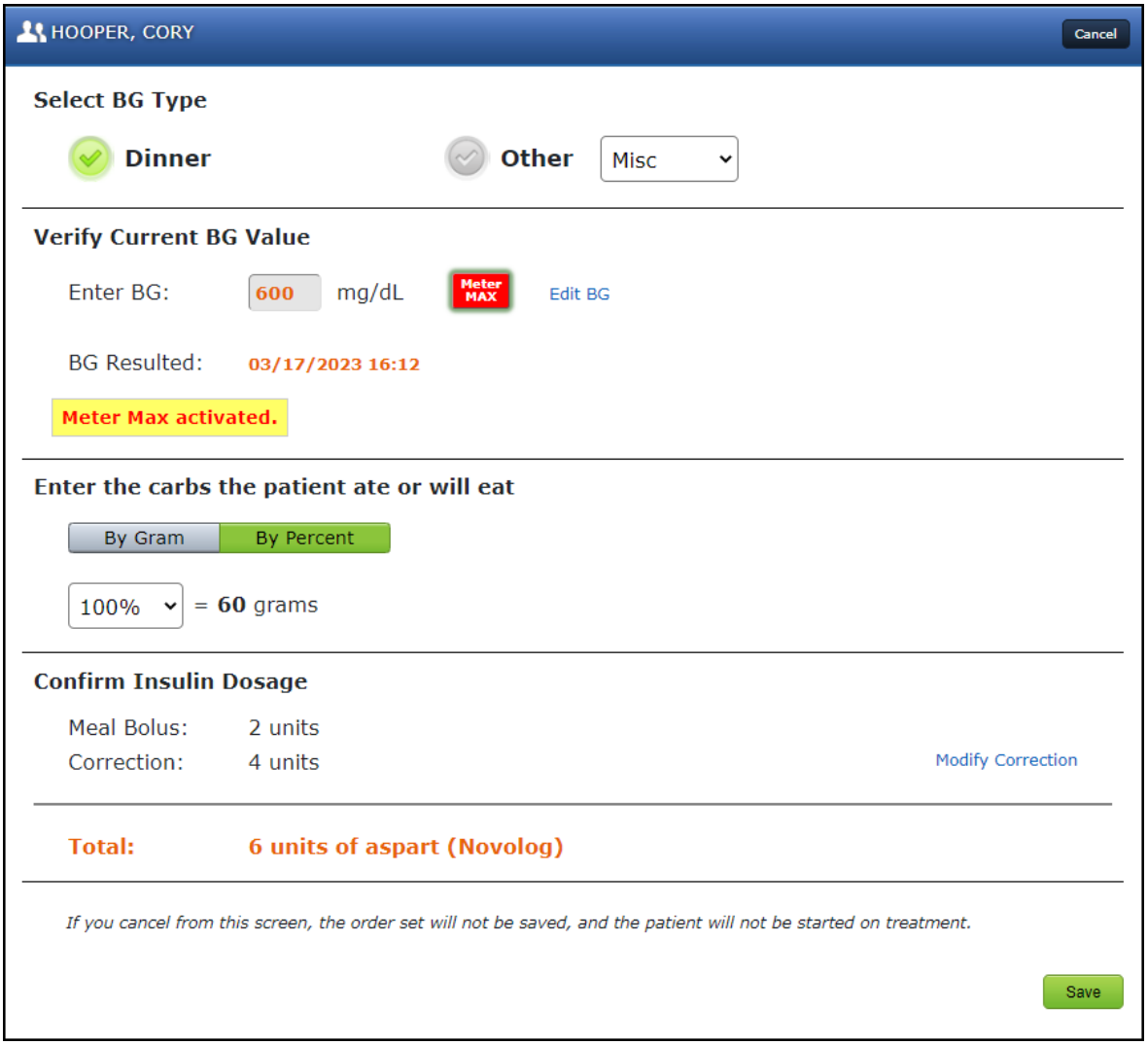


SubQ patient



The **Enter BG** field is populated with the preconfigured minimum or maximum BG value for the patient's facility. Under that field, the resulted date and time for the integrated BG is displayed. The activated meter button (in the example above, Meter MAX) appears red/enabled and is view only.

2. To reject the integrated minimum or maximum BG value:
   - Click **Cancel**, which closes the Enter Current BG Value page and opens the patient detail page.
3. To accept the integrated minimum or maximum BG value, respond to the prompts and then click **Save**:



Automatic Discontinuation

Automatically discontinued patients no longer appear on the dashboard (Current Patients page). Patients are automatically discontinued from Glucommander when:

- Through the HL7 interface, Glucommander receives an A03 message (Patient Discharge) for the patient from the hospital's Admission/Discharge/Transfer (ADT) system.
- The configured time limit of inactivity is reached. The patient is idle on Glucommander (that is, has no blood glucose entries) for a period of time exceeding the configuration of Discontinue IV Treatment or Discontinue SubQ Treatment.

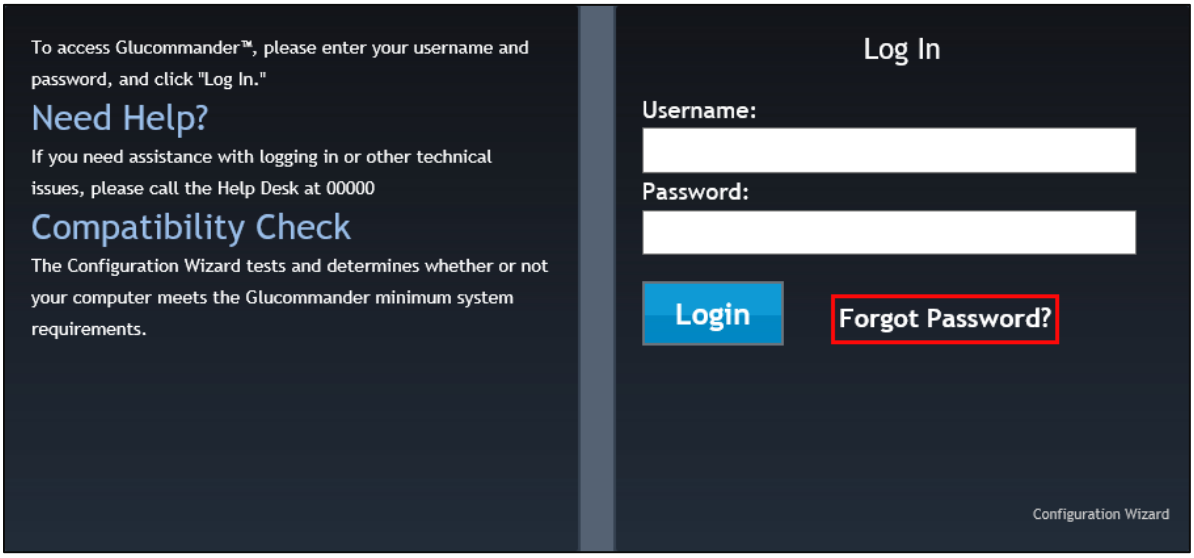
If patients are manually discontinued, they will appear again on the Add Patient list for that unit until a discharge message is received through the HL7 interface.

Logging in to Glucommander using URL

1. On the Glucommander Log In page, type your username and password in the input boxes. The password is case sensitive.
2. Click **Login**.

   If you forget:

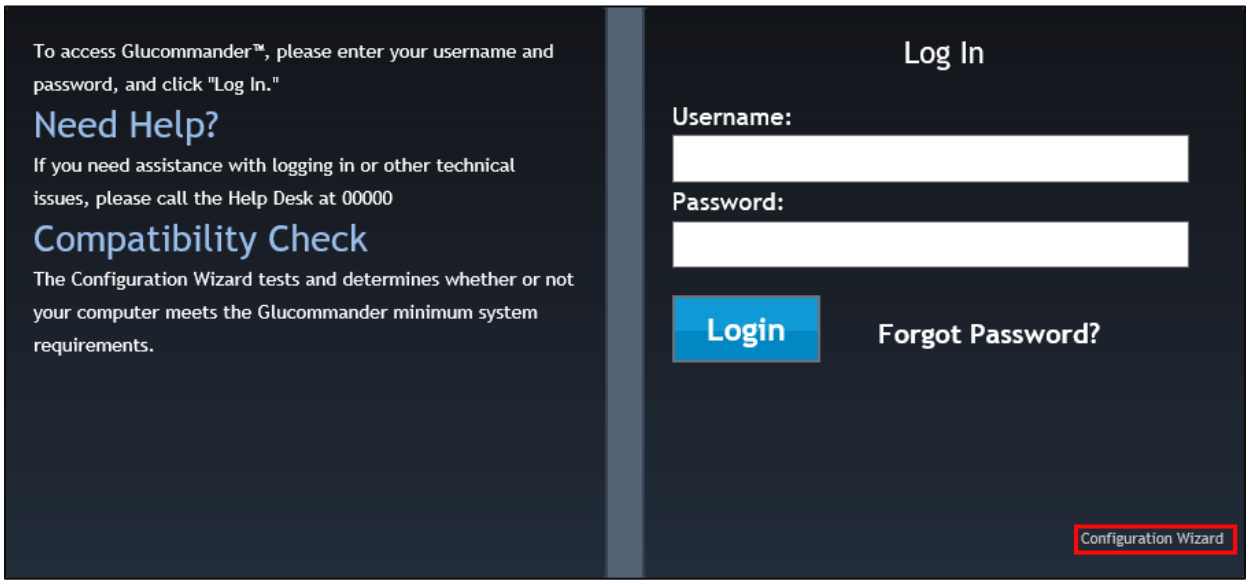
   - Your username, contact your hospital's helpdesk support.
   - Your password, click **Forgot Password?** Glucommander will send a link to your email address for you to reset your password.



Compatibility Check

Upon initial start-up and on a regular basis, you should perform a compatibility check to provide assurance the minimum system software requirements have been correctly installed, thereby ensuring satisfactory Glucommander performance.

To determine whether your computer meets the minimum system requirements for Glucommander, click **Configuration Wizard** in the lower-right corner of the Log In page.



Glucommander provides immediate feedback on whether your system meets functional criteria for each of the following:

- Minimum browser version
- Windows operating system
- JavaScript
- Cookies
- Adobe Acrobat viewer plug-in
- Audio

Log out of Glucommander

Click **Logout** in the upper right-hand corner of the screen.

Start a Patient

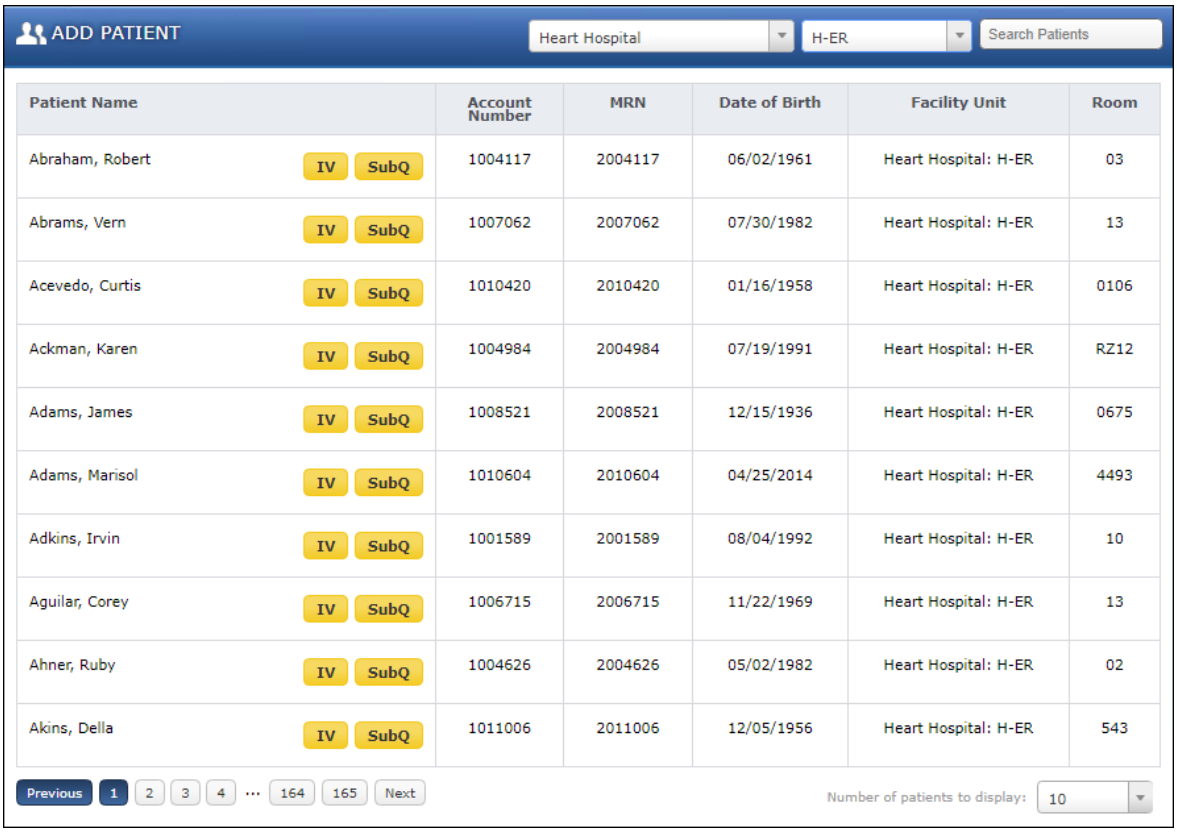
There are two ways to start a patient on Glucommander. You can either select a patient within your hospital information system or add a patient who is new to both your system and Glucommander.

Glucommander communicates with your hospital's Admission/Discharge/Transfer (ADT) system through its HL7 interface.

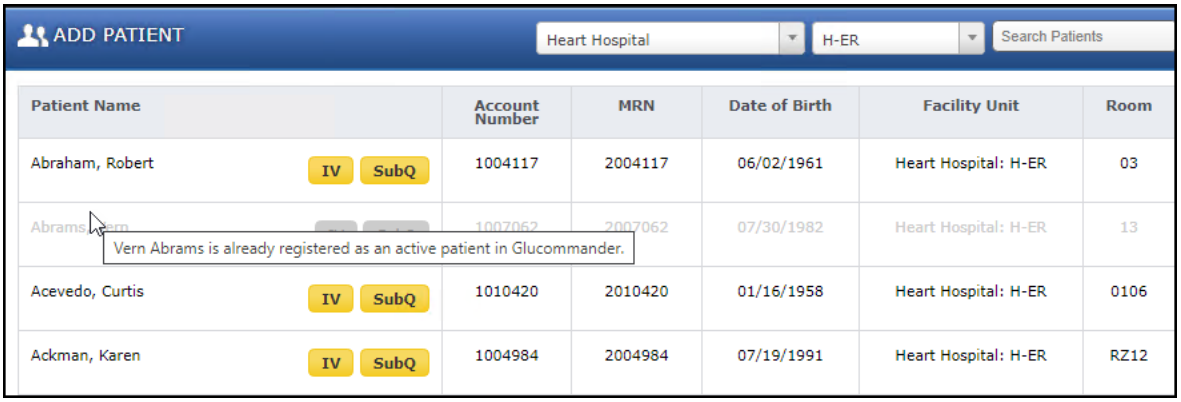
To start a patient on Glucommander:

1. **SmartClick® users**: See *Logging in to Glucommander Using EMR*.
2. At the top of the dashboard (Current Patients page), click **Add Patient**.

   The Add Patient page displays.
3. View the list of patients who are either currently active on Glucommander (grayed-out IV and SubQ buttons) or who are available to be started on Glucommander (yellow IV and SubQ buttons).



When you hover over an active patient's name on the Add Patient page, Glucommander displays this message, "*patient* is already registered as an active patient on Glucommander." When the patient is no longer receiving treatment on Glucommander, this message no longer appears and instead, the IV and SubQ buttons display beside the patient's name. Patients remain listed on the Add Patient page until they are discharged through the hospital's Admission/Discharge/Transfer (ADT) system.



4. Select a patient from the list on the Add Patient page. Choose this method for patients identified by Glucommander through its HL7 interface with the hospital system. To select a patient, click either **IV** or **SubQ** next to the patient's name. Use the fields at the top of the page to filter patients by facility (hospital), hospital unit, and patient last name or ID.

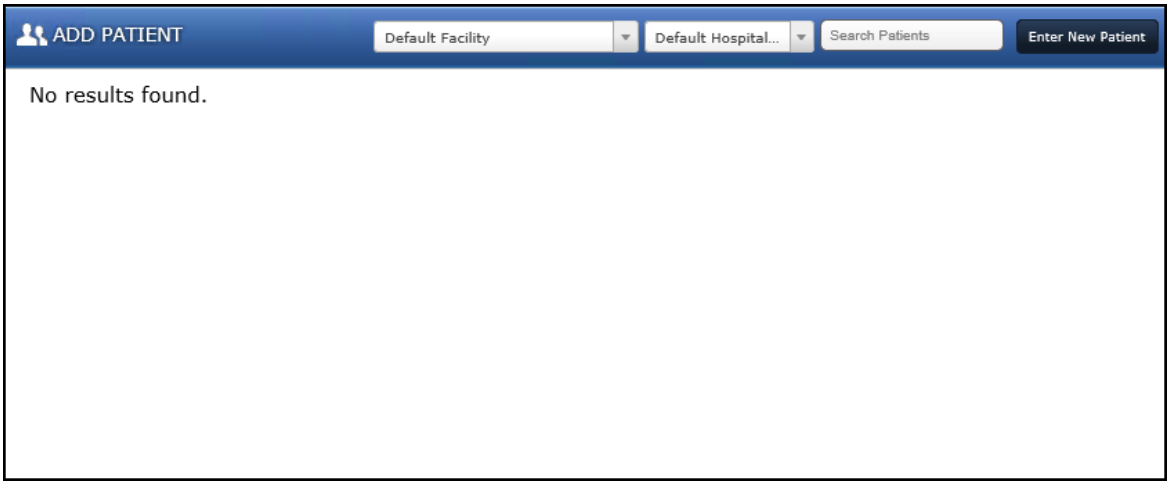
   - Proceed to *Complete IV Order Set Initiated in EMR* or *Complete SubQ Order Set Initiated in EMR*.

Start a Patient (No ADT Interface)

If your hospital does not have the Admission/Discharge/Transfer (ADT) system interface, use the steps below to start a patient:

1. At the top of the dashboard (Current Patients page), click **Add Patient**.

   The Add Patient page displays.



2. Click **Enter New Patient** to add a patient manually. Choose this method for new patients, not already identified within the hospital system.

   - Proceed to *Add a New Patient Manually* below.

Add a New Patient Manually

When you click **Enter New Patient** on the Add Patient page, the Add Patient form displays:

ADD PATIENT

PATIENT INFORMATION

First Name:*

Last Name:*

Account Number :*

MRN :*

DOB:* (EX: mm/dd/yyyy)

Room Number:

Gender:*

Hospital Unit:* Heart Hospital : H-ER

PATIENT DEMOGRAPHICS

Height:* in

Weight:* kg

A1C:

A1C Resulted Date: (EX: mm/dd/yyyy)

Physician:

PATIENT TYPE

Patient Type:* IV SubQ

Cancel Save and Continue

This form allows you to specify identifying information for a new patient. It also allows you to designate the patient's treatment method by selecting a patient type.

The patient type should correspond to the treatment ordered by the provider. If the patient type is subcutaneous (SubQ), you will be prompted to select a blood glucose (BG) type before entering the BG value. If the patient type is intravenous (IV), you will be prompted to enter just the BG value.

Pediatric patients may be either IV or SubQ patient types and are identified by their entries for date of birth.

1. Complete all required (*) fields on the Add Patient form.

All fields in the insulin order set require a provider's order.

Pay careful attention to the weight entry units of measure (lbs or kg). This is especially true for pediatric patients.

Pay careful attention to the date of birth (DOB) entry for pediatric patients. Enter the DOB only as month, day, and year.

Field	Entry
First Name	**Required**. Patient's given name (e.g., Alice).
Last Name	**Required**. Patient's surname or family name (e.g., Smith).
Account Number	**Required**. Patient's hospital-assigned identification number. The number must be unique among active patients.
MRN	**Required.** Medical Record Number. The number must be unique among active patients.
DOB	**Required**. Patient's date of birth. Must be entered in *mm*/*dd*/*yyyy* format.
Room Number	Patient's assigned hospital room number. **Note:** Special characters and spaces are allowed in the room number.
Gender	**Required**. Select either: • Female • Male • Other • Unknown

Field	Entry
Hospital Unit	**Required**. Select one of the listed units. **Note:** The unit displayed by default is the user's default hospital unit, defined when the user was added to Glucommander (see page 193).
Height	**Required**. Patient's height, in inches (in) or centimeters (cm).
Weight	**Required**. Patient's weight, in kilograms (kg) or pounds (lbs).
A1C	Average amount of glycated hemoglobin (A1c) in the blood, calculated over a period of time (usually 2-3 months) and expressed as a percentage. Though not required, an A1c value is recommended for all patients on SubQ treatment. Glucommander prompts the user to provide an A1c value when the patient starts SubQ treatment, when an IV patient without an A1c begins transitioning to SubQ treatment, and every 4 hours while the patient remains on SubQ treatment without an A1c value. A recent A1c value is also a prerequisite for the Hospital to Home option under SubQ treatment. For more information, see *Hospital to Home (H2H®)*. The A1c value can contain greater than (>) or less than (<) symbols in the following instances: • < with values 1-7 • > with values 9 or above **Note:** Glucommander recommends that a patient with an A1c value less than 6.5 may not require treatment with SubQ insulin.
A1C Resulted Date	**Required if A1c specified**. Date in *mm/dd/yyyy* format that A1c value was recorded for the patient.
Physician	Name of the physician who ordered the patient to be placed on Glucommander. Last name only is recommended. **Note:** Admission Discharge Transfer (ADT) Interface will include the admitting physician in this field.
Patient Type	**Required**. Select either: • IV – to start the patient on intravenous treatment • SubQ – to start the patient on subcutaneous treatment

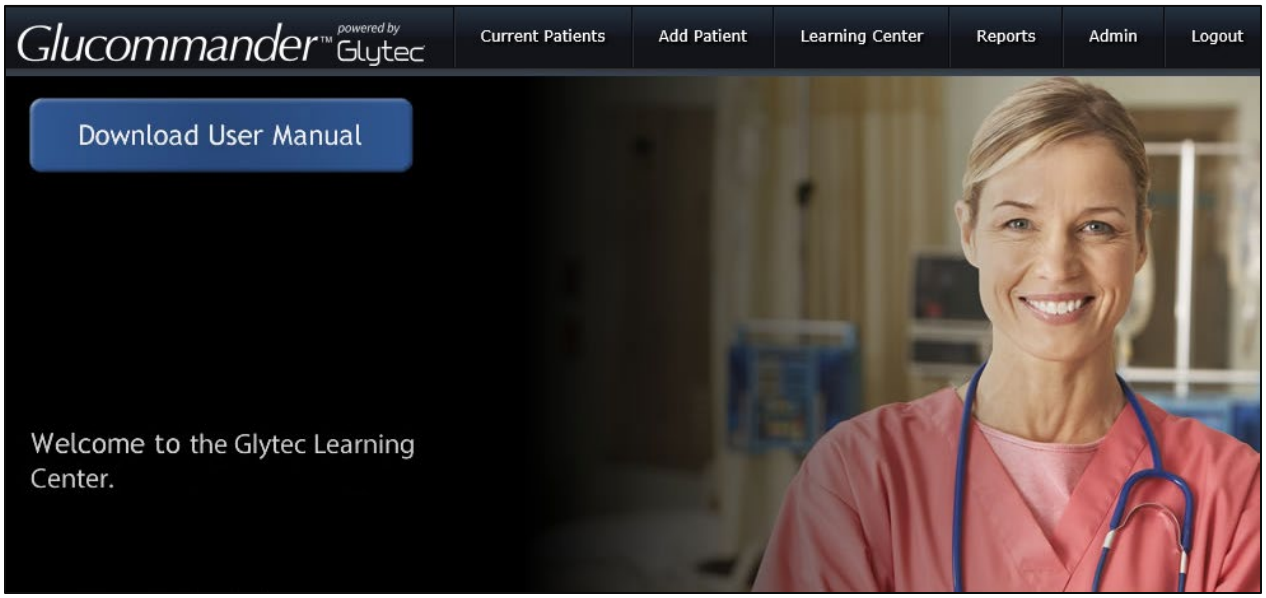
2. Click **Save and Continue**.
3. The insulin order set page displays. Complete all fields for the order set and then click **Save**.

   See *Verify IV Order Set Manually (Order Set Integration Disabled)* or *Verify SubQ Order Set Manually (Order Set Integration Disabled)*.

   Proceed to *Enter IV BG Value* or *Enter SubQ BG Value*.

The Learning Center

The Glytec Learning Center is your go-to site for information about Glucommander. Here you can find the latest version of this user manual after logging in to Glucommander using the URL.



Reports

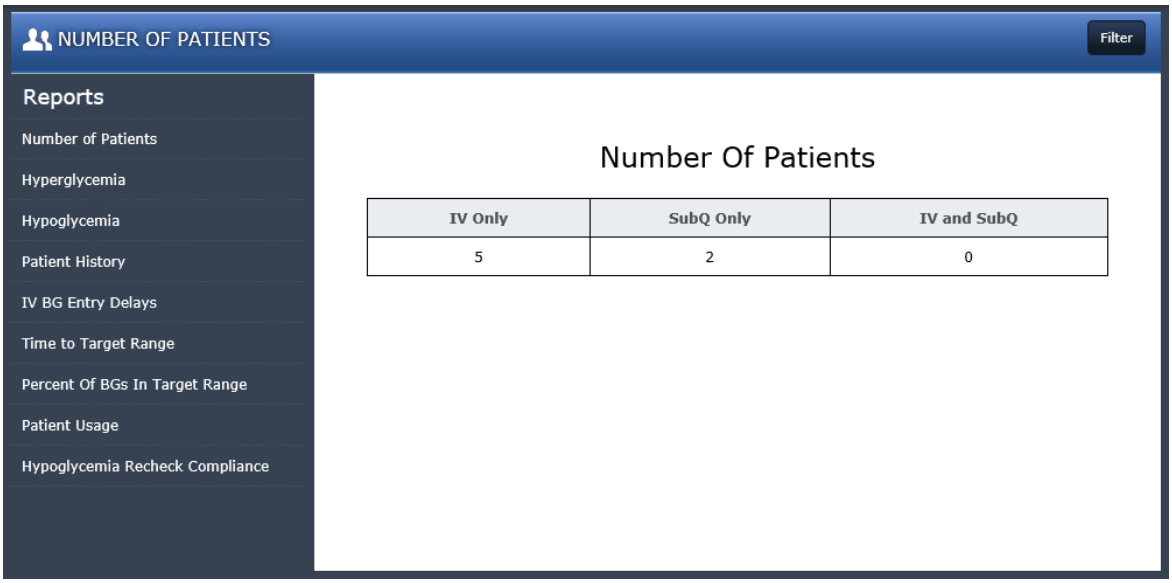
The **Reports** tab is the place to view and evaluate data on patient outcomes.

Use the links along the left-hand side to access the reports, which include:

- Number of Patients
- Hyperglycemia
- Hypoglycemia
- Patient History
- IV BG Entry Delays
- Time to Target Range
- Percent of BGs in Target Range
- Patient Usage
- Hypoglycemia Recheck Compliance

Some important considerations about reports:

- Reports are available immediately, with filter options. See *Set Report Filter*.
- Standard functions like Print, PDF, or export to Excel are available for most reports. For reports containing graphical content, Flash must be installed and enabled in Internet Explorer to use the Print and PDF buttons.
- The Number of Patients report lists only the number of patients who are currently active and those who have been discontinued from treatment by default. You can set report filters to display only the number of patients by specified data. For example, you can set filters to display the number of patients who received treatment within the last 7 days (default: last 30 days) or the number of patients who had BG values within an 80-120 mg/dL range within a timeframe specified. Patient treatment details are not shown on this report.

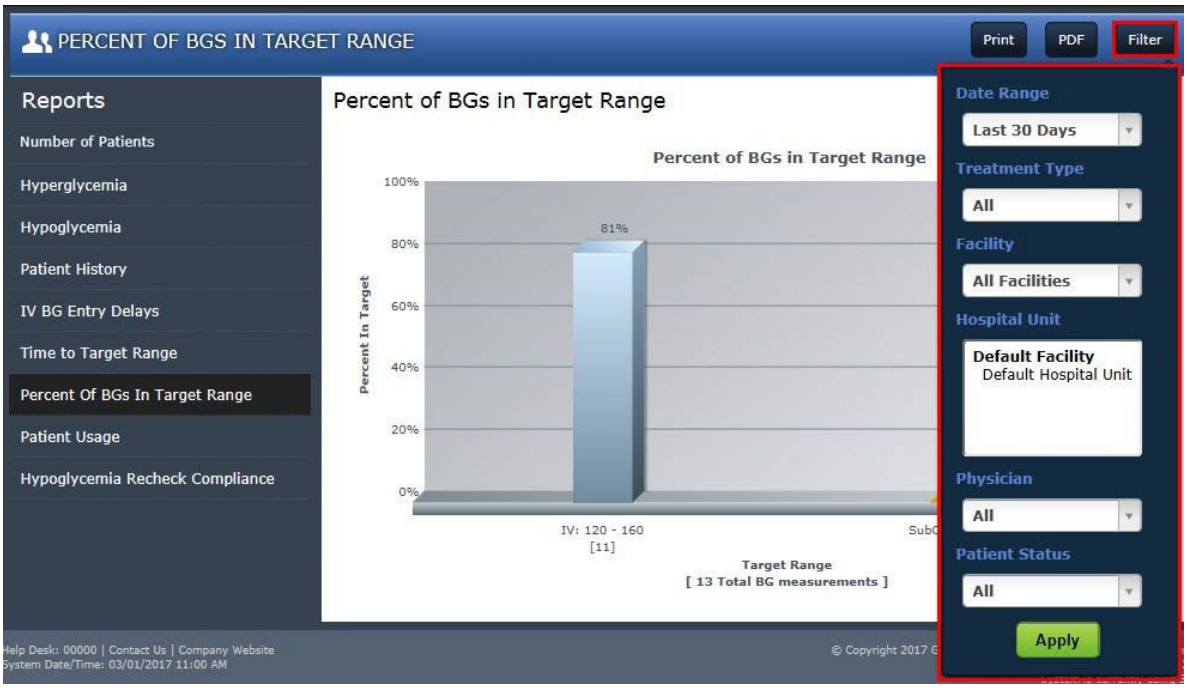


Set Report Filter

The report Filter is not available on the Patient Usage report.

1. Click **Filter**.

   The filter for the current report is displayed:



2. Select one or more filter options:

Filter	Default	Reports Used In
Date Range	“Last 30 Days”	All except for Patient Usage report
Treatment Type	“All” – Other options are “IV” and “SubQ”	All except for Number of Patients, IV BG Entry Delays, and Patient Usage reports
Target Range	“All”	All except for Time to Target Range and Percent of BGs in Target Range reports
Facility	“All Facilities”	All except for Patient Usage report

Filter	Default	Reports Used In
Hospital Unit	Default is all selected (by association with "All Facilities") **Note:** Use the Ctrl key to select more than one hospital unit.	All except for Hyperglycemia, Hypoglycemia, and Patient Usage reports
Physician	"All"	All except for Hyperglycemia, Hypoglycemia, and Patient Usage reports
Patient Status	"All" – Other options are "Discontinued" and "Current"	All except for Patient Usage report
A1C	"All" – Other options are "is >" and "is <" **Note:** If "is >" or "is <" is selected, a drop-down box appears containing numeric values from 0-15. Select a numeric value to view a specific set of A1c values.	All except for Percent of BGs in Target Range and Patient Usage reports
User	"All Users"	Applies only to IV BG Entry Delays report

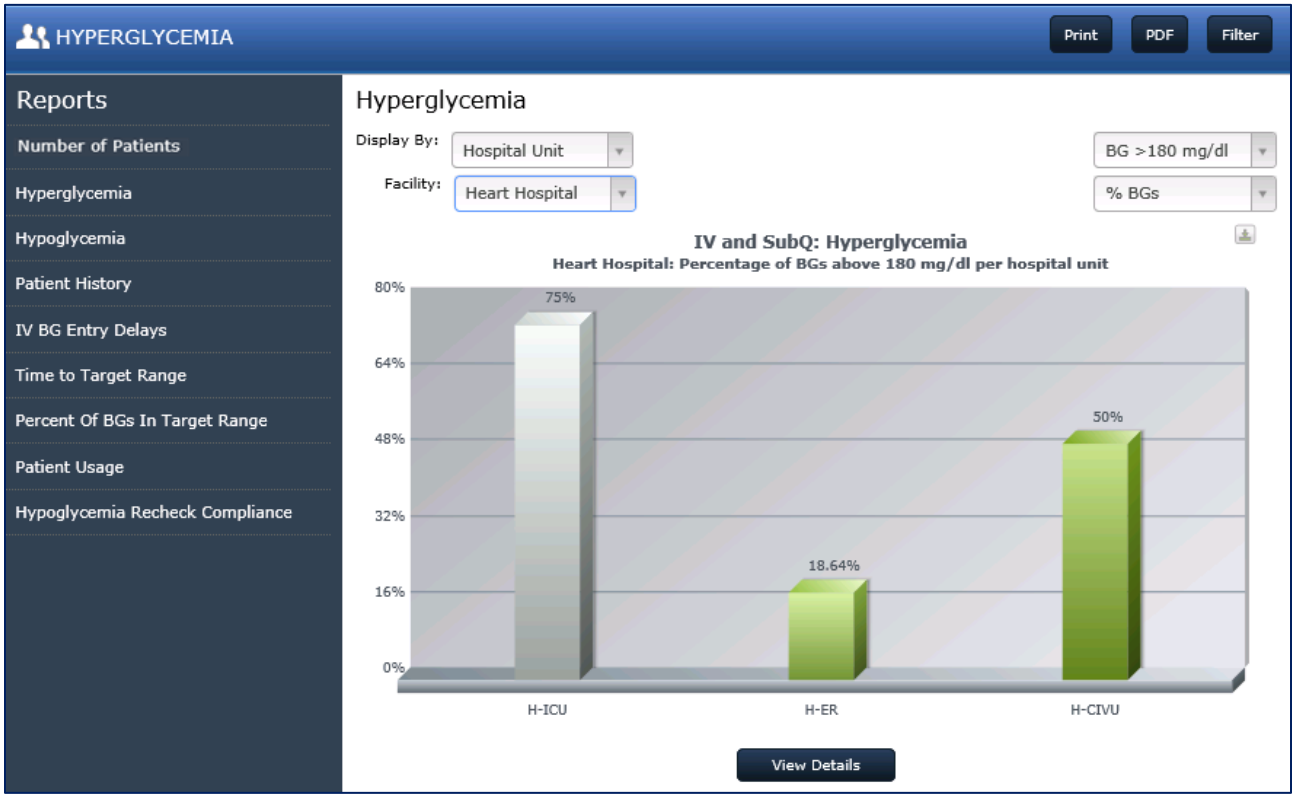
3. Click **Apply** to confirm the filter options.

   To close the pop-up without confirming the filter options, click **Filter**.

After the filter options are set, Glucommander filters report data according to the setting.

Hyperglycemia

The Hyperglycemia report shows blood glucose (BG) statistics by facility or hospital unit recorded in Glucommander that are above a set threshold for hyperglycemia. By default, the report threshold is set at 180 mg/dL, but it can be reset higher. The statistics are displayed in a bar chart with a supplementary detailed table view (accessed via View Details).



1. To adjust the report's threshold for hyperglycemia measurement to a value higher than 180 mg/dL, use the **BG > *xxx* mg/dl** drop-down menu.
   The value can be adjusted from 180 to 500 mg/dL.

   % BGs is the only option available for displaying the report's type of hyperglycemia percentage data. The report will display the percentage of BG entries greater than the selected mg/dL value.

2. To change the display option for the report, use the **Display By** drop-down and select one of the following:
   - Facility (hospital)
   - Hospital unit – also requires selection of a facility (hospital)

3. Click **View Details** to see detailed information about the patients whose BG values are summarized in the report:

Details

Excel Print

Search:

Patient Name	Account Number	Hospital Unit	Date	BGValue
Acuff, Billie	1007046	Default Facility:Default Hospital Unit	2017-03-01 11:27	189 mg/dl
Adams, Margaret	1007438	Default Facility:Default Hospital Unit	2017-03-01 11:26	196 mg/dl
Akins, Della	1011006	Heart Hospital:H-ER	2017-02-28 06:17	220 mg/dl
Barnes, Larry	1008040	Heart Hospital:H-ER	2017-03-01 11:30	210 mg/dl
Barnes, Larry	1008040	Heart Hospital:H-ER	2017-02-28 02:44	600 mg/dl

First Previous 1 Next Last

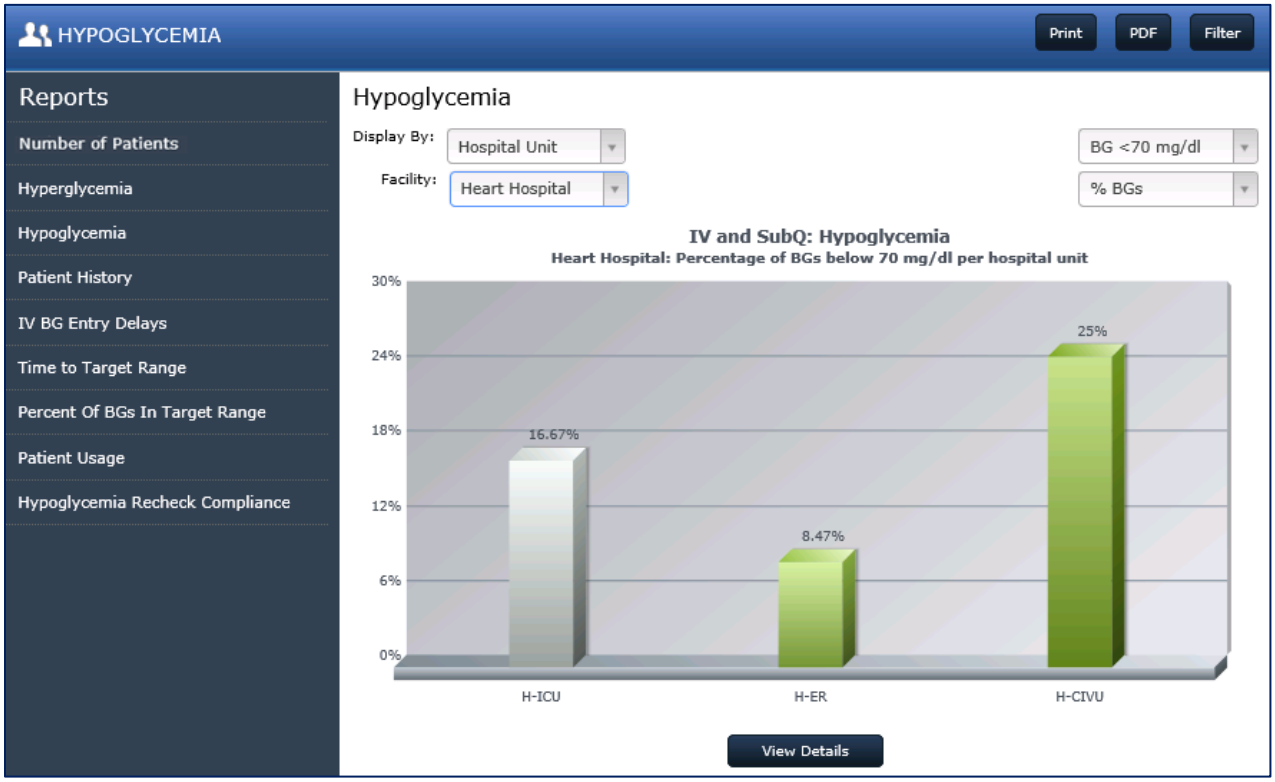
Number of records to display: 10

Use the sort buttons to adjust your view of the patient list and the **Search** field to locate a patient quickly by name or ID. By default, the View Details version of the report is sorted by patient last name.

4. Use the buttons in the report title bar to print the report or save it to Excel (.xls).

Hypoglycemia

The Hypoglycemia report shows blood glucose (BG) statistics by facility or hospital unit recorded in Glucommander that are below a set threshold for hypoglycemia. By default, the report threshold is set at 70 mg/dL. The statistics are displayed in a bar chart with a supplementary detailed table view (accessed via View Details).



1. To adjust the report's threshold for hypoglycemia measurement to a value higher or lower than 70 mg/dL, use the **BG < *xx* mg/dl** drop-down menu.
   The value can be adjusted from 30 to 90 mg/dL.

   % BGs is the only option available for displaying the report's type of hypoglycemia percentage data. The report will display the percentage of BG entries less than the selected mg/dL value.

2. To change the display option for the report, use the **Display By** drop-down and select one of the following:
   - Facility (hospital)
   - Hospital unit – also requires selection of a facility (hospital)

3. Click **View Details** to see detailed information about the patients whose BG values are summarized in the report.

Details

Excel Print

Search:

Patient Name	Account Number	Hospital Unit	Date	BGValue	D50 Dose
Acuff, Billie	1007046	Default Facility:Default Hospital Unit	2017-02-28 02:41	20 mg/dl	0
Adams, Margaret	1007438	Default Facility:Default Hospital Unit	2017-03-01 12:29	69 mg/dl	12
Lind, Robert	1011428	Default Facility:Default Hospital Unit	2017-03-01 12:33	65 mg/dl	14
Tyson, Cassandra	1009772	Default Facility:Default Hospital Unit	2017-03-01 12:31	66 mg/dl	14

First Previous 1 Next Last

Number of records to display: 10

Use the sort buttons to adjust your view of the patient list and the **Search** field to locate a patient quickly by name or ID. By default, the View Details version of the report is sorted by patient last name.

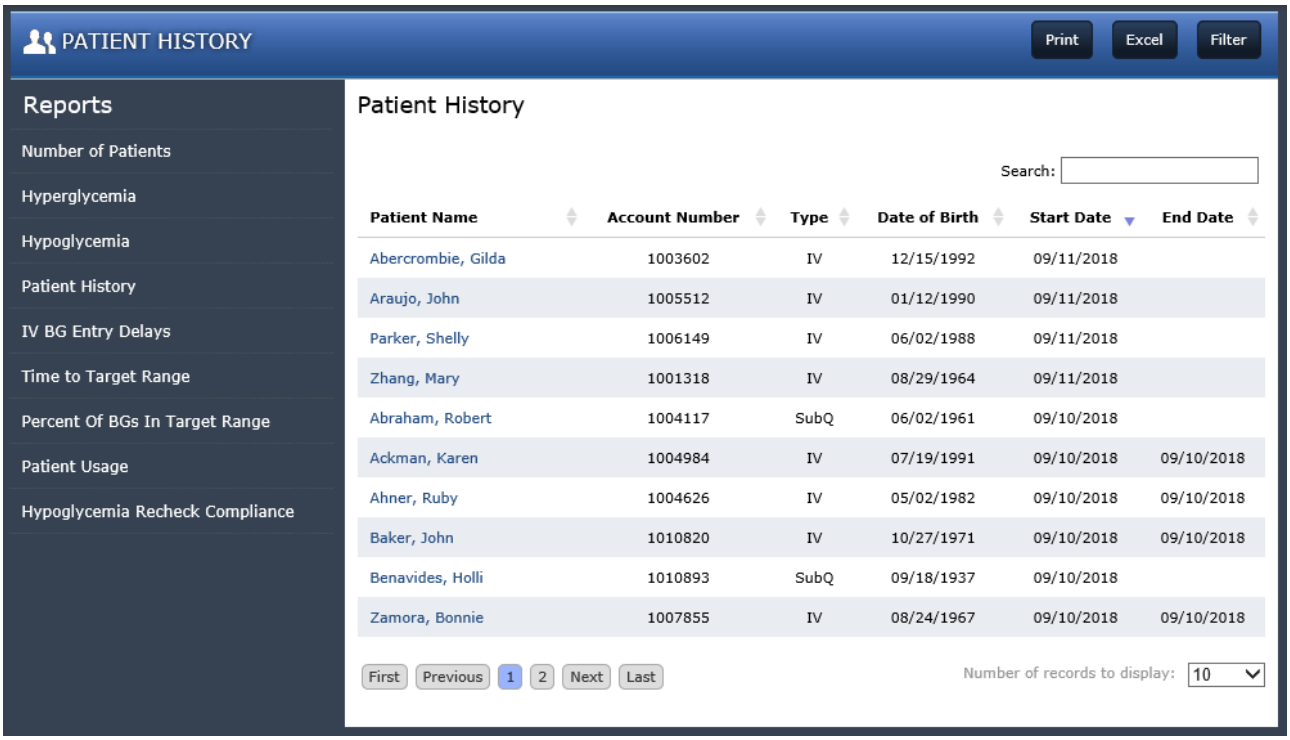
4. Use the buttons in the report title bar to print the report or save it to Excel (.xls).

Patient History

The Patient History report shows all patients who are or were active on Glucommander and provides access to their detailed history.

Each entry in the Patient History report records a separate treatment session – IV, SubQ, or Both (i.e., transitioned) – for the patient. That is why the same patient name often appears more than once in the report.

Patient sessions with no End Date entry indicate patients who remain active on the indicated type of treatment.



1. Click on any patient name to view a detailed history for that patient's treatment session.

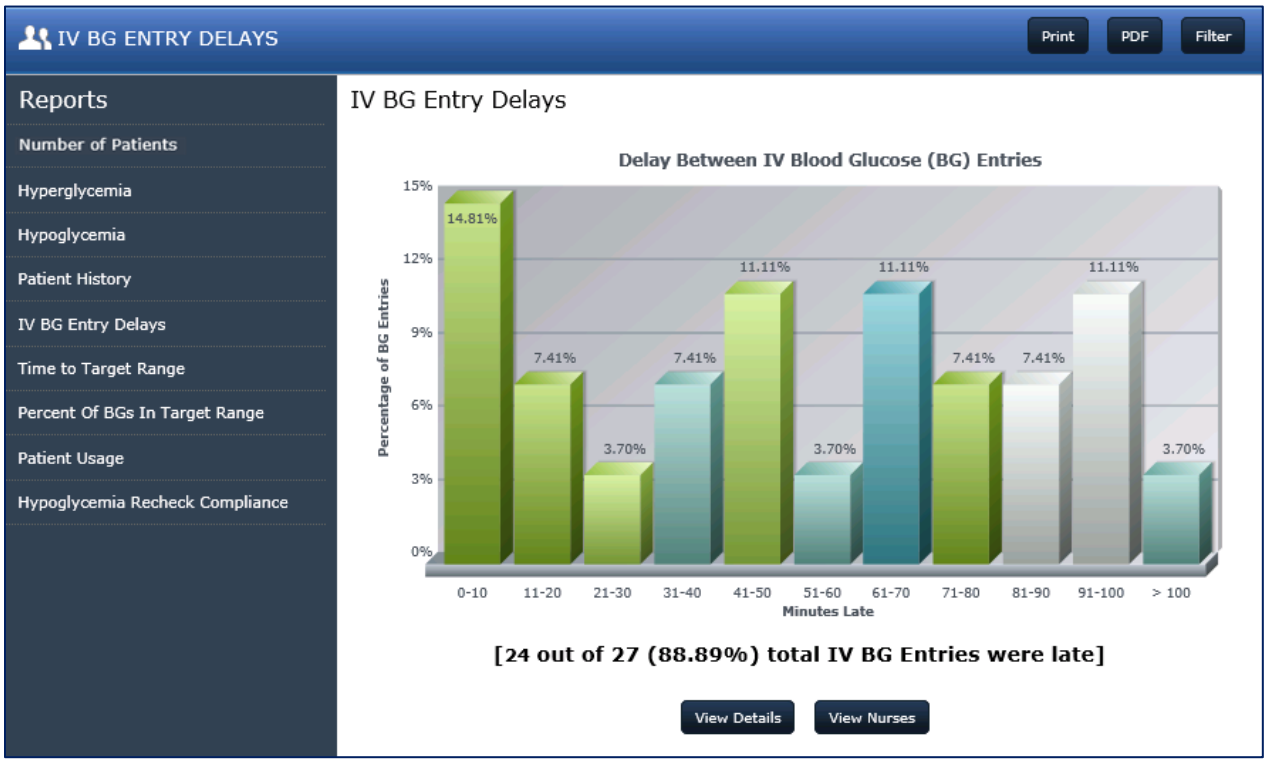
   To search for a patient, enter the patient's name in the **Search** field. To filter the user list by patient type, select IV or SubQ from the drop-down box. Use the pagination fields at the bottom of the report to adjust your view of the patient list.

2. To sort the report, use the buttons in any column.

3. Use the other buttons in the report title bar to print the report, save it to Excel (.xls), or filter its results.

IV BG Entry Delays

The IV BG Entry Delays report displays statistics about the timeliness of BG readings performed for patients on IV treatment. The report is a bar chart with separate bars for the percentage of BGs checked late in distinct time ranges (0-10 minutes late, 11-20 minutes late, etc.).



The **Filter** options for this report include the ability to filter the report by users — specifically, users who entered BGs past their due time. The default is All Users, and any individual user can be selected.

1. Hover the cursor over each vertical bar to see a tooltip displaying the number of BGs recorded late for the defined time ranges.

2. For more information about the delayed BG entries, click **View Details**. Details include minutes entered late and the entering nurse:

Details

Excel Print

Search:

Account Number	Nurse	Late	Expected	Actual
1001318	Gloria Fraeme	3 minutes	03:46	03:49
1001318	Gloria Fraeme	2 minutes	23:34	23:36
1001318	Gloria Fraeme	2 minutes	22:32	22:34
1001318	Gloria Fraeme	18 minutes	21:14	21:32
1001318	Gloria Fraeme	11 minutes	20:03	20:14

First Previous 1 2 Next Last Number of records to display: 10

Use the sort buttons to adjust your view of the patient list and the **Search** field to locate a patient quickly by name or ID.

3. For more information about the nurses who entered the BG entries, click View Nurses.

Details

Excel Print

Search:

Nurse Name	% BGs late < 10 min	% BGs late 10-60 min	% BGs late > 60 min	Total # late
Gloria Fraeme	74%	26%	0%	19

First Previous 1 Next Last Number of records to display: 10

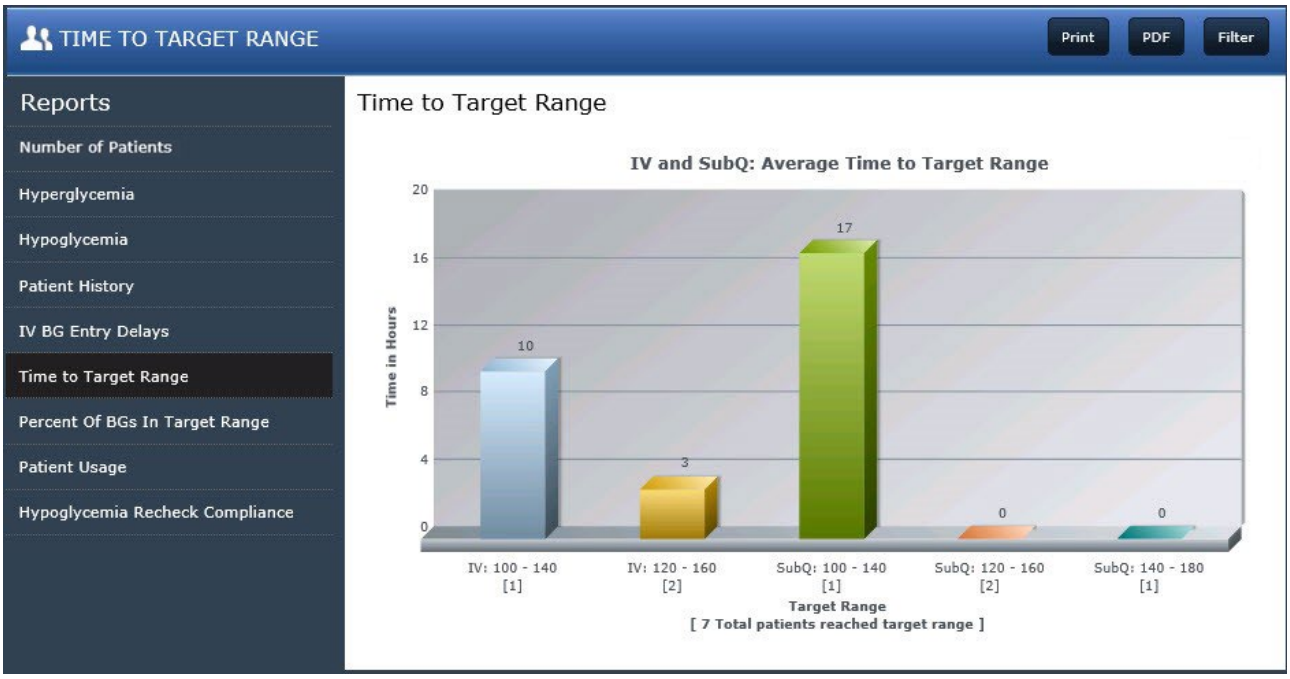
Use the sort buttons to adjust your view of the nurse list and the **Search** field to locate a nurse quickly by name.

4. Use the buttons in the report title bar to print the report or save it to Excel (.xls).

Time to Target Range

The Time to Target Range report displays the average time, in whole hours, that patients took to reach their assigned target ranges. The report is a bar chart that displays the average times to target for each target range, for IV and SubQ. For example, the average times for 100-140 IV and 100-140 SubQ are displayed as separate results.

The numbers above each bar indicate the y-axis value of average time in (whole) hours. The numbers in brackets below each bar indicate the number of patients to reach target within the assigned target range. The number [*xx*] in the legend below the chart [*xx* Total patients reached target range] is the total of all the numbers in brackets below the bars.



1. Hover your cursor over each vertical bar to see a tooltip displaying the total number of patients who reached the target range within the assigned target range. This same number is displayed in brackets [#] in the legend below each bar.

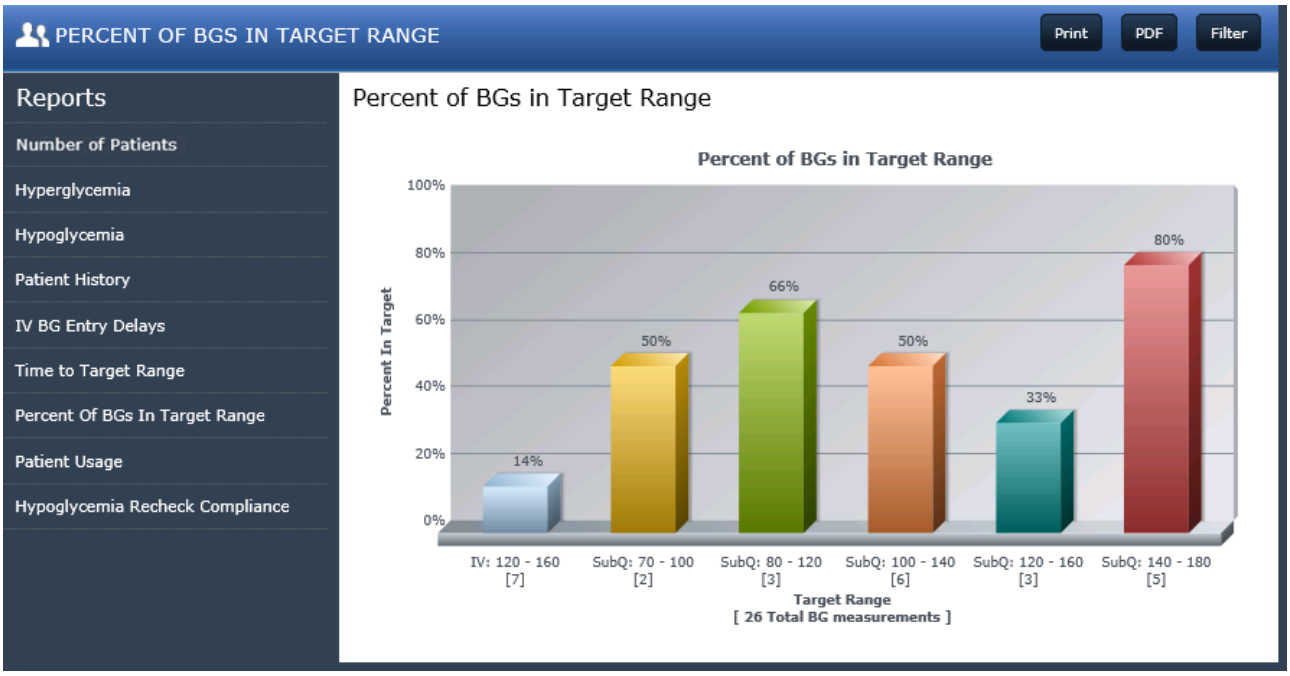
> In the report example above, the two SubQ patients with a target range of 120-160 both reached target in 0 hours – that is, with their first BG reading, so did the SubQ patient with the 140-180 target range. By contrast, it took the IV patient with a 100-140 target range 10 hours to get into target.

2. Use the buttons in the report title bar to print the report, export it to PDF, or filter the results.

Percent of BGs in Target Range

The Percentage of BGs in Target Range report indicates the percentage of in-target blood glucose (BG) entries within the patient-assigned target ranges.

A separate vertical bar is displayed for each IV or SubQ target range with assigned patients. Each bar shows the percentage of in-target BGs relative to the number of BGs recorded within that range. For example, a bar for SubQ: 100-140 shows 50% of in-target BGs for 6 BGs recorded within that range. This means that 3 BGs out of the 6 recorded were in-target.



1. Hover the cursor over each vertical bar to see a tooltip displaying the number of BGs recorded within the target range. This same number is displayed in brackets [#] in the legend below each bar.

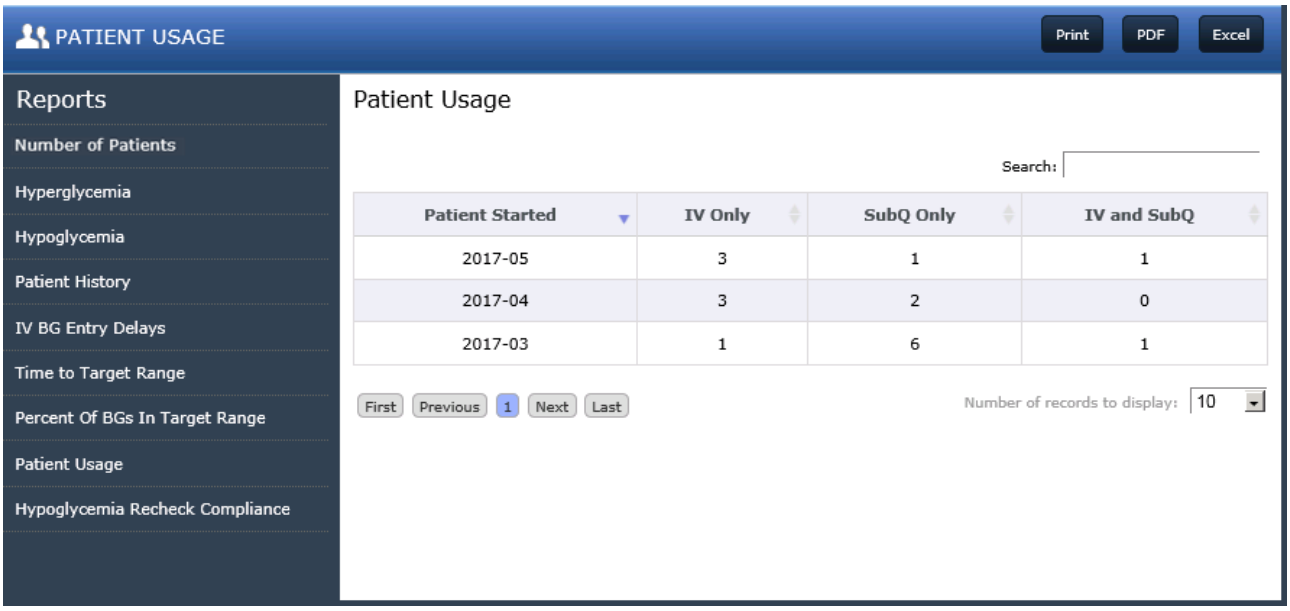
   The total of all BGs recorded in all assigned target ranges is displayed in the legend below the chart: [# Total BG measurements].

2. Use the buttons in the report title bar to print the report, export it to PDF, or filter the results.

Patient Usage

The Patient Usage report lists the number of IV and SubQ patients treated on Glucommander each month. Numbers are based on patient start date.

> Patients listed in the "IV and SubQ" column have transitioned from IV to SubQ or vice versa. After patients have transitioned and are listed in this column, they are no longer listed in the single-treatment column they started in.



1. To sort the report, use the buttons in any column.
2. Use the **Search** field to filter the report results by any numerical value.
3. Use the buttons in the report title bar to print the report, export it to PDF, or save it to Excel (.xls).

Hypoglycemia Recheck Compliance

The Hypoglycemia Recheck Compliance report lists patients with confirmed hypoglycemic blood glucose (BG) entries requiring a recheck within 15 minutes.

HYPOGLYCEMIA RECHECK COMPLIANCE

Print Excel Filter

Reports

- Number of Patients
- Hyperglycemia
- Hypoglycemia
- Patient History
- IV BG Entry Delays
- Time to Target Range
- Percent Of BGs In Target Range
- Patient Usage
- Hypoglycemia Recheck Compliance

Hypoglycemia Recheck Compliance

8 out of 14 Hypo BGs Rechecked within 15 Minutes

Search:

Patient Name	Account Number	Date/Time	BG	Treatment	Dose	Minutes	Nurse Name
Cory Hooper	A08	2023-04-26 09:53	68	D10	64 ml	15	Gloria Fraeme
Chantelle Bray	A04	2023-04-26 09:38	68	D50	13 ml	14	Gloria Fraeme
Justin Garrison	A02	2023-04-26 09:24	59	Carbs	15 gm	13	Gloria Fraeme
Anastasia Herrera	A07	2023-04-26 09:03	67	Glucagon	1 mg	13	Gloria Fraeme
Cory Hooper	A08	2023-04-26 08:49	64	D10	72 ml	12	Gloria Fraeme
Justin Garrison	A02	2023-04-26 08:33	61	Carbs	15 gm	15	Gloria Fraeme
Chantelle Bray	A04	2023-04-26 08:18	66	D50	14 ml	14	Gloria Fraeme
Hector Durham	A03	2023-04-26 08:04	63	Carbs	15 gm	13	Gloria Fraeme
Fred Rowe	A01	2023-04-26 07:41	57	Carbs	15 gm	17	Gloria Fraeme
Chantelle Bray	A04	2023-04-26 06:17	69	D50	12 ml	17	Gloria Fraeme

First Previous 1 2 Next Last

Number of records to display: 10

1. Click on any patient name to view a detailed history for that patient.

> To search for a patient, enter the patient's name in the **Search** field. Use the pagination fields at the bottom of the report to adjust your view of the patient list.

2. To sort the report, use the buttons in any column.

> If the number in the Minutes column exceeds the expected 15-minute interval, the number displays in red. If the number is less than or equal to 15 minutes, it displays in black. If the BG has not been rechecked, a dash displays.

3. Use the buttons in the report title bar to print the report, export it to PDF, save it to Excel (.xls), or filter its results.

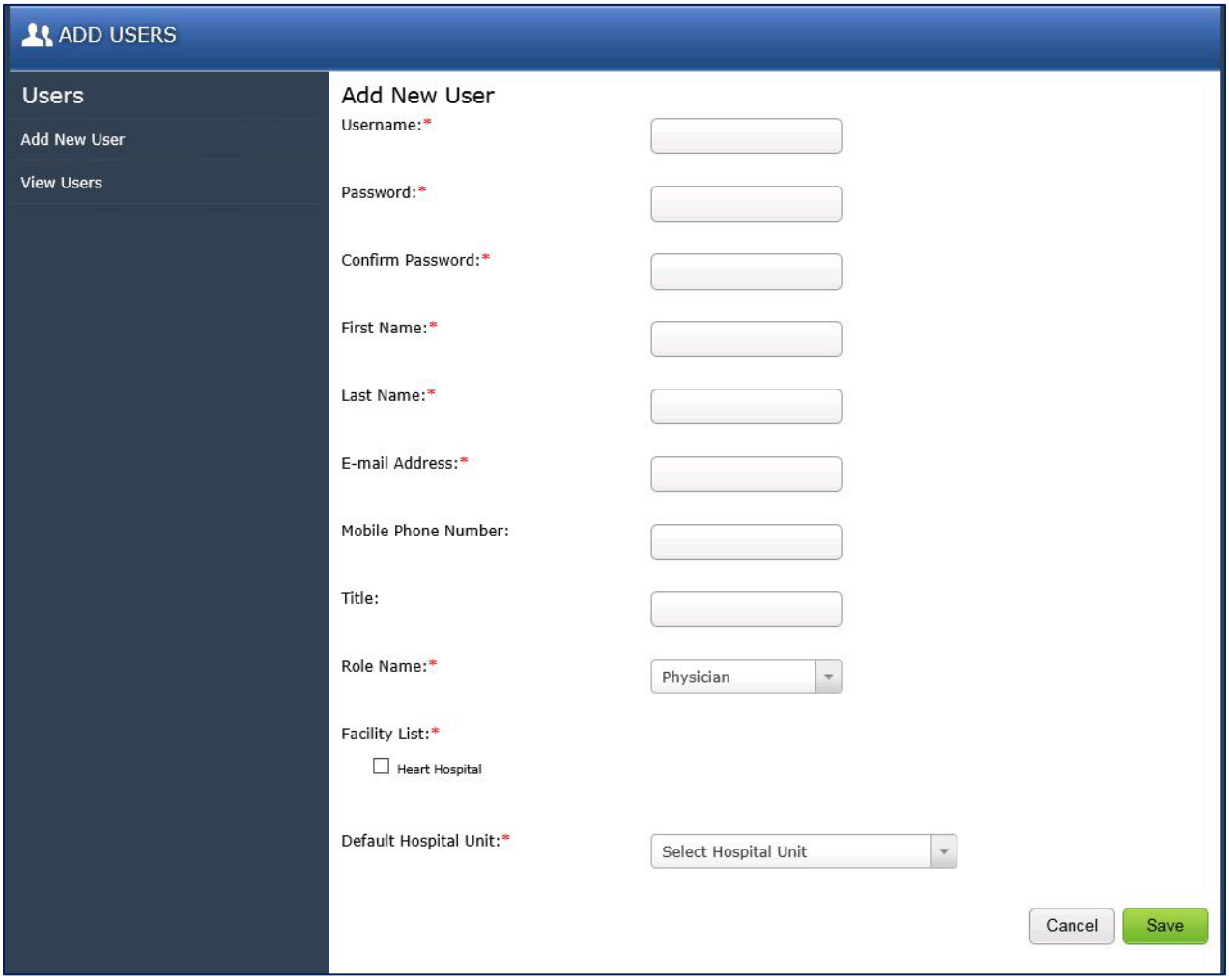
Administration

The **Admin** tab contains options for user-related configuration settings.

Add New User

The Add New User page allows you to create a new user of Glucommander.

Users with the user roles of Nurse Super User or Tech Support can add new users. For more information about user roles, see *Role Names*.



To add a user:

1. Complete the following fields. Required fields are marked with a red asterisk (*).

For help in filling out this and other pages, hover the cursor over each field to see the context-sensitive tooltips.

Field	Entry
Username	**Required**. User name can be alphanumeric, maximum of 50 characters.
Password	**Required**. Password length and format are determined by configuration.
Confirm Password	**Required**. Must match entry in Password field exactly.
First Name	**Required**. User's given name (e.g., Susan).
Last Name	**Required**. User's surname or family name (e.g., Jones).
E-mail Address	**Required**. User's email address (e.g., sjones@hospital.com).
Mobile Phone Number	User's cell phone number.
Title	User's job title (e.g., ICU Nursing Director).
Role Name	**Required**. User's role as defined within Glucommander. See *Role Names*.
Facility List	**Required**. User's hospital as defined within Glucommander. Select ☑ hospital from list.
Hospital Units in *variable*	**Required**. Hospital unit or units that user belongs to, associated with the facility (hospital) selected from Facility List. Unit(s) must already be defined within Glucommander.
Default Hospital Units	Hospital unit associated by default with the user. Patients in this unit are displayed by default on the dashboard (Current Patients page) when the user logs in. Unit must already be defined within Glucommander.

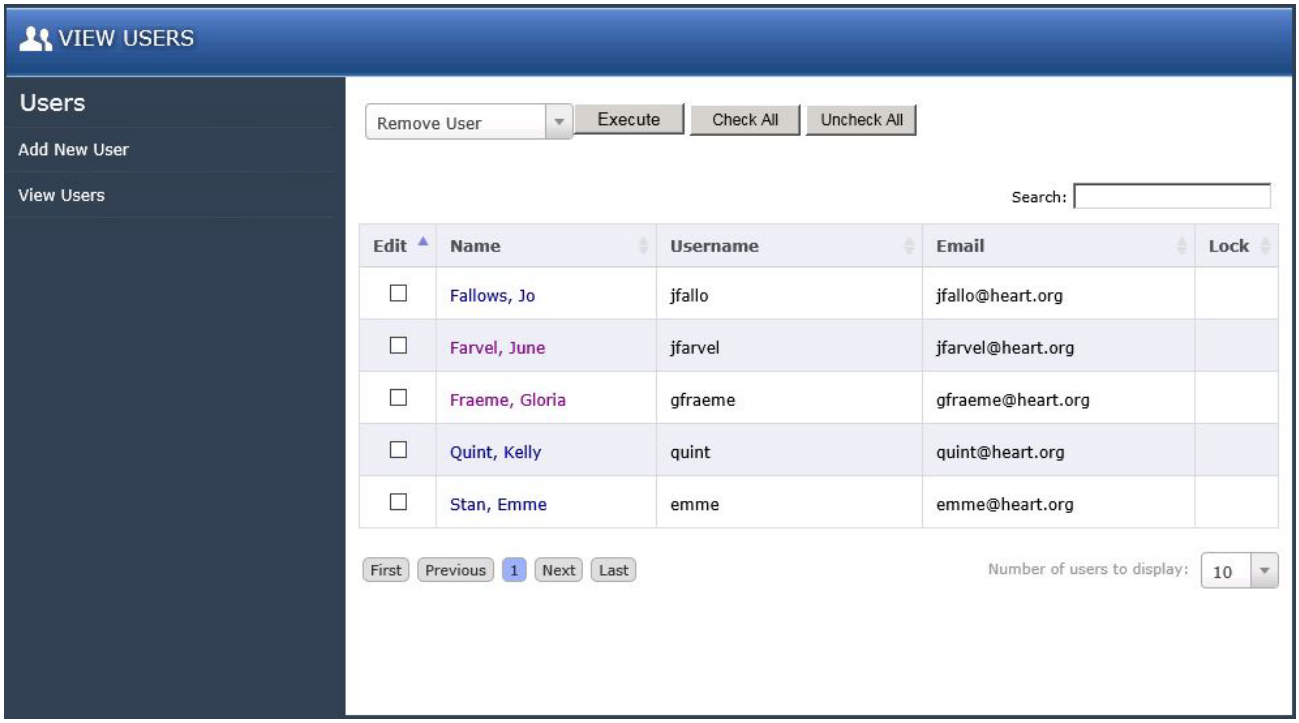
2. Click **Save**.

To edit a user's information, click the user's name on the View Users page. For more information, see *View Users*.

View Users

The View Users page allows you to edit user information and change other user settings.

Users with the user roles of Nurse Super User or Tech Support can view and edit users. For more information about user roles, see *Role Names*.



To edit a user's information:

1. Click the user's name. See *Add New User* for appropriate field values.

   To search for a user, enter the user's username in the **Search** field. Use the Show *xx* entries and **Previous/Next** fields to adjust your view of the user list.

2. On the Edit User page, make all necessary updates (e.g., change user's password) and then click **Save**.

   To search for a user, enter the user's username in the **Search** field. Use the Show *xx* entries and **Previous/Next** fields to adjust your view of the user list.

To change other user settings:

1. Select ☑ one or more of the listed users.

To select/unselect all users, click **Check All/Uncheck All**.

2. Select one of the actions listed in the drop-down menu at the top of the page:

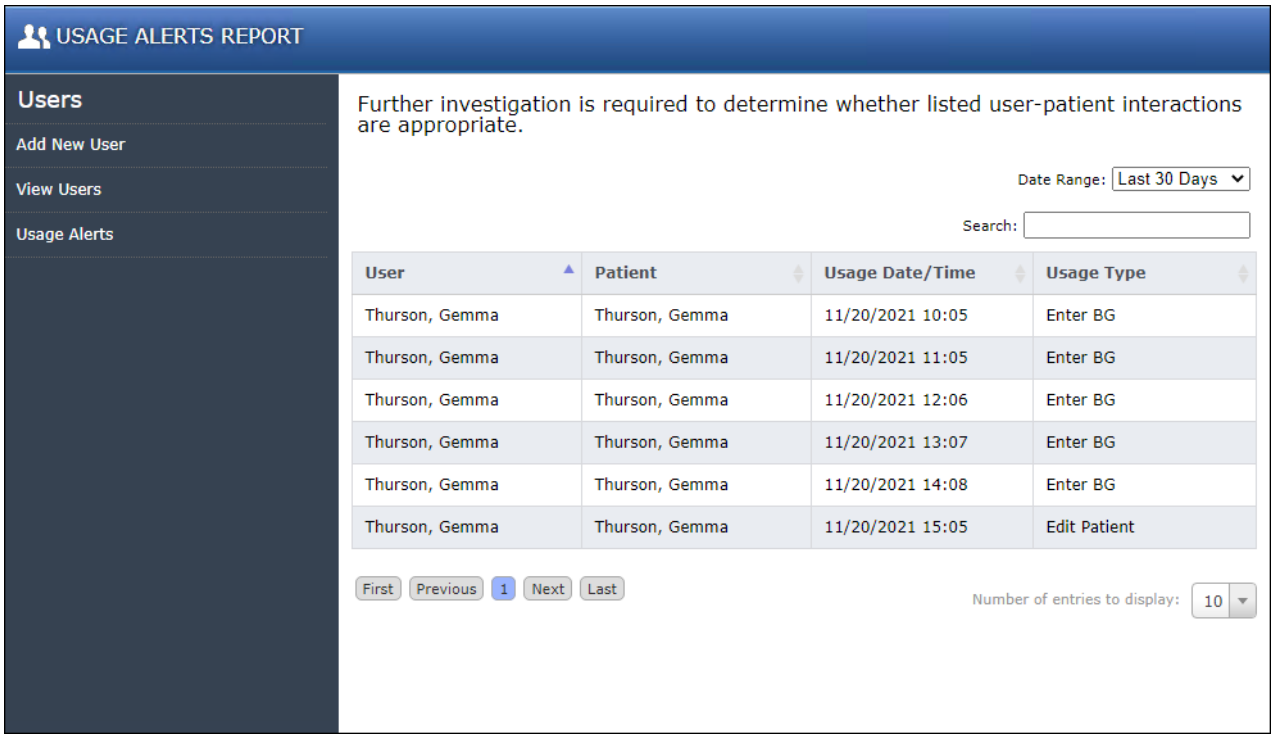
Action	Meaning
Remove User	Delete the user from Glucommander. Can be issued against one or more users at a time. **Note:** After a user is deleted, you can restore the user with a new password and access rights. On the Add New User page, enter the user's previous username, a new password, and all other required information and then click Save. Confirm the restoration when the confirmation message appears.
Generate Password	Create temporary password for user, to enable user to change that password to one of their choosing. Can be issued against one or more users at a time.
Lock Users	Place a lock on user, temporarily disabling login capability. Can be issued against one or more users at a time.
Unlock Users	Remove lock placed on user due to a Lock Users action or invalid login activity. Can be issued against one or more users at a time.
Import Users	Import user information from a comma-delimited (.csv) file.
Export Users	Export user information to a comma-delimited (.csv) file for easy reference outside of Glucommander. Can be issued against one or more users at a time.
Expire Password	Require user to reset Glucommander password following next login to system. Can be issued against one or more users at a time.

3. Click **Execute** to submit the action.

Usage Alerts

The Usage Alerts report allows administrative users to inspect potentially suspicious user-patient interactions. Glucommander flags these interactions on the basis of close similarity between user and patient names, which may indicate a user who was also a patient and who accessed their own patient records.

Users with a user role of Tech Support can view users and patients listed on this report. For more information about user roles, see *Role Names*.



To review user-patient interactions on this report:

1. For each user-patient interaction, the following information is listed:

Column	Meaning
User	User who interacted with the patient, identified by last name, first name.
Patient	Patient identified by last name, first name.
Usage Date/Time	Date and time (*mm/dd/yyyy hh:mm*) of the user-patient interaction identified in the Usage Type column. On this report the time of the user-patient interaction is displayed in Coordinated Universal Time (UTC) instead of the patient's local time zone. For example, a BG entry that was recorded in the local Eastern time zone at 11/20/2021 18:07 would be displayed on this report at 11/20/2021 13:07.

Column	Meaning
Usage Type	One of the following user-patient interactions: • Enter BG • Void BG • Enter Basal • Edit Protocol • Edit Patient (including adding, transitioning, and discontinuing) • Add Note

2. To search for a user or patient, enter the name in the **Search** field. Use the Number of entries to display xx and Previous/Next fields to adjust your view of the list.

3. To filter the report by date, use the **Date Range** field to make a selection. The default is Last 30 Days.

4. To sort the report by any column, use the buttons. By default, the report is sorted by user last name, ascending order.

General Precautions and Warnings

Clinicians treating patients with hyperglycemia via insulin therapy may encounter one or more adverse outcomes. Glucommander is designed to assist the clinician by providing additional clinical information and notification of the possibility of these common events occurring during treatment for reference.

Hypoglycemia

This condition occurs when the patient has received too much insulin and/or too little nutritional intake. The onset of hypoglycemia may differ depending on various circumstances, but strictly defined, hypoglycemia occurs when the body's counter-regulatory hormones are stimulated in response to a low blood glucose (BG) level. The body's response is an attempt to send additional glucose to the brain in order to preserve its viability and function since too little glucose can cause temporary or permanent brain damage.

Hypoglycemia is linked to neurological deficits, increased length of stay in the intensive care unit and increased mortality. Glucommander defines treatable hypoglycemia as less than 70 mg/dL When a patient's BG reaches this limit, Glucommander warns the healthcare professional to stop the insulin infusion and recommends a calculated amount of dextrose IV, carbohydrates, or Glucagon to give.[3] At this point Glucommander also resets its reminder alarm to 15 minutes for intravenous and subcutaneous treatment.

Documented evidence has shown that the risk of hypoglycemia can be minimized with prompt, on-time testing of the patient's BG at the predetermined intervals recommended by Glucommander.[4]

Glucose Velocity Rate/Cerebral Edema

Glucommander addresses the potential complication of cerebral edema by warning clinicians when a patient's BG level has decreased at a rate faster than 100 mg/dL/hr. This is called the Glucose Velocity Warning. The software prompts the clinician to recheck the patient's BG in 30 minutes instead of one hour. If the BG decreases by more than two-thirds, the timer is reset to 20 minutes.

Hyperglycemia

Hyperglycemia is a common occurrence in adults and children who are critically ill. Its occurrence has been associated with increased morbidity and mortality. Although tight glycemic control through the use of intensive insulin therapy has been shown to improve outcomes, it has sparked controversy, and adoption has been slow in the pediatric population due to the incidence

[3] Faustino, E.V., Hirshberg, E.L., Bogue, C.W. (2012). Hypoglycemia in critically ill children. *Journal of Diabetes Science and Technology*, *6*(1), 48-57.

[4] Davidson, P.C., Steed, R.D., Bode, B.W. (2005). Glucommander: a computer-directed intravenous insulin system shown to be safe, simple, and effective in 120,618 h of operation. *Diabetes Care*, *28*(10), 2418-23.

of hypoglycemia. Glucommander is used to achieve normoglycemia, defined as the midpoint of a provider-directed target range. Based on documented results, the risk of glycemic excursions can be minimized with prompt, on-time BG testing of the patient's BG at the predetermined intervals as recommended.[5]

Hyperosmolar Hyperglycemic State (HHS)

Patients with type 2 diabetes (diagnosed or new onset) may be at risk for HHS, a potentially fatal complication resulting from intracellular fluid imbalance.

Diabetic Ketoacidosis (DKA)

Patients with type 1 diabetes and some patients with type 2 diabetes (diagnosed or new onset) may be at risk for DKA when their BG levels are significantly elevated. In the absence of insulin, the body begins breaking down proteins as an alternative source of energy, creating ketones as a by-product. HHS and DKA are most commonly caused by infection, omission or inadequate insulin, pancreatitis, cerebrovascular accident, myocardial infarction, or drugs which interfere with carbohydrate metabolism, such as steroids, sympathomimetic agents and second-generation antipsychotics drugs.[6]

In critically ill patients with DKA or HHS, continuous intravenous insulin is the standard of care. Intravenous insulin infusions should be administered using validated written or computerized protocols that allow for predefined adjustments in the insulin infusion rate based on glycemic fluctuations and insulin dose.[7]

Special precautions must be taken to ensure that a patient's intravenous (IV) line is functioning properly. An infiltrated IV line can be the cause of unexplained hyperglycemia. Make sure to assess the IV line with each adjustment in IV insulin rate to ensure proper delivery of insulin infusion.

Anion Gap

In DKA, the accumulation of ketoacids results in an increased anion gap. The anion gap generally returns to a normal range when ketoacid anions have disappeared from the serum.[8]

A common oversight in the treatment of DKA patients is the premature discontinuation of insulin after glucose has been brought into the glycemic target but before the anion gap has normalized. If a user tries to discontinue IV treatment or transition the patient to SubQ treatment before the anion gap has closed, Glucommander issues a warning but does not prevent transition. For more information, see *Transition to SubQ*.

[5] Ulate, K.P., Raj, S., Rotta, A.T. (2012). Critical illness hyperglycemia in pediatric cardiac surgery. *Journal of Diabetes Science and Technology*, *6*(1), 29-36.
[6] Nyenwe, E.A. & Kitabchi, A.E. (2011). Evidence-based management of hyperglycemic emergencies in diabetes mellitus. *Diabetes Research and Clinical Practice, 94*, 340-251.
[7] American Diabetes Association. (2017). Diabetes Care in the Hospital. *Diabetes Care*, *40* (Suppl 1), S120-S127.
[8] Kitabchi, A.E., Umpierrez, G.E., Miles, J.M., & Fisher, J.N. (2009). Hyperglycemic crisis in adult patients with diabetes: ADA consensus statement. *Diabetes Care*, *32*(7), 1335-1343.

Hypokalemia

Low potassium levels may present a life-threatening event in patients. Treatment with insulin should not be initiated until potassium is > 3.3 mEq/L and close monitoring of potassium levels is recommended during ongoing IV insulin therapy.

Renal Failure

Patients with renal failure may experience significantly lower blood glucose (BG) levels and may be at risk for hypoglycemia. A patient with renal impairment may need more frequent monitoring to ensure a balance of electrolytes and glycemia. The kidneys degrade approximately 40 percent of insulin. In renally impaired patients, insulin levels build up and can lead to recurrent hypoglycemia. Therefore, extra precautions should be taken, e.g., target range may need to be increased, testing frequency may need to be increased, or the multiplier may need to be lowered. Contact the ordering provider if hypoglycemia occurs. The provider may want to increase the predetermined target range and/or lower the multiplier to minimize the risk of hypoglycemia.

False Test Results

The Glucommander system logic is not a substitute for but rather an adjunct to clinical reasoning. Clinicians should be careful not to treat patients solely on the basis of BG test results. They should be alert to the possibility of false test results in the following situations:

- In 2006, the FDA published warnings of erroneously elevated BG results in patients taking parenteral products containing maltose, galactose, or oral xylose and testing using glucose dehydrogenase pyrroloquinoline quinone (GDH-PQQ)-based glucose monitoring systems. It is important that the hospital verify that GDH-PQQ systems are not used to monitor patient BG results for this reason.[9]

- Critically ill patients experiencing hypotension, dehydration, or anemia are at risk for erroneous BG results. Healthcare professionals should be alert to the possibility that BG test results may be inaccurate.

- Capillary whole-blood testing – Currently, in a critical care setting, the American Diabetes Association (ADA) recommends use of serum blood testing because it is considered more reliable than capillary testing, particularly when patients encounter some of the conditions previously mentioned. Patients experiencing acidosis may need to be evaluated using venous BG measurements. Please consult your hospital BG monitoring literature to ensure accurate BG measurements before entering the BG value into Glucommander.

- Point-of-Care Meters – Point-of-care (POC) meters have limitations for measuring blood glucose. Although the U.S. Food and Drug Administration (FDA) has standards for blood glucose meters used by lay persons, there have been questions about the appropriateness of these criteria, especially in the hospital and for lower blood glucose readings (22). Significant discrepancies between capillary, venous, and arterial plasma samples have been observed in patients with low or high

[9] (2006). *The Nurse Practitioner*, 2006, 31(1), 72

hemoglobin concentrations and with hypoperfusion. Any glucose result that does not correlate with the patient's clinical status should be confirmed through conventional laboratory glucose tests. The FDA established a separate category for POC glucose meters for use in health care settings and has released guidance on in-hospital use with stricter standards (23). Before choosing a device for in-hospital use, consider the device's approval status and accuracy.[10]

Changes in Nutritional Status, Physical Activity, Patient Condition, and Medications

Glucommander offers recommendations for an insulin rate adjustment toward the goal of achieving and maintaining BG levels within target range.

As one would anticipate, changing nutrition or other variables may result in sudden changes in BG levels. For example, discontinuing enteral tube feedings or certain medications may cause a sudden drop in blood glucose.

To compensate for these changes, Glucommander will alert the clinician to re-check the patient's BG in as little as 30 minutes in order to monitor the patient more closely until his or her values have stabilized. It is important to recognize how changing variables like nutrition, stress (caused by infection or sepsis, the emotional and physical stress of surgery, etc.), and medication play a role in the glycemic management of the patient.

[10] *Diabetes Care* 2018 Jan; 41(Supplement 1): S144-S151. *https://doi.org/10.2337/dc18-S014*

Alerts, Alarms, and Warnings

Glucommander provides the user with numerous notifications about patient status and offers the clinician information related to glycemic management.

Glucommander offers these types of notifications:

- Alerts – Custom messages sent automatically by email to designated users when user-prescribed notifications occur.
- Alarms – Audible and/or visual messages generated within the Glucommander interface to notify clinicians of user-prescribed clinical input actions that have not been recorded or entered into Glucommander.
- Warnings – Visual messages to offer users useful clinical information relative to glycemic management.

Alarms

Glucommander generates the following alarm messages to notify clinicians of patient conditions requiring prompt attention. Most of these alarms appear on the dashboard (Current Patients page).

Alarm	Location	Why Triggered?	Action
(Audible alarms)	Dashboard (Current Patients page)	Audible alarms accompany red visual alarms, signal scheduled data entry needed. Audible alarms will sound and can be temporarily silenced by clicking the button if Alarm Snooze is enabled.	1. Respond to the alarm condition. Typically, a blood glucose (BG) entry is overdue. 2. To silence the alarm temporarily, click the Silence All Alarms button on the dashboard. The audible alarm will be silenced for the configured time period.

Alarm	Location	Why Triggered?	Action
A1C needed	Dashboard (Current Patients page)	A patient has been started on subcutaneous treatment without an A1c value.	Informational. When starting a patient on subcutaneous treatment or when prompted thereafter, either: • Provide an A1c value • Continue without providing an A1c value **Note:** An A1c value is not required for subcutaneous treatment on Glucommander.
Basal Overdue	Dashboard (Current Patients page)	A basal insulin dose entry for a subcutaneous patient is more than 2 hours past the time set in one of the basal insulin time fields.	Confirm and administer the basal dose.
Basal Overdue Contact Physician	Dashboard (Current Patients page)	A basal insulin dose entry for a subcutaneous patient is past due the configured time. The default setting is 3 hours.	1. Contact the prescribing provider to consider adjusting the basal distribution time (set on the SubQ Therapy page). 2. Confirm and administer the basal dose.
Basal Missed Contact Physician	Dashboard (Current Patients page)	A basal insulin dose entry for a subcutaneous patient is past due more than half the time between the current and next scheduled basal dose. For example, a patient is set for two basal doses per day, at 09:00 and 21:00, and the 09:00 basal has not been entered before 15:00. This basal is considered to have been missed.	Contact the prescribing provider for additional instructions.

Alarm	Location	Why Triggered?	Action
BG DUE!	Dashboard (Current Patients page), patient detail page	Countdown timer for BG data entry has expired. The amount of time between BG entries varies with the patient condition. Generally, if the patient's BG readings are within the specified target range, the timer is set to alert the clinician to re-check BG and enter result in one hour. After the patient's BG level has been reported in the provider-selected target range for two-and-a-half consecutive hours, the countdown timer is automatically set to re-check and enter a BG result at a configured interval (e.g., every 2 hours).	1. Check the patient's BG. 2. Click on the BG DUE! message area to input the BG value.
Converting to SubQ (Insulin)	Dashboard (Current Patients page), patient detail page	Transition to subcutaneous treatment has been started for an intravenous patient.	1. Continue to respond to BG DUE! messages and interact with the patient and Glucommander as during normal intravenous treatment. 2. Wait for Glucommander message to discontinue (D/C) insulin.
Last basal dose not recorded (Audible alarm)	Patient detail page	As soon as the basal dose is one minute late – for example, at 10:01 for a dose due at 10:00 – an audible alarm starts. At the same time the audible alarm starts sounding, a message in red text appears under the active Give Basal button, "Last basal dose not recorded."	1. Check the patient's BG. 2. If a bolus dose is also due, confirm and administer that dose first. 3. Confirm and administer the basal dose.

Alarm	Location	Why Triggered?	Action
Meal Bolus Activated	Patient detail page	A bolus insulin dosage entry has been started for an intravenous patient.	Informational. To cancel the meal, click **Cancel Meal** on the patient detail page.
Minimum Requirements have not been met in order to provide D/C medication considerations	Hospital to Home messages	Patient does not meet one or more of the following prerequisite conditions for Hospital to Home: • Is not on Glucommander SubQ treatment for at least 48 hours • Does not have a current A1c value (recorded within previous 60 days) • Did not have at least one BG 70 mg/dL or greater over the previous 24 hours	1. Obtain a current A1c value for the patient. 2. Keep patient on Glucommander SubQ treatment for at least 48 hours, which may help. 3. Get patient's BG level above 70 mg/dL. 4. Revisit Hospital to Home option only after first 3 actions have been completed.
Next Basal Dose box flashing amber color	Patient detail page	Two hours before the basal dose is due, the background of the Next Basal Dose box on the SubQ patient detail page starts flashing an amber color. For example, if the basal dose is due at 10:00, the background of the Next Basal Dose box starts flashing amber at 08:00.	Confirm and administer the basal dose at its scheduled time.
Paused turns amber color	Dashboard (Current Patients page), patient detail page	Fifteen minutes before new orders are required, the background of the patient's banner on the dashboard and PAUSED message on the patient detail page will turn amber.	If ready to resume insulin infusion, enter a BG and follow steps to resume insulin infusion.

Alarm	Location	Why Triggered?	Action
Paused with message to contact provider for new orders in red font.	Dashboard (Current Patients page), patient detail page	When new orders are required due to the length of time the IV is paused: Dashboard: the background of the patient's banner will return to gray. The font color for the pause message will change to red and new message displays: Contact provider for new orders. Patient Detail page: font changes to red and a new message displays: Contact provider for new orders. Order set button will display.	Contact the prescribing provider for new orders. Once new orders have been received, select the Order set button to initiate new orders and resume insulin infusion.

Warnings

Glucommander displays the following visual messages to offer users useful clinical information relative to glycemic management.

Message	Location	Why Triggered?	Recommended Action
A BG value was entered for this patient less than *xx* minute(s) ago. Entering another BG value now may affect the insulin dosing algorithm. Are you sure you want to continue?	Enter Current BG Value screen | Review Messages	User entered a BG reading for a patient and then less than 15 minutes later a second attempt is made.	Select the check mark and proceed with entering the BG reading.

Message	Location	Why Triggered?	Recommended Action
The BG value you entered is the same as the previous one. Are you sure you want to continue?	Enter Current BG Value screen | Review Messages	User entered a BG reading for a patient that is the same as the previous one.	Select the check mark and proceed with entering the BG reading.
BG value is less than 250 mg/dL. Check orders for possible change in IV fluids, especially in patients diagnosed with DKA.	Enter Current BG Value screen | Review Messages	The BG recorded is the first BG less than 250 mg/dL after BGs greater than or equal to 250 mg/dL were recorded.	1. Contact the attending provider. 2. Select the check mark and proceed with administering insulin as recommended if provider does not give new orders.
Entry cannot be above *configured Meter MAX value*. Select Meter MAX button to proceed.	Enter Current BG Value screen	The BG entered is above the meter maximum value configured for your facility.	1. Click the Meter MAX button. 2. Select the check mark and proceed with administering insulin as recommended if provider does not give new orders.
Entry cannot exceed 2499.	Enter Current BG Value screen	Glucommander prevents input of BG values above 2,499 mg/dL.	Contact the attending provider.
Entry must be a whole number greater than or equal to zero.	Various screen locations	Dose value entered with non-numeric character, such as a decimal, for a dose value that cannot contain non-numeric characters.	Delete non-numeric character.

Message	Location	Why Triggered?	Recommended Action
Blood Glucose is decreasing rapidly.	Enter Blood Glucose Value screen | Review Messages	BG level has decreased at a rate faster than: • 100 mg/dL/hr • 66%, between current and previous BG This is called the Glucose Velocity Warning.	Re-check and enter patient's BG in 20 or 30 minutes, depending on how rapid the decrease. **Note:** If drop is more than two-thirds of the previous BG entry (e.g., 330 mg/dl drops to 105 mg/dL), counter is reset to 20 minutes.
Insulin given within 3 hours. Insulin may still be on board. Giving more insulin may cause patient to become unstable.	Pop-up message	BG entry as part of subcutaneous insulin dosing requires a correction dose, but a previous correction dose was given within x hours of the current BG entry.	Click **Continue** to record the BG entry and, if an insulin dose is recommended, to confirm the recommended dose.
Do not D/C insulin. System will prompt for hourly blood glucose checks and will alert when IV insulin should be discontinued.	Convert to SubQ screen	User has initiated a transfer from intravenous to subcutaneous insulin.	1. Continue to respond to BG DUE! messages and interact with the patient and Glucommander as during normal intravenous treatment. 2. Wait for Glucommander message to discontinue (D/C) insulin.
Warning: Insulin infusion rate exceeds *xx* units/hr	Enter Blood Glucose Value screen | Adjust Insulin Infusion Rate to	The insulin rate configured in the **Display Warning if Insulin Rate >** field on the Protocol Settings page has been exceeded.	Informational. Watch insulin rate on subsequent entries. Entries may indicate early stages of insulin resistance.
Insulin resistance may exist. Contact the provider.	Enter Blood Glucose Value screen | Review Messages	The patient has had BG readings above 250 mg/dL for 4 consecutive hours.	Contact provider for additional instructions.

Message	Location	Why Triggered?	Recommended Action
Maximum insulin infusion rate has been reached. Contact physician and continue infusion at the above prescribed rate.	Enter Blood Glucose Value screen | Review Messages	Insulin rate has reached or exceeded the maximum rate specified in the **Stop Insulin Recommendation if Insulin Rate >** field on the IV Protocol Settings page. After the insulin rate reaches or exceeds this maximum rate, the current multiplier is frozen and Glucommander continues to recommend only the maximum rate. After the rate recommendation falls below the maximum, the multiplier is unfrozen and dose adjustments continue.	1. Continue infusion at the recommended dose. 2. Contact provider for additional instructions.
Meter Max activated.	Enter Current BG Value screen	User clicked the Meter MAX button or accepted an integrated meter maximum entry.	1. Continue treatment at the recommended meter maximum BG entry. 2. Contact provider for additional instructions.
Meter minimum selected. Are you sure you want to continue?	Enter Current BG Value screen	User clicked the Meter MIN button or accepted an integrated meter minimum entry.	Determine whether you want to accept the meter minimum BG entry: • If you want to continue, accept any other displayed messages and continue treatment at the recommended meter maximum BG entry. • If integrated entry, click Edit BG to clear the Enter BG field. • If manual entry, click Cancel to exit the Enter Current BG Value screen.

Message	Location	Why Triggered?	Recommended Action
Next basal dose will be due *hh:mm* on *yyyy-mm-dd*. Notify provider of *hh* hr gap in coverage of basal insulin. Void basal button will be unavailable if basal dose/distribution is edited.	SubQ Insulin Order Set Edit Screen	The basal time or the basal distribution frequency was edited	1. Notify provider of the gap in basal insulin coverage. 2. Click **Save** to confirm the changes.
Total daily dose of insulin is high (200 units or above). Do you want to continue?	SubQ Insulin Order Set | Transition Patient to SubQ screen	Total daily dose (TDD) has reached or exceeded 200 units. After the TDD reaches or exceeds 200 units, Glucommander notifies the user and allows treatment to continue if the patient is transitioning to SubQ or starting treatment on SubQ.	Determine whether you want to administer the dose even though it exceeds the TDD. • If you want to continue, continue treatment at the prescribed dose. • If you do not want to continue, contact provider for additional instructions.
Patient height and weight are missing	IV Insulin Order Set screen, SubQ Insulin Order Set screen	When added from the Add Patient page, patient is missing height and/or weight value.	1. Click **Edit**. 2. Provide the missing height and/or weight value.
Patient is at risk for DKA.	Enter Current BG Value screen | Review Messages	Initial BG value is above 250 mg/dL, the level at which Glucommander provides messages for diabetic ketoacidosis (DKA).	1. Select the check mark to view the recommended insulin dose. 2. Continue to watch for increases in BG value. 3. Recommend following DKA protocol.
Patient is at risk for Hyperosmolar Hyperglycemic State.	Enter Current BG Value screen | Review Messages	Initial BG value is above 300 mg/dL, which is the level at which Glucommander starts alerting for Hyperosmolar Hyperglycemic State (HHS).	Continue to monitor patient for BG increases.

Message	Location	Why Triggered?	Recommended Action
Patient does not qualify for SubQ treatment. Total Transitional basal must be at least 3 units. Contact physician for additional orders.	SubQ Insulin Order Set | Transition Patient to SubQ screen	Value in the Total Daily Dose field is less than 3 units.	Contact the provider for additional instructions.
Discontinue IV insulin to prevent hypoglycemia.	Enter Current BG Value screen | Review Messages	BG value is in target range, a precondition for transition to subcutaneous treatment.	1. Click **Discontinue IV** on the patient detail page. 2. Take the patient off intravenous insulin.
Since the patient's blood glucose is slightly elevated, a correction dose has been calculated.	Confirm Insulin Dosage screen	BG value is above the midpoint of the target range.	Informational.
Stop Insulin Infusion!	Enter Current BG Value screen | Adjust Insulin Infusion Rate to	On IV treatment, when the BG value indicates hypoglycemia (BG < 70 mg/dL), Glucommander displays a message to stop insulin, resets the reminder alarm for 15 minutes, and recommends a calculated IV push of D50W, carbohydrates, or Glucagon IM. On SubQ treatment, when the BG value indicates hypoglycemia (BG < 70 mg/dL), Glucommander resets the reminder alarm for 15 minutes and recommends a calculated IV push of D50W, carbohydrates, or Glucagon IM.	1. Select the check mark and then select a check mark beside one of the hypo treatment options. 2. Discontinue insulin. 3. Push recommended amount of hypo treatment. 4. If a renal dialysis patient did not receive renal dialysis today, recommend additional D50W.

Message	Location	Why Triggered?	Recommended Action
The Body Mass Index (BMI) of the patient you have entered is xx.0. Normally a patient's BMI is greater than/less than xx. Are you sure you entered the Height and Weight correctly?	Pop-up message	The BMI is outside the normal range, which is determined by the formula: BMI = [(Weight * 703) / (Height * Height)]	1. Note the discrepancy between the patient's calculated BMI and normal BMI. 2. Close the message, check the patient's Height and Weight values, and adjust if needed. **Note:** Glucommander will allow you to proceed if the patient's BMI is outside the normal range.
The two BG Values do not match.	Enter Current BG Value screen	Two different values entered in the Enter BG and Re-Enter BG fields	Delete the mismatched BG values and then enter the same BG value in the Enter BG and Re-Enter BG fields

SmartClick® Warnings

SmartClick® displays the following visual messages to offer users useful clinical information relative to glycemic management.

Message	Location	Why Triggered?	Recommended Action
Account: *PatientId* Does Not Exist in Glucommander	Patient detail page	The specified *PatientId* does not exist in Glucommander.	Confirm that the patient identifier matches the medical record number or account number, which are Glucommander recognized numbers.
Account: *PatientId* Age requirements not met. Patient must be at least <age> years old	Patient detail page	The patient specified by *PatientId* does not meet Glucommander minimum age requirements.	Verify the patient's date of birth. Glucommander is indicated for use in adult and pediatric (ages 2–17 years) patients.

Message	Location	Why Triggered?	Recommended Action
Facility does not match patient information	Patient detail page	FacilityName is specified but does not match the facility of the specified patient.	1. Determine if your facility matches the facility that the patient is in. If your facility does not match, the patient detail page will not load. 2. Contact your system administrator to update your permissions.
HospitalUnit does not match patient information	Patient detail page	HospitalUnit is specified but does not match the hospital unit of the specified patient.	1. Determine if your hospital unit matches the hospital unit that the patient is in. If your hospital unit does not match, the patient detail page will not load. 2. Contact your system administrator to update your permissions.
Invalid patient type for patient	Patient detail page	The patient found with the specified *PatientId* has a patient type that is not IV or SubQ.	The patient type is used only when the patient does not already exist in Glucommander.
Invalid role id *roleId* for action *action*	Patient detail page	User role for provided UserName is Tech Support or Kiosk and Action is PATIENTDETAIL OR ENTERBG.	1. Verify your Glucommander user role. Tech Support and Kiosk users cannot view patient treatment details. 2. Contact your system administrator to change your user role.
Unknown facility *facility* and/or Hospital Unit *hospital unit*	Dashboard (Current Patients page)	Facility or hospital unit is specified but does not match a facility/hospital unit in Glucommander.	1. Determine if your facility or hospital unit matches the location that the patient is in. If your facility or hospital unit do not match, the dashboard (current patients page) will not load. 2. Contact your system administrator to update your permissions.

Order Set Integration Warnings

When Order Set Integration is enabled, Glucommander may display the following visual messages.

Message	Location	Why Triggered?	Recommended Action
Conflicting values found for order set parameters. Please contact provider to correct orders.	Start Order Set page	Two SubQ order set requests are active for the patient, but their orders contain conflicting values for the same parameter(s). The corresponding field(s) are unselected or empty and editable.	Contact the provider to have the correct order set initiated in the EMR. Alternatively, enter the patient's order set parameters manually.
More than two orders received for this patient. Please contact the provider to discontinue unnecessary orders.	Start Order Set page	More than two order set requests are active for the patient within 10 days of the current time.	Contact the provider to have the correct order set initiated in the EMR. Alternatively, enter the patient's order set parameters manually.
No orders have been received.	Start Order Set page	There are no active order set requests for the patient. Order set fields are set to [Blank].	1. Contact the provider to have verify if the order has been initiated in the EMR. 2. Make manual selections per the provider order.
Orders received for different treatment type. Review orders in the EMR.	Start Order Set page	At least one order set request is active for the patient, but it is for the wrong treatment type (e.g., patient needs to start on IV, but only SubQ order set requests are active).	Contact the provider to have the correct order set initiated in the EMR. Alternatively, enter the patient's order set parameters manually.
Orders received have order set types that do not match. Please contact provider to correct orders.	Start Order Set page	Two SubQ order set requests are active for the patient, but their order set types (e.g., Basal/Bolus+Correction, Basal+Correction,) do not match.	Contact the provider to have the correct order set initiated in the EMR. Alternatively, enter the patient's order set parameters manually.

Message	Location	Why Triggered?	Recommended Action
Order set incomplete. Fill in missing information.	Start Order Set page	At least one order set request is active for the patient, but not all the fields have been populated and/or some of the order set fields are not valid options. The populated fields are loaded in “locked’ (read-only) mode, while the other fields are [Blank].	Make manual selections per the provider order.

Glossary

Glucommander alerts clinicians to a range of conditions. These conditions are labeled as warnings in the Glossary.

Term	Definition
A1c	Average amount of glycated hemoglobin (A1c) in the blood, calculated over a period of time (usually 2–3 months) and expressed as a percentage.
Blood Glucose (BG) Limit Exceeded	Glucommander does not accept input of BG values above 2,500 mg/dL. When Glucommander detects an entry of this value, it recommends the clinician contact a provider immediately for instruction.
Correction Factor (CF)	The correction factor (CF) is used to calculate the subcutaneous correction dose. To obtain the CF, divide the correction factor rule (e.g., 1700) by the total daily dose (TDD). The CF is good for 24 hours.
Correction Factor Rule (CFR)	The correction factor rule (CFR) is a value used to determine the correction factor (CF), which in turn is used to calculate the subcutaneous correction dose. For more information, see *Correction Factor (CF)* above. The CFR value used in Glucommander (e.g., 1700) is configurable on the SubQ Therapy page.
Force Focus when BG Due	If enabled on the General Settings page, this feature forces Glucommander to assume focus within the browser when a BG entry is due. While Force Focus is in effect, the Glucommander screen cannot be minimized. If other unused pages are open in the browser, Glucommander automatically opens on top of those other pages. If other pages, tools, or applications are in use, Glucommander flashes on the toolbar.
Glucose Velocity/Cerebral Edema Warning	If BG entries indicate values are falling faster than 100 mg/dL/hr, Glucommander displays an alert to the clinician and resets the countdown timer to require a BG entry in 30 minutes. If the data indicates a rate of decrease of more than two-thirds of the previous BG reading, the timer is reset to 20 minutes instead of 30 minutes.
Hyperglycemia Glucose Infusion	If fluid management is enabled, when BG is over 250 mg/dL for 3 consecutive entries and is increasing, Glucommander displays an alert recommending that the clinician stop administering a dextrose solution and begin a normal saline solution.

Term	Definition
Hypoglycemia	Glucommander defines treatable hypoglycemia for patients as less than 70 mg/dL. **Note:** The hypoglycemia threshold values for both intravenous and subcutaneous therapy can be adjusted with a provider's order.
Hypoglycemia Glucose Infusion	When the BG entry value indicates hypoglycemia (less than 70 mg/dL), Glucommander displays a message to stop insulin, resets the reminder alarm for 15 minutes, and recommends a calculated IV push of D50W.
Hypoglycemia Message Option	Located near the bottom of the IV Protocol Settings page, this option allows the default Glucommander hypoglycemia message to be replaced with a custom message: • Enabled – Glucommander displays a user-defined message instead of the Glucommander message. The custom message is specified in the **Hypoglycemia Message** field, which displays when Enabled is selected. • Disabled – Glucommander displays a default message, which recommends that the healthcare professional stop the insulin infusion and give a calculated amount of dextrose IV, carbohydrates, or glucagon. Along with the message, Glucommander resets its reminder alarm for 15 minutes. **Note:** Glucommander defines treatable hypoglycemia as less than 70 mg/dL.
Insulin Resistance	When a hyperglycemic BG entry has not fallen below 250 mg/dL in 4 hours, Glucommander displays a message that insulin resistance may exist. Recommendations of more than 500 units per hour of insulin are assumed to indicate extreme insulin resistance. At these values Glucommander will display a warning message indicating possible severe insulin resistance and recommend the healthcare professional to contact the attending provider for treatment of insulin resistance before resuming the program.
Insulin Sensitivity	See *Multiplier* below.
In-Target Timer	When the BG value is within the specified target range (see *Target Range* below), the timer is set to alert the clinician to enter a new BG in one hour. After the BG level has been confirmed within the provider-selected target range, the countdown timer is automatically set to re-check and enter a BG result at a configured interval (e.g., every 2 hours).
Height value	Patient height entries allow whole numbers without decimal values (e.g., 165 cm. or 65 in.) on the Edit Patient Details page in the Patient Demographics section.

Term	Definition
Hospital to Home	Feature of Glucommander, accessed from the SubQ patient detail toolbar, that provides at-home SubQ dosing considerations for a patient based on SubQ treatment in the hospital.
Lockout Effective Period	Time period a user must wait before being able to log in to Glucommander after exceeding the configured number of invalid login attempts.
Multiplier	In the Glucommander algorithm, the multiplier is used to approximate a patient's insulin sensitivity. For adults age 18 and above, the system provides a default value of 0.02, although 0.01 is typically recommended by providers for patients who may be at risk for complications arising from DKA, renal issues, or hypoglycemia. The provider may order higher multipliers for patients with insulin resistance. The Glucommander algorithm then adjusts this multiplier based on subsequent BG entries.
Patient Identifier	Either Account Number or Medical Record Number can be selected as the primary patient identifier. Whichever ID option is selected, Glucommander uses that value for the patient identifier. This HL7 feature is configured on the HL7 Interface Configuration page.
Patient List	List of patients on the Add Patient page (see page 170).When integrated with HL7, Glucommander is capable of displaying a patient list that includes the patient's hospital unit and room number.
Role Names	Users can have one of the following roles, selected on the Add New User page (see page 192). Each role has a corresponding responsibility level: • Admin – Glytec-only user role with access to all functions except Super User fields (see below). • Kiosk-Only – User role with access to only GlucoView. • Nurse – Access to patients and assigned hospital unit(s). No access to reports or administrative functions. • Nurse Super User – Access to patients and assigned hospital unit(s). Access to reports. Access to some administrative functions (can view, add, edit, and delete users, including Nurse Super Users). • Physician – Access to all hospital units and patients. Access to reports. No access to administrative functions. • Super User – Glytec-only user role with access to all functions, including Super User fields (on various configuration settings pages). • Tech Support – Access to some administrative functions (can view, add, edit, and delete users, including Tech Support users). No access to patients.
Session Lockout Time	Time period the Glucommander session must be inactive before the screen is locked, requiring the user to authenticate with login credentials to gain entry.

Term	Definition
Silence All Alarms	When a user clicks the Silence All Alarms button ( ) on the dashboard (Current Patients page), audible alarms are temporarily silenced (but not disabled) for all current users for the time period specified in the **Re-Alarm** field in General Settings. Visual alarms are not affected and cannot be disabled. Users are not required to provide login authentication (username and password) to silence alarms. **Note:** The Silence All Alarms button is not displayed if the feature is disabled.
Target Range	The provider-specified range of BG measurements (e.g., 90–120 mg/dL) that insulin treatment is aiming to achieve. Within Glucommander, intravenous and subcutaneous treatment may have different target range values.
Void BG	Feature of Glucommander that allows a BG value to be withdrawn or voided by any user with access to the patient's unit.
Weight value	Patient weight entries allow a single or two-digit decimal value (e.g., 120.5 lbs., 54.8 kg, or 98.43 kg.) on the Edit Patient Details page in the Patient Demographics section

Troubleshooting

No.	Condition	Solution
1	Alarm is not audible.	Verify that the computer is powered on, the sound card is properly installed and functioning, and the alarm is not temporarily silenced. Alarms can be temporarily silenced by clicking the Silence All Alarms button on the dashboard (Current Patients page). “Silence All Alarms” is not displayed if the feature is disabled. If Glucommander is running on a laptop, be sure to check that the computer is plugged into an electrical outlet, properly configured, and the speaker turned “ON” and set at an audible level. The charge on the portable computer’s battery might be so low that the alarm will not work. It is important to keep all portable computers charged up, especially those running the Glucommander application. Run the software compatibility check (see page 169 169) and verify all necessary components are properly installed. If this does not resolve the problem, contact your internal helpdesk or call Glytec at 888-458-2683.
2	Computer screen is blacked out and Glucommander has not generated an alarm for approximately three hours.	Check to determine whether the computer has gone into “Standby,” “Power Save,” or other hibernation state. Glucommander will **not** generate alerts or operate if the computer is in standby/sleep/power save mode. If other software programs remain operable, consult your hospital’s helpdesk support. As a precaution, be sure to follow hospital guidelines for disabling standby/sleep/power save mode to ensure the computer meets the Glucommander necessary requirements for hardware to remain functioning properly.
3	Glucommander appears to be running slowly or is not displaying properly (e.g., trouble viewing patients)	Press F5 on the keyboard to clear browser cache and to refresh the current page. If this does not resolve the issue, contact local IT support.

No.	Condition	Solution
4	No patients are showing on the dashboard (Current Patients page), and all patients on the Start a New Patient page are showing the intravenous (IV) and subcutaneous (SubQ) buttons as if they are new patients.	Patients on the Add Patient page who are active on Glucommander appear disabled/grayed-out. Also, when you hover over an active patient's name on the Add Patient page, Glucommander displays the message, "*patient* is already registered as an active patient in Glucommander." When the patient is no longer receiving treatment on Glucommander, the patient displays normally, the tooltip no longer appears on mouse hover, and the intravenous (IV) and subcutaneous (SubQ) buttons display beside the patient's name. Patients remain listed on the Add Patient page until they are discharged through the hospital's Admission/Discharge/Transfer (ADT) system.
5	User not seeing expected patients	Check which hospital unit the patient is assigned to as well as the role name assigned to the user, to make sure the user is also assigned to that unit. What units a user sees are based on the user's role. If units are added or removed after the user is configured, Glucommander does not automatically update and revise the user's access to these units (except for assigned Super Users). For more about user roles, see *Role Names*.
6	Glucommander is not running as expected.	Run the software compatibility check (see page 169 169) and verify all necessary components are properly installed.
7	Patient on GlucoView (kiosk) has timer counting down with flashing red background and alarm tone	Perform a manual refresh (e.g., press F5) on the computer where GlucoView (kiosk) is displayed. Refresh should dismiss flashing alert and alarm.

Frequently Asked Questions

No.	Question	Answer
1	How is a pediatric patient identified?	Patients of ages 2–17 are considered pediatric patients. On the dashboard (Current Patients page), a Pediatric label identifies all pediatric patients as a result of the date of birth entry.
2	How is the initial multiplier determined for pediatric patients?	In the intravenous treatment protocol for pediatric patients, the initial multiplier is a weight-based recommendation that can be overridden by provider order.
3	Can you start a patient directly on subcutaneous therapy?	Yes, you can start a patient directly on subcutaneous therapy using one of two options: weight-based or provider-directed custom dose.
4	What condition needs to be met before you can transition a patient from intravenous to subcutaneous therapy?	Patients cannot transition to SubQ therapy until they have been on IV therapy for 6 hours and have their last 2 consecutive BGs in the 70-180 mg/dL range.
5	Are there any messages for mealtime using subcutaneous therapy?	During subcutaneous treatment, Glucommander displays the name of the current mealtime for which a blood glucose (BG) entry is due.
6	Can I use insulin not displayed by Glucommander?	No, you can use only insulin choices available for display by Glucommander. Which insulins are displayed is controlled by the **Basal Insulin Type** and **Bolus Type** fields on the SubQ Protocol Settings page.
7	Can I use insulin mixtures?	No, Glucommander is not indicated for use when dosing mixed insulins.

No.	Question	Answer
8	What subcutaneous insulin types are permitted?	For basal therapy, Glucommander recommends the following basal insulins: • detemir (Levemir) • glargine (Lantus) • NPH • glargine (Basaglar) • glargine (Toujeo) • glargine (Semglee) For subcutaneous bolus dosing, Glucommander accepts only these insulins: • aspart (Novolog) • glulisine (Apidra) • lispro (Humalog) • lispro (Admelog) • aspart (Fiasp) • lispro-aabc (Lyumjev)
9	What if I forget my Glucommander access information?	If you forget your access information: • Reset your password by clicking the **Forgot Password?** link on the Glucommander Log In page. For this option to work, an email address that you can access must be associated with your Glucommander user account. • Contact your hospital's helpdesk support.
10	When an IV meal bolus is active in Glucommander, and a patient does not eat within the first 30-minute BG entry period, what happens?	Click **Cancel Meal**, select the check mark for the question, "*Are you sure you would like to cancel the meal for this patient,*" enter the patient's current BG value and then Glucommander will cancel the IV meal bolus.
11	When can an early morning Misc BG value be used to adjust the basal dose?	An early morning Misc BG value can adjust the basal dose under these conditions: • Any BG reading less than 3 hours after another BG that resulted in 3 or more correction units is eliminated as a candidate for basal adjustment. • Of the candidate BGs that remain, choose the lowest BG for adjustment.

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Appendix

Glucommander Downtime Forms

The goal of insulin therapy is to maintain blood glucose values within the prescribed target range.

The following written protocols are suggestions for treatment that can be used in the event of system downtime.

Intravenous

- Pediatric Glucommander Intravenous Insulin Downtime Form (for versions 3.5.2 and later)
- Glucommander Intravenous Insulin Downtime Form (for versions 3.5.3 and later)
- Glucommander OB Intravenous Insulin Downtime Form (for versions 3.5.3 and later)

Subcutaneous

- Basal / Bolus + Correction Subcutaneous (SubQ) Insulin Downtime Form (for versions 3.5.3 or later)
- Subcutaneous Insulin Downtime Form for Initiating Therapy (for versions 3.5.3 or later)
- Basal + Correction Subcutaneous (SubQ) Insulin Downtime Form (for versions 3.5.3 or later)

Glucommander®

Patient Label

PEDIATRIC Glucommander Intravenous Insulin Downtime Form (for versions 3.5.2 and later)

PEDIATRIC USE ONLY (AGES 2-17)

Initial Step: Obtain Multiplier

Date: _____

Obtain known multiplier _____. *(reference Glucommander Flowsheet in EMR).*

If multiplier is unknown, calculate multiplier by using the following:

*Do not use an insulin rate during a meal bolus to calculate the multiplier. If during a meal bolus, use the insulin rate and BG prior to starting the meal bolus to calculate the multiplier.

Last insulin rate (units/hr) ÷ (Last BG value – 60) = multiplier

_____ ÷ (_____ – 60) = _____

If new start:
Use table to determine initial multiplier

Weight in kg	Initial Multiplier
5-9 kg	0.001
10-14 kg	0.002
15-19 kg	0.003
20-24 kg	0.004
25-29 kg	0.005

Weight in kg	Initial Multiplier
30-34 kg	0.006
35-39 kg	0.007
40-44 kg	0.008
45-49 kg	0.009
>/=50 kg	0.01

Multiplier Adjustment (based on BG value and target range _____)

Check BG values every hour, and adjust multiplier as follows

BG **above** target high	**Multiply previous multiplier (PM) by 1.1**
BG **within** target range	**No change in multiplier**
BG **below** target low but **greater than** [stop insulin value]	**Multiply previous multiplier (PM) by 0.9**
BG **less than or equal to** [stop insulin value] but **greater than or equal** to [hypo value]	1. Stop infusion - change rate to 0 units/hr. 2. **Multiply previous multiplier (PM) by 0.9**

BG **less than** [hypo value]	1. Stop infusion - change rate to 0 units/hr. 2. Administer IV Dextrose, Carbohydrates, or IM Glucagon according to facility protocol. 3. Recheck BG in 15 minutes **4. Multiply previous multiplier (PM) by 0.9**

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Glucommander®

Patient Label

PEDIATRIC Glucommander Intravenous Insulin Downtime Form **(for versions 3.5.2 and later)**

PEDIATRIC USE ONLY (Ages 2-17)

Time	BG	–	60	=		X	(PM X Adjustment = New Multiplier) New Multiplier*	=	New rate (units/hr)	Hypo Treatment	Signature
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			

*Multiplier should be rounded to 4 decimal places (Ex. 0.07483 would round to 0.0748)

Resuming Glucommander from Downtime:

1. Obtain a new BG when due
2. Enter the BG on this downtime form and calculate a new multiplier
3. Open Glucommander IV
4. **BEFORE ENTERING the BG**, edit the multiplier to the last multiplier used on this form
5. Enter the BG in Glucommander
6. Confirm the infusion rate and click save

Glucommander®

Patient Label

Glucommander Intravenous Insulin Downtime Form **(for versions 3.5.3 and later)**

Initial Step: Obtain Multiplier Date: _____

Obtain known multiplier _____ *(reference Glucommander Flowsheet in EMR).*

If multiplier is unknown, calculate multiplier by using the following:
**Do not use an insulin rate during a meal bolus to calculate the multiplier. If during a meal bolus, use the insulin rate and BG prior to starting the meal bolus to calculate the multiplier.*

Last insulin rate (units/hr) ÷ (Last BG value – 60) = multiplier

_____ ÷ (_____ – 60) = [ ]

Multiplier Adjustment (based on BG value and target range _____)

Check BG values every hour, and adjust multiplier as follows

BG **above** target high	**Multiply previous multiplier (PM) by 1.1**
BG **within** target range	**No change in multiplier**
BG **below** target low but **greater than** [stop insulin value]	**Multiply previous multiplier (PM) by 0.9**
BG **less than or equal** to [stop insulin value] but **greater than or equal** to [hypo value]	1. Stop infusion - change rate to 0 units/hr. 2. Multiply previous multiplier (PM) by 0.9
BG **less than** [hypo value] If OB population uses hypoglycemia threshold of <60, create an OB specific form. Delete first row in Dextrose table and change to 54-59 for 15 grams of carbs.	1. Stop infusion - change rate to 0 units/hr. 2. Select Treatment: IV Dextrose (D50 or D10), Oral Carbohydrates or IM Glucagon 1mg (see tables). 3. Recheck BG in 15 minutes **4. Multiply previous multiplier (PM) by 0.9**

BG (mg/dL)	D50W	D10W
60-69	15 mL IV push	75 mL IV
50-59	20 mL IV push	100 mL IV
30-49	25 mL IV push	125 mL IV
< 30	30 mL IV push	150 mL IV

BG (mg/dL)	Carbohydrates
54-69	15 grams
< 54	30 grams

Glucommander®

Patient Label

Glucommander Intravenous Insulin Downtime Form (for versions 3.5.3 and later)

Treatment Log: Calculate Infusion Rate

Time	BG	–	60	=		X	(PM X Adjustment = New Multiplier) New Multiplier*	=	New rate (units/hr)	Hypo Treatment	Signature
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			
		–	60	=		X		=			

*Multiplier should be rounded to 3 decimal places (Ex. 0.0748 would round to 0.075)

Resuming Glucommander from Downtime:

1. Obtain a new BG when due
2. Enter the BG on this downtime form and calculate a new multiplier
3. Open Glucommander IV
4. **BEFORE ENTERING the BG**, edit the multiplier to the last multiplier used on this form
5. Enter the BG in Glucommander
6. Confirm the infusion rate and click save

Glucommander®

Patient Label

Glucommander OB Intravenous Insulin Downtime Form (for versions 3.5.3 and later)

(For use in units with hypoglycemia configured to <60 mg/dL)

Date:

Step 1: Obtain Target BG range: _____ mg/dL

Step 2: Obtain known multiplier _____.

(reference Glucommander Flowsheet in EMR)

If multiplier is unknown, calculate multiplier by using the following formula:

Note: Do not use an insulin rate during a meal bolus to calculate the multiplier.
If during a meal bolus, use the insulin rate and BG prior to starting the meal bolus to calculate the multiplier.

Last insulin rate (units/hr) ÷ (Last BG value – 60) = multiplier

_____ ÷ (_____ – 60) = _____

If new start or multiplier is known, use multiplier in flowsheet below.

Note Meter Min/Max:

Facility meter max value _____, Meter minimum value _____.

For **Glucose** Meter Max/Min values, use the meter max/min value as the BG in the calculation below.

Check Blood Glucose (BG) every hour:

With each BG check, adjust multiplier:

- If BG is above target range, multiply previous multiplier (PM) by 1.1
- If BG is within target range, no change in multiplier.
- If BG is below target range, multiply previous multiplier (PM) by 0.9

Multiplier should be rounded to 3 decimal places. (Ex. 0.0748 would round to 0.075)

Time	BG	–	60	=		X	(PM X Adjustment = New Multiplier) New Multiplier	=	New rate (units/hr)	Signature
		–	60	=		X		=		
		–	60	=		X		=		
		–	60	=		X		=		
		–	60	=		X		=		
		–	60	=		X		=		
		–	60	=		X		=		

Once Glucommander resumes, take the following steps:

1. Obtain a new BG when due
2. Enter the BG on this downtime form and calculate a new multiplier
3. Open Glucommander IV
4. **BEFORE ENTERING the BG**, edit the multiplier to the last multiplier used on this form
5. Enter the BG in Glucommander
6. Confirm the infusion rate and click save

Glucommander®

Patient Label

Glucommander OB Intravenous Insulin Downtime Form (for versions 3.5.3 and later)

(For use in units with hypoglycemia configured to <60 mg/dL)

For BG < 60 mg/dL:

- **Stop insulin infusion**
- Select Treatment: IV Dextrose (D50 or D10), Oral Carbohydrates, or IM Glucagon IM 1mg (see tables)
- Recheck BG in 15 minutes
- For BG recheck results:
  - BG >80 mg/dL: Multiply previous multiplier (PM) by 0.9, calculate new insulin rate. Resume insulin infusion and hourly BG monitoring
  - BG 60-80 mg/dL: Insulin infusion remains off. Recheck BG in 15 minutes.
  - BG <60 mg/dL: Repeat hypoglycemia treatment and notify provider

BG (mg/dL)	D50W	D10W
50-59	20 mL IV	100 mL IV
30-49	25 mL IV	125 mL IV
< 30	30 mL IV	150 mL IV

BG (mg/dL)	Carbohydrates
54-59	15 grams
< 54	30 grams

Time	BG	Hypoglycemia Treatment (carbohydrate, mL D50 or Glucagon)	Signature

Glucommander®

Patient Label

Basal/Bolus + Correction Subcutaneous (SubQ) Insulin Downtime Form (for versions 3.5.3 or later)

Date: _____. Start new form each day.

**If patient has not been on Glucommander for 24 hours, use the *Initiating SubQ Therapy During Downtime* form to calculate doses.

Step 1: Calculate the patient's total daily dose (TDD) of insulin. To do this, add the most recent *projected* meal bolus insulin doses plus the most recent total basal insulin dose recommendations (if dose edited by provider, use edited dose).
Also, obtain the target range: _____.

Meal		***Projected* Meal Bolus Dose (units)** *Obtain from Glucommander Flowsheet*
Breakfast		
Lunch	+	
Dinner	+	
Basal		**Basal Dose (units)**
AM Dose	+	
PM Dose	+	
Total Daily Dose (TDD) Meal boluses + Basal doses	=	

Step 2: Meal bolus insulin: For current meal bolus dose, use the projected meal dose for that meal (from the table above). Use the chart below to adjust the dose based on percentage of carbohydrates the patient will eat. Remember to administer meal bolus insulin when the meal tray is at the bedside and patient is prepared to eat. For bedtime snacks up to 30 grams of carbohydrate, give 1 units per 15 grams of carbs

Carb %	Meal Bolus Adjustment
0-25%	Hold meal bolus
25-75%	½ meal bolus
75% or more	Full meal bolus

Breakfast	Lunch	Dinner	Snack (if applicable)
Projected Dose:	Projected Dose:	Projected Dose:	
Carb %	Carb %	Carb %	Carb grams:
Meal Dose:	Meal Dose:	Meal Dose:	Snack Dose:

Step 3: Correction insulin, if the patient's BG is 150mg/dl or greater at designated BG checks, use the Correction Insulin Dosing Table below to determine correction dose. Use the column that corresponds to the **TDD.**

Correction Insulin Dosing Table	BG Value (mg/dl)	For TDD ≤ 40 units/day	For TDD 41 to 80 units/day	For TDD > 80 units/day
	150 – 199	1 Unit	1 Units	2 Units
	200 – 249	2 Units	3 Units	4 Units
	250 – 299	3 Units	5 Units	7 Units
	300 – 349	4 Units	7 Units	10 Units
	>349	5 Units	8 Units	12 Units

Glucommander®

Patient Label

Basal/Bolus + Correction Subcutaneous (SubQ) Insulin Downtime Form (for versions 3.5.3 or later)

	Breakfast	Lunch	Dinner	Bedtime	Midsleep	PRN
BG Value						
Correction Dose (units)						

Step 4: basal insulin:
Use today's basal dose recommendation, if available from Glucommander (see flowsheet): _____
If today's basal dose recommendation is not available, notify the provider for basal dose adjustment.

AM Basal Dose (units)	
PM Basal Dose (units)	

Hypoglycemia: For any BG < 70 mg/dl:

- Select treatment: IV Dextrose (D50 or D10), Oral Carbohydrates, or IM Glucagon 1 mg (see tables)
- Recheck BG in 15 minutes.
- Repeat as necessary.
- Notify provider for potential adjustments to meal bolus or basal insulin doses

BG (mg/dL)	D50W	D10W
60-69	15 mL IV push	75 mL IV
50-59	20 mL IV push	100 mL IV
30-49	25 mL IV push	125 mL IV
< 30	30 mL IV push	150 mL IV

BG (mg/dL)	Carbohydrates
54-69	15 grams
< 54	30 grams

All insulin doses need to be documented in the MAR. Once system resumes, enter any missed BG values and insulin doses from past 24 hours in Glucommander. Edit the date, time, and dose to match MAR documentation.

To restart Glucommander after downtime:

Less than 24 hours downtime: Enter or confirm basal dose if administered during downtime. Then enter other BG's and doses as "Late Entries" in Glucommander.
Greater than 24 hours downtime: Review current BG's and insulin doses with provider. Restart in Glucommander using Custom Start or Weight-based multiplier per provider's order

Glucommander®

Patient Label

Subcutaneous Insulin Downtime Form for Initiating Therapy (for versions 3.5.3 or later)

Custom – Follow physician orders for initial dosing. Utilize the *Correction Insulin Dosing Table* to determine correction dose if Blood Glucose (BG) is 150 mg/dl or greater. Follow steps #4 and #5 below. **Weight Based** – Record order set parameters ordered by physician below.

Patient Weight (kg): _____ TDD Multiplier: _____ % Basal: _____

1. Calculate Total Daily Dose (TDD)

_____ X _____ = _____
(Weight) (TDD Multiplier) (TDD)

2. Calculate Basal Dose

_____ X _____ = _____
(TDD from Step 1) (% Basal) (Total Basal Dose)

Give basal insulin once daily (full amount) or twice daily (half of the total daily basal dose at each dose).

3. Calculate Bolus Dose. Skip this step if patient is on Basal + Correction order set.

_____ - _____ = _____
(TDD) (Total Basal Dose) (Meal Bolus TOTAL)

_____ ÷ 3 = _____
(Meal Bolus TOTAL) (Individual Meal Bolus)

If patient is not able to eat, give basal and correction insulin but hold bolus insulin until meals are resumed.

4. Calculate Correction Dose. *Correction insulin should not be given more frequently than every three hours.*

If the patient's BG is 150mg/dl or greater at designated BG checks, utilize the Correction Insulin Dosing Table below to determine correction dose. Choose which algorithm to use based on the TDD calculation from Step 1.

BG Value (mg/dl)	Low Dose Algorithm	Medium Dose Algorithm	High Dose Algorithm
	For TDD ≤ 40 units/day	For TDD 41 to 80 units/day	For TDD > 80 units/day
150 – 199	1 Unit	1 Units	2 Units
200 – 249	2 Units	3 Units	4 Units
250 – 299	3 Units	5 Units	7 Units
300 – 349	4 Units	7 Units	10 Units
>349	5 Units	8 Units	12 Units

5 Document all doses on the MAR.

If the patient was started on therapy during the downtime, initiate Glucommander once system resumes. You will not be able to time doses prior to the start on Glucommander,

If the patient was started on therapy prior to the downtime, enter any missed BG values and insulin doses in Glucommander when system resumes. Edit the date, time and dose to match MAR documentation.

Subcutaneous Insulin Downtime Form for Initiating Therapy (for versions 3.5.3 or later)

6	**Hypoglycemia Treatment: For BG < 70 mg/dl,**

- Select treatment: IV Dextrose (D50 or D10), Oral Carbohydrates, or IM Glucagon 1 mg (see tables)
- Recheck BG in 15 minutes.
- Repeat as necessary.

BG (mg/dL)	Carbohydrates
54-69	15 grams
< 54	30 grams

BG (mg/dL)	D50W	D10W
60-69	15 mL IV push	75 mL IV
50-59	20 mL IV push	100 mL IV
30-49	25 mL IV push	125 mL IV
< 30	30 mL IV push	150 mL IV

Glucommander®

Patient Label

Basal + Correction Subcutaneous (SubQ) Insulin Downtime Form (for versions 3.5.3 or later)

Date: _____. Start new form each day.

**If patient has not been on Glucommander for 24 hours, use the *Initiating SubQ Therapy During Downtime* form to calculate doses.

Step 1: Calculate the patient's total daily dose (TDD) of insulin. To do this, add total amount of all insulin that the patient received yesterday (midnight to midnight). Include all basal and correction doses administered. You will have four to six doses depending on how often correction insulin is being administered. Patient's Target Range: _____	**Correction Insulin**	**units**
	Dose 1	
	Dose 2	
	Dose 3	
	Dose 4	
	Dose 5	
	Dose 6	
	Total Correction	
	Yesterday's Basal Dose (AM & PM) x 2 =	+
	Total Daily Dose	

Step 2: Correction insulin, if the patient's BG is 150mg/dl or greater at designated BG checks, use the Correction Insulin Dosing Table below, finding the corresponding TDD to determine correction dose.

Correction Insulin Dosing Table	**BG Value (mg/dL)**	**For TDD ≤ 40 units/day**	**For TDD 41 to 80 units/day**	**For TDD > 80 units/day**
	150 – 199	1 Unit	1 Units	2 Units
	200 – 249	2 Units	3 Units	4 Units
	250 – 299	3 Units	5 Units	7 Units
	300 – 349	4 Units	7 Units	10 Units
	>349	5 Units	8 Units	12 Units

Glucommander®

Patient Label

Basal + Correction Subcutaneous (SubQ) Insulin Downtime Form (for versions 3.5.3 or later)

	Time:	Time:	Time:	Time:	Time:	Time:
BG Value						
Correction Dose (units)						

Step 3: Basal insulin:
Use today's basal dose recommendation, if available from Glucommander (see flowsheet): _____
If today's basal dose recommendation is not available, notify the provider for basal dose adjustment.

AM Basal Dose (units)	
PM Basal Dose (units)	

Hypoglycemia: For any BG < 70 mg/dl:

- Select treatment: IV Dextrose (D50 or D10), Oral Carbohydrates, or IM Glucagon 1 mg (see tables)
- Recheck BG in 15 minutes.
- Repeat as necessary.
- Notify provider for potential adjustments to meal bolus or basal insulin doses

BG (mg/dL)	D50W	D10W
60-69	15 mL IV push	75 mL IV
50-59	20 mL IV push	100 mL IV
30-49	25 mL IV push	125 mL IV
< 30	30 mL IV push	150 mL IV

BG (mg/dL)	Carbohydrates
54-69	15 grams
< 54	30 grams

All insulin doses need to be documented in the MAR. Once system resumes, enter any missed BG values and insulin doses from past 24 hours in Glucommander. Edit the date, time, and dose to match MAR documentation.

To restart Glucommander after downtime:
Less than 24 hours downtime: Enter or confirm basal dose if administered during downtime. Then enter other BG's and doses as "Late Entries" in Glucommander.
Greater than 24 hours downtime: Review current BG's and insulin doses with provider. Restart in Glucommander using Custom Start or Weight-based multiplier per provider's order.