

Insulin Infusions –Critical Care Units (Adult)

Site Applicability

Sites using the CST-Cerner Electronic Health Record

- PHC – SPH and MSJ Critical Care Units, Emergency Department
- VCH – VGH Critical Care and Burns Trauma High Acuity
 - LGH ICU, HAU, ED
 - Sechelt CCU

Practice Level

Basic Skill: Registered Nurses working in Critical Care units as per sites listed above

Need to Know

- Hyperglycemia is a common occurrence in critically ill patients due to the patient's stress response.
- Patients who are critically ill require close monitoring of their blood glucose levels and most will require an insulin infusion to control hyperglycemia for some duration of their Intensive Care Unit (ICU) stay, even if they have not been diagnosed with diabetes.
- Patient's dependency on insulin and other anti-diabetic medications to manage hyperglycemia usually resolves as they recover from a critical illness.
- Stop the insulin infusion, if the patient's tube feed or total parenteral nutrition (TPN) is stopped for any reason (e.g. extubation, going to Operating Room, leaving unit for tests etc.).
- Check with the Most Responsible Provider (MRP) before stopping the insulin infusion if the patient has insulin dependent diabetes.
- When resuming the tube Feed or TPN, restart insulin at previous rate and check blood glucose Q1H x 3 (refer to orders).
- An [Independent Double Check](#) is required for insulin infusions.
- This protocol is not suitable for patients in Diabetic Ketoacidosis – refer to provider orders.

Protocol

Unless ordered otherwise, the following protocol should be followed in applicable sites where the ICU Insulin Infusion – Critical Care Module in CST Cerner is being used.

Assessment

Target Point of Care Blood Glucose = 7 to 10 mmol/L

All blood samples are to be drawn from arterial line (primed only with Normal Saline). If no arterial line, obtain capillary sample (finger poke).

Insulin Infusion

100 units insulin in 100 mL 0.9% sodium chloride (1 unit/mL)

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Starting rate 0 units/h (minimum rate), maximum rate 20 units/h titrated based on protocol

Critical Care Protocols

1. Protocol for patients NOT currently receiving insulin infusion		
Current blood glucose	Interventions	
Less than 4 mmol/L	No Insulin Required Administer 25 mL IV Dextrose 50% Refer to Hypoglycemia Management in Adults , Notify MRP Recheck blood glucose in 15 minutes	
4 to 4.9 mmol/L	No insulin required. Recheck blood glucose in 1 hour	
5 to 10 mmol/L	No Insulin Required Recheck blood glucose in 4 hours	
10.1 to 12 mmol/L	No IV bolus. Start insulin infusion at 1 unit/h Recheck blood glucose in 2 hours	
12.1 to 14 mmol/L	Give 1 unit insulin IV bolus	Start infusion at 1 unit/h
	Recheck blood glucose in 1 hour	
14.1 to 17 mmol/L	Give 3 units insulin IV bolus	Start infusion at 2 units/h
	Recheck blood glucose in 1 hour	
17.1 to 20 mmol/L	Give 5 units insulin IV bolus	Start infusion at 3 units/h
	Recheck blood glucose in 1 hour	
Greater than 20 mmol/L	Give 7 units insulin IV bolus	Start infusion at 4 units/h
	Notify MRP Recheck blood glucose in 1 hour	

2. Protocol for patients who are CURRENTLY receiving insulin infusion		
Current blood glucose	Interventions	
Less than 4 mmol/L	Discontinue insulin infusion Administer 25 mL IV Dextrose 50% Refer to Hypoglycemia Management in Adults , Notify MRP Recheck blood glucose in 15 minutes	
4 to 4.9 mmol/L	Discontinue insulin infusion Recheck blood glucose in 30 minutes	
5 to 5.9 mmol/L	Decrease infusion rate by 50% (rounded to the nearest 0.5 units/h) Stop infusion if less than 0.5 units/h Recheck blood glucose in 1 hour	
6 to 6.9 mmol/L	Decrease infusion rate by 25% (rounded to the nearest 0.5 unit/h) Stop infusion if less than 0.5 units/h Recheck blood glucose in 1 hour	
7 to 10 mmol/h	No insulin dose adjustment If change is more than 3 mmol/L from last reading, recheck blood glucose in 1 hour If change is 3 mmol/L (or less) than last reading, recheck blood glucose in 2 hours. If two consecutive Q2H readings remain in target range, recheck blood glucose Q4H	
10.1 to 12 mmol/L	Current rate	Infusion adjustment
	0.5 to 6.5 units/h	Increase infusion by 1 unit/h
	7 to 12.5 units/h	Give 2 units insulin IV bolus and increase infusion rate by 1 unit/h
	13 or greater units/h	Give 3 units insulin IV bolus and increase infusion rate by 3 units/h
	Recheck blood glucose in 2 hours	
12.1 to 14 mmol/L	Current rate	Infusion adjustment
	0.5 to 6.5 units/h	Give 1 unit insulin IV bolus and increase infusion rate by 1 unit/h
	7 to 12.5 units/h	Give 3 units insulin IV bolus and increase infusion rate by 1 unit/h
	13 or more units/h	Give 4 units insulin IV bolus and increase infusion rate by 3 units/h
	Recheck blood glucose in 2 hours	

Protocol for patients who are CURRENTLY receiving insulin infusion, cont.		
Current blood glucose	Interventions	
14.1 to 17 mmol/L	Current rate	Infusion adjustment
	0.5 to 6.5 units/h	Give 3 units insulin IV bolus and increase infusion rate by 2 units/h
	7 to 12.5 units/h	Give 5 units insulin IV bolus and increase infusion rate by 2 units/h
	13 or more units/h	Give 5 units insulin IV bolus and increase infusion rate by 3 units/h
	Recheck blood glucose in 1 hour	
17.1 to 20 mmol/L	Current rate	Infusion adjustment
	0.5 to 6.5 units/h	Give 5 units insulin IV bolus and increase infusion rate by 3 units/h
	7 to 12.5 units/h	Give 7 units insulin IV bolus and increase infusion rate by 3 units/h
	13 or more units/h	Give 7 units insulin IV bolus and increase infusion rate by 4 units/h
	Recheck blood glucose in 1 hour	
20.1 to 24 mmol/L	Current rate	Infusion adjustment
	0.5 to 6.5 units/h	Give 7 units insulin IV bolus and increase infusion rate by 4 units/h
	7 to 12.5 units/h	Give 10 units insulin IV bolus and increase infusion rate by 4 units/h
	13 or more units/h	Give 10 units insulin IV bolus and increase infusion rate by 5 units/h
	Recheck blood glucose in 1 hour	
Greater than 24 mmol/L	Call MRP for more orders Recheck blood glucose in 1 hour	

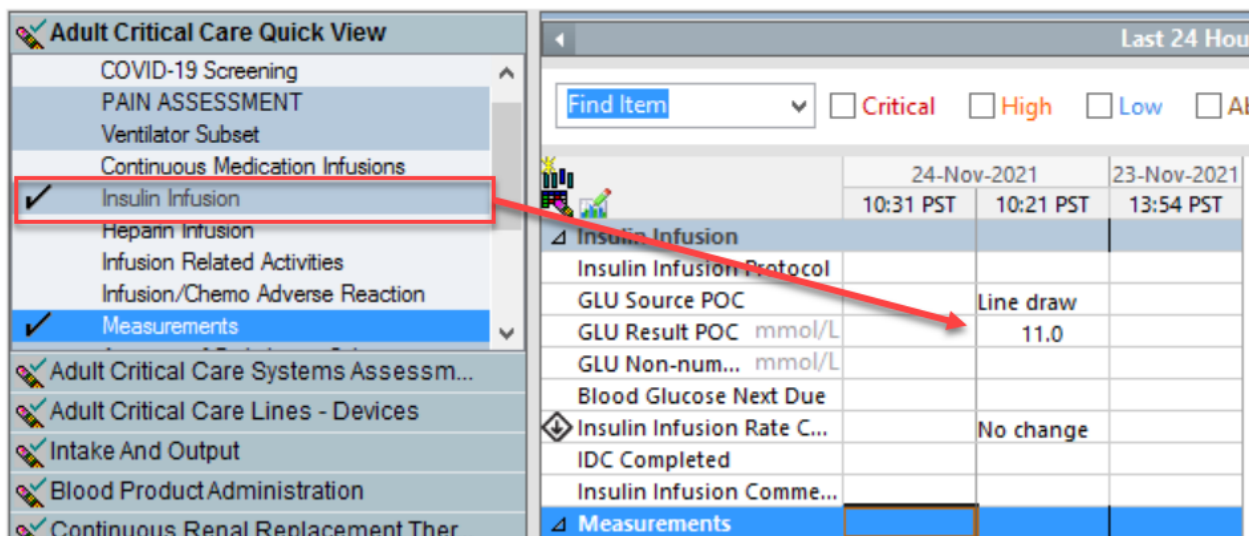
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Documentation

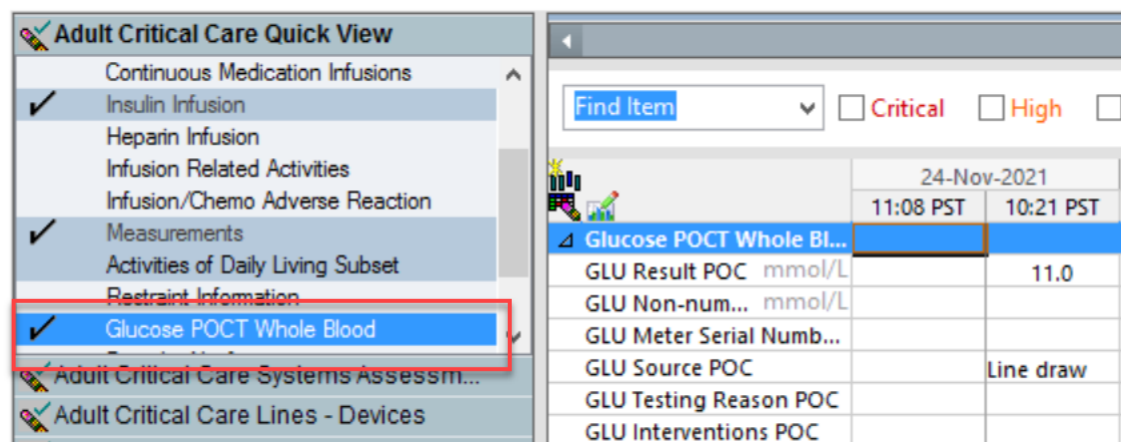
CST Cerner:

1. Document glucose point of care testing (POCT) whole blood readings in iView

NOTE: The blood glucose results documented in the **iView** section for **Insulin Infusion** will flow to the **Glucose Blood Point of Care** section, or vice versa (see below)

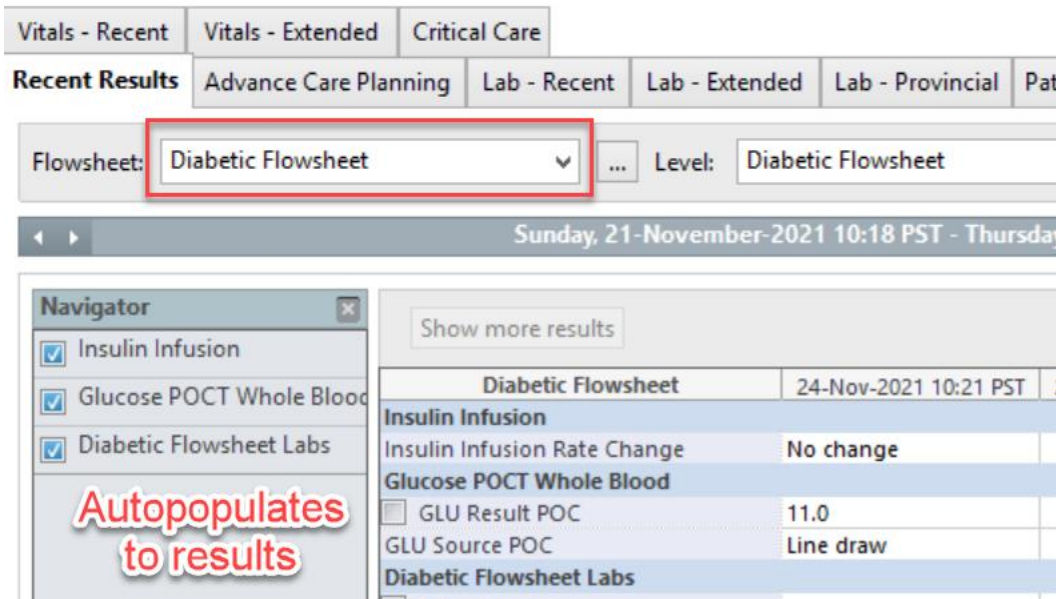


Last 24 Hours				
Find Item	<input type="checkbox"/> Critical	<input type="checkbox"/> High	<input type="checkbox"/> Low	<input type="checkbox"/> All
	24-Nov-2021	23-Nov-2021		
	10:31 PST	10:21 PST	13:54 PST	
Insulin Infusion				
Insulin Infusion Protocol				
GLU Source POC		Line draw		
GLU Result POC mmol/L		11.0		
GLU Non-num... mmol/L				
Blood Glucose Next Due				
Insulin Infusion Rate C...		No change		
IDC Completed				
Insulin Infusion Comme...				
Measurements				



Last 24 Hours				
Find Item	<input type="checkbox"/> Critical	<input type="checkbox"/> High	<input type="checkbox"/> Low	<input type="checkbox"/> All
	24-Nov-2021	23-Nov-2021		
	11:08 PST	10:21 PST		
Glucose POCT Whole Blood				
GLU Result POC mmol/L		11.0		
GLU Non-num... mmol/L				
GLU Meter Serial Numb...				
GLU Source POC		Line draw		
GLU Testing Reason POC				
GLU Interventions POC				

Information will flow directly and auto populate to the Results Review



Autopopulates to results

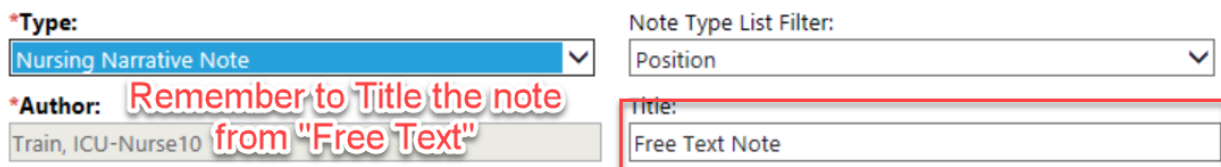
Diabetic Flowsheet	24-Nov-2021 10:21 PST
Insulin Infusion	
Insulin Infusion Rate Change	No change
Glucose POCT Whole Blood	
GLU Result POC	11.0
GLU Source POC	Line draw
Diabetic Flowsheet Labs	

- Additional documentation may be done using narrative notation and includes assessment, interventions and outcomes.

For example:

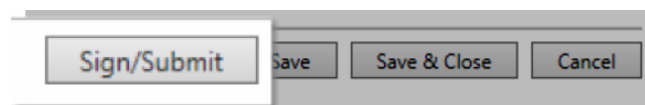
Service Date/Time	Subject	Type	Facility	Author; Cor
24-Nov-2021 12:26:16 P...	Hypoglycemia Event	Nursing Narrative Note	SPH St Pauls	Train, ICU-N
24-Nov-2021 10:14:00 P...	Allergy Rule	Allergy Rule - Text	SPH St Pauls	Train, Gener

Remember to change the title of "Free Text Note" with something that will describe the event, e.g. Hypoglycemia event.



Remember to Title the note from "Free Text"

Remember to sign off the note using *Sign and Submit*. Saving will not submit the information to the chart and other staff will not be able to see.



Patient and Family Education

Provide patient and family with information about the insulin infusion and blood glucose monitoring as needed.

Related Documents

1. [BD-00-12-40009](#) - Capillary Blood Glucose Monitoring using the Nova Blood Glucose Meter (StatStrip or Xpress)
2. [BD-00-13-40096](#) – Hypoglycemia Management in Adults

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