

Optimizing Glucose Management in Hospitalized Patients Using a Subcutaneous Basal-Bolus Insulin Therapy Approach

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Introduction

- Both hyperglycemia and hypoglycemia can cause adverse consequences for patients. This training will address:
 - Pitfalls of using sliding scale insulin (SSI)
 - A new approach to managing insulin therapy
 - Hypoglycemia and new treatment guidelines

Objectives

- At the completion of this course, you will be able to:
 - Describe the impact hyperglycemia has on the hospitalized patient
 - Outline the differences between Sliding Scale Insulin and Basal Bolus Insulin Therapy
 - Identify the components of the new CPOE Insulin Order Set
 - Recognize the early and later symptoms of hypoglycemia
 - Identify the various treatments of hypoglycemia based upon the patient's level of alertness, oral intake status, and intravenous access

Hyperglycemia in Hospitalized Patients

- “Hyperglycemia is a common, serious, and costly health care problem in hospitalized patients. Observational and randomized controlled studies indicate that improvement in glycemic control results in lower rates of hospital complications in general medicine and surgery patients.”
- The association between hyperglycemia in hospitalized patients (with or without diabetes) and the increased risk for complications and mortality is well established. It is associated with :
 - a higher incidence of clinical and surgical complications
 - increased morbidity and mortality
 - prolonged hospital stays
 - increased risk of infections
 - more disability after discharge

Current Hyperglycemia Management at UConn Health

- Insulin, given either intravenously or subcutaneously, is the preferred regimen for effectively treating hyperglycemia in the hospital.
- Sliding Scale Insulin (SSI), a treatment regimen that has been around since the 1930s, is most often used in hospitals.
- In most SSI treatment regimens, a patient's blood sugar is measured using a glucometer generally every six (6) hours, or before meals and at bedtime.
 - The dose of insulin is based on the blood sugar level obtained at those times.
 - Usually fast-acting insulin is used.
 - The higher the blood sugar, the more insulin to be administered

Pitfalls of Sliding Scale Insulin

- Sliding Scale Insulin use has become controversial in recent years because it treats hyperglycemia after it has occurred and it can cause dangerous fluctuations in blood glucose levels throughout the day.
- Unstable insulin levels are hazardous to patients, potentially making them hypoglycemic, especially in the morning after taking their nighttime dose for the prior day.

Pitfalls of Sliding Scale Insulin

- Despite being an easy and convenient treatment regimen, SSI has the disadvantage of not delivering insulin in a physiologic manner, resulting in poor glucose control.
- SSI therapy does not take into account factors that can affect a patient's blood sugar and insulin needs. Such factors include:
 - **Diet:** What is eaten can affect the need for insulin. For example, a meal high in carbohydrates — like bread and cookies — may require a higher dose of insulin than if a low-carb meal was eaten.
 - **Weight:** A person who weighs more may need more insulin. If a 120-pound person and a 180-pound person each get the same dose, the person weighing 180 pounds may not receive enough insulin to lower their blood sugar.
 - **Insulin history:** The dose doesn't take into account how much insulin a patient needed in the past, nor does it consider how sensitive a patient has been to its effects.

Pitfalls of Sliding Scale Insulin

- SSI doses are based on the blood sugar before a meal, so they correct for the previous dose of insulin, rather than prepare for the meal.
- Hyperglycemia is extremely common in patients using a sliding scale. See next slide summarizing a pharmacy student project from September 2014.

September 2014 Insulin Audit at UConn Health

- An Insulin Audit was completed in September 2014 by a group of pharmacy students.
- The audit results revealed that for patients being treated with SSI only (59 patients and 1349 blood glucose tests):
 - 38% of the patients still experienced hyperglycemia with FS of 180-350 mg/dl
 - 1.41% experienced hyperglycemia with FS >350 mg/dl
- The audit also revealed that for patients being treated with Lantus + SSI +/- other medications (67 patients, 2062 blood glucose tests):
 - 52% of the patients experienced hyperglycemia with FS 180-350 mg/dl

Evaluating Efficacy of Sliding Scale Insulin Therapy

- SSI is often a reactive process, rather than a proactive process.
- American Association of Clinical Endocrinologists (AACE), the American Diabetes Association (ADA), and the Society of Hospital Medicine (SHM) have consensus recommendations to abandon traditional sliding-scale insulin as the sole method for glycemic control.
- Instead, they recommend a proactive approach to management of hyperglycemia using scheduled basal, bolus and correction (supplemental) insulin as the preferred method. This helps keep insulin levels steady throughout the day.

Source: Glycemic Control in Hospitalized Patients Not in Intensive Care: Beyond Sliding-Scale Insulin
<http://www.aafp.org/afp/2010/0501/p1130.html>

Management of Hyperglycemia: A New Approach

What is Basal Bolus Insulin Therapy?



Basal Bolus Insulin Therapy?

- Basal Bolus Insulin Therapy is scheduled physiologic insulin dosing. It involves giving the right type of insulin, in the right amount, at the right time to meet the needs of the patient.
- There are three (3) components to a basal/bolus regimen:
 - Basal insulin
 - Prandial/Bolus (meal) insulin
 - Correction (supplemental) insulin

Basal Insulin

- Basal insulin provides a constant 24-hour level of insulin.
- Long or immediate-acting insulin is scheduled and administered either once or twice a day to cover basal insulin needs and control blood glucose levels between meals and at bedtime. It also helps prevent diabetic ketoacidosis (DKA) in patients with type 1 diabetes.
- When administered correctly, basal insulin should not cause hypoglycemia when patient's are NPO.

Prandial/Bolus (meal) Insulin

- Prandial/Bolus insulin is scheduled rapid or short-acting insulin given prior to meals to cover the predicted rise in blood glucose as a result of the calories ingested.
- It may also be used to cover intake provided continuously, as in the case of continuous parenteral or enteral feeds.

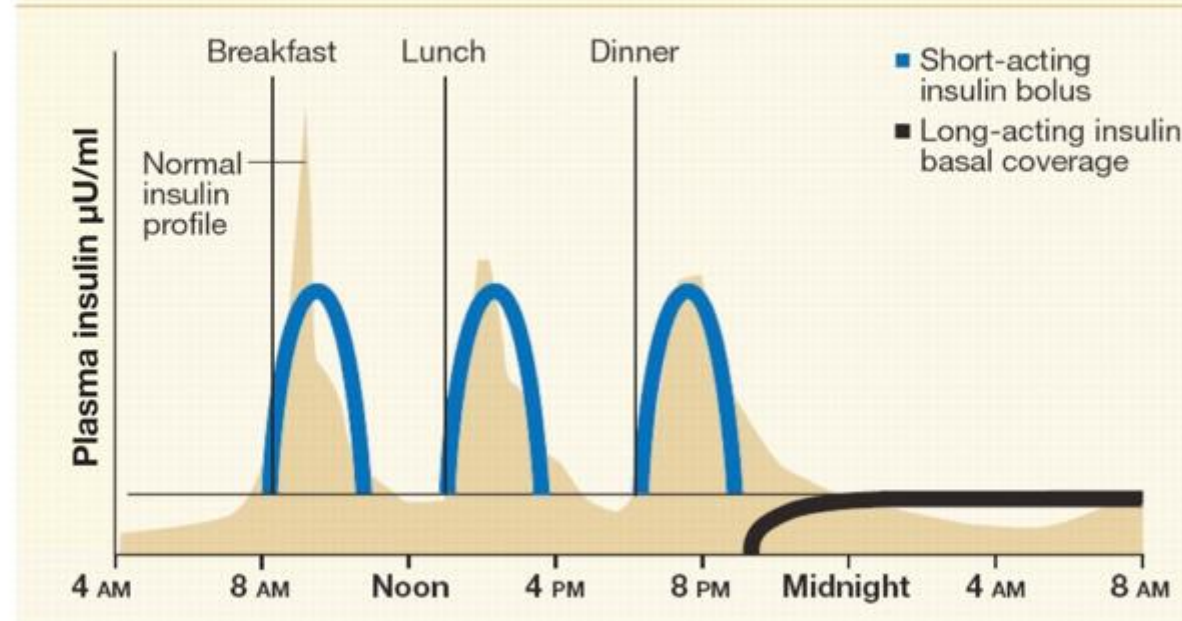
Correction (Supplemental) Insulin

- Correction insulin is rapid or short-acting insulin given with the meal-time insulin (when patient is eating) or on its own (when patient is NPO) when the patient's blood glucose measurement is above the target range for that patient at that time.
- The correction insulin is designed to:
 - correct unanticipated hyperglycemia in the event that the patient's scheduled insulin regimen did not match their intake
 - ensure that high glucose values are not left untreated

Basal / Bolus Regimen

Physiological principles of the basal/bolus insulin regimen.9.

Basal/bolus regimen mimics normal insulin profile



Vasudev Magaji, and Jann M. Johnston Clin Diabetes
2011;29:3-9

NEW Practice at UConn Health: The New CPOE Order Set

- In order to better manage patients receiving insulin therapy, and to avoid episodes of hyperglycemia associated with SSI, a new Insulin Order Set and Hypoglycemia Protocol have been created.
- The order set includes:
 - Basal Insulin Orders
 - Prandial/Bolus (Meal) Insulin Orders
 - Correction Dose Insulin (although technically a sliding scale, it will be referred to as correction dosing)
 - Misc Insulin Orders (e.g. Humalog Mix, U-500)
 - Consult Area and Labs
 - Hypoglycemia Protocol Medications
- The Clinical Diabetes Journal published an article in the January 2011 edition which serves as a reference article for this order set. It will be a link within the CPOE order set: <http://clinical.diabetesjournals.org/content/29/1/3.full>

Basal Insulin

The Basal Insulin orders are the first orders to appear in the new order set.

There are 2 insulin options for the basal dose:

Long-acting insulin: Glargine (Lantus)
OR

Intermediate-acting insulin: NPH

If Levemir is ordered as the long-acting insulin, pharmacy will change it to Lantus since Levemir is non-formulary



DISCONTINUE ALL PREVIOUS INSULIN ORDERS
Scroll to bottom for custom dosing, U-500 and mix insulin

Medications:

BASAL INSULIN ORDERS:

Patient may require reduction in basal insulin from home dose while hospitalized

Estimated Insulin Total daily dose (TDD) 0.3 - 0.6 units/kg body weight, 50% of TDD to be provided as basal insulin (Lantus), and 50% as bolus insulin (Lispro or Regular). Please take into account patient's insulin sensitivity and creatinine clearance. Please see link at bottom of order set to Diabetes/Hyperglycemia Mgt.

Levemir is non-formulary and will be interchanged to Lantus at 1:1 conversion

This conversion is during hospitalization only

☐ INSULIN GLARGINE,HUMAN SC QDAYCC When pt is NPO, consult LIP*

☐ INSULIN GLARGINE,HUMAN SC HS When pt is NPO, consult LIP fo*

OR

☐ INSULIN NPH HUMAN SC QDAYCC When pt is NPO, consult LIP for*

☐ INSULIN NPH HUMAN SC HS When pt is NPO, consult LIP for dos*

* An asterisk in the POE orders indicates that additional directions/comments are part of the order and need to be viewed

Prandial (Bolus) Insulin

PRANDIAL INSULIN ORDERS:

ORDER ALL 3 TO COVER MEALS

Novolog is non-formulary and will be interchanged to Lispro (Humalog) at 1:1 conversion

This conversion is during hospitalization only

- ☐ INSULIN LISPRO SC QD0730IN Admin 0-15 min before or after m*
- ☐ INSULIN LISPRO SC QD1130IN Admin 0-15 min before or after m*
- ☐ INSULIN LISPRO SC QD1630IN Admin 0-15 min before or after m*

*****OR*****

- ☐ INSULIN REGULAR HUMAN SC QD0730IN Admin 0-15 min before or *
- ☐ INSULIN REGULAR HUMAN SC QD1130IN Admin 0-15 min before or *
- ☐ INSULIN REGULAR HUMAN SC QD1630IN Admin 0-15 min before or *

The Prandial/Bolus Insulin orders are second in the new order set.

There are 2 insulin options for the prandial/bolus dose:

Rapid-acting insulin: Lispro

OR

Short-acting insulin: Regular

If Novolog is ordered as the rapid-acting insulin, pharmacy will change it to Lispro since Novolog is non-formulary

The practitioner has the ability to customize the doses for each meal.

Correction Dose Insulin – Low Dose or Moderate Dose

Correction Dose Insulin

Low Dose: recommended for ESRD, severe CHF, elderly thin patients or patients on <70 units of Insulin daily

Insulin Low Dose Sliding Scale

- ☐ INSULIN LISPRO SC ACINS Low Dose Sliding Scale
- ☐ INSULIN LISPRO SC HS Low Dose Sliding Scale

****OR****

- ☐ INSULIN REGULAR HUMAN SC ACINS Low Dose Sliding Scale
- ☐ INSULIN REGULAR HUMAN SC HS Low Dose Sliding Scale

LOW dose

Insulin Moderate Dose Sliding Scale

- ☐ INSULIN LISPRO SC ACINS Moderate Dose Sliding Scale
- ☐ INSULIN LISPRO SC HS Moderate Dose Sliding Scale

****OR****

- ☐ INSULIN REGULAR HUMAN SC ACINS Moderate Dose Sliding Scale
- ☐ INSULIN REGULAR HUMAN SC HS Moderate Dose Sliding Scale

MODERATE dose

There are 2 options for the correction dose “sliding” scale:

LOW dose
or
MODERATE dose

Doses for bedtime are also reduced to prevent hypoglycemia

ACINS as listed in various insulin orders refers to a drop-down box in POE listing the hospital standard times of administration:

AMPM	0900 2100
AC	0600 1100 1600
ACHS	0600 1100 1600 2200
ACINS	0730 1130 1630

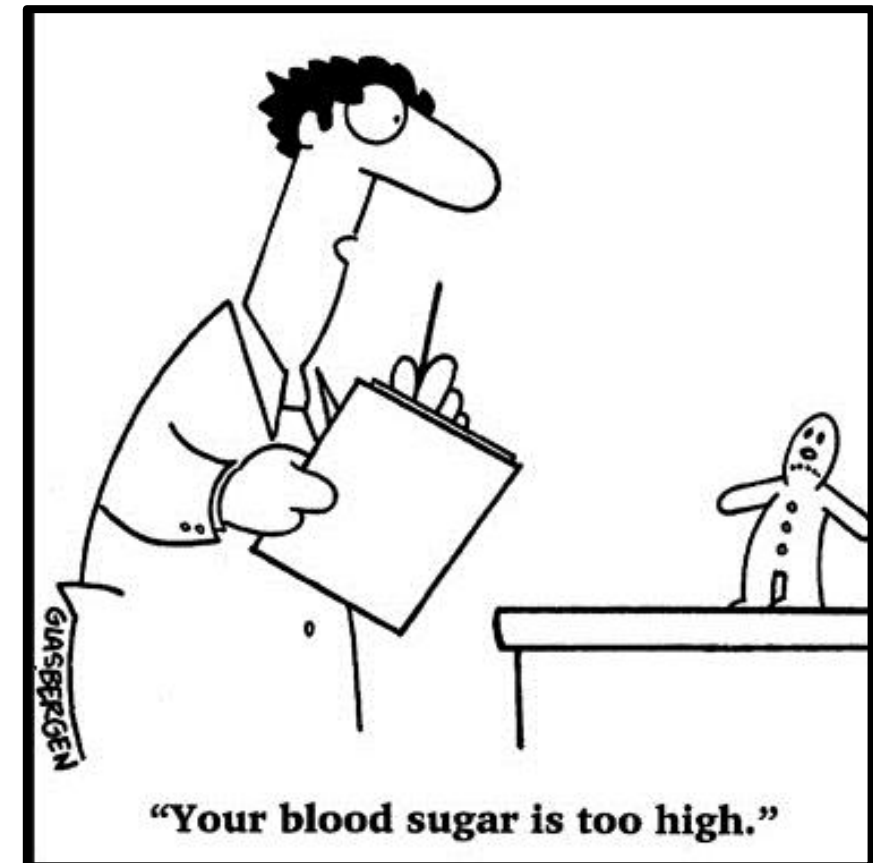
Correction Dose Insulin – Custom Dose

Insulin Custom Dose Sliding Scale

- ☐ INSULIN LISPRO SC ACINS Custom dose sliding scale
- ☐ INSULIN LISPRO SC HS Custom dose sliding scale

- ☐ INSULIN REGULAR HUMAN SC ACINS Custom dose sliding scale
- ☐ INSULIN REGULAR HUMAN SC HS Custom dose sliding scale

The practitioner can still fully customize the pre-meal and bedtime doses for correction by using the “Custom Dose Sliding Scale”



Miscellaneous Insulin Orders

- Additional insulin orders are available within the Insulin Order Set *after* the basal, prandial/bolus and correction doses are listed.
 - Mix Insulin (Long Acting/Rapid Acting Mix Product)
 - Insulin HumaLOG MIX 75/25
 - U-500 Regular Insulin

MISC. INSULIN	
MIX INSULIN (LONG ACTING/RAPID ACTING MIX PRODUCT)	
Novolog Mix 70/30 and Humulin/Novolin 70/30 are non-formulary and will be interchanged with Humalog Mix at 1:1 conversion	
This conversion is during hospitalization only	
<input type="checkbox"/>	INSULIN HumaLOG MIX 75/25
U-500 REGULAR INSULIN	
Concentrated U-500 insulin is a high alert medication that is FIVE TIMES MORE CONCENTRATED than U-100 Insulin	
Per P&T policy, only patients receiving greater than 200 units/day of insulin (from ALL sources) are permitted to receive concentrated U-500 Insulin	
<input type="checkbox"/>	INSULIN REGULAR, HUMAN U-500

Consults and Labs

- The order set also allows the practitioner to order a dietary or endocrinology consult, as well as select the frequency of fingersticks

.	
Consults:	
<input type="checkbox"/>	DIETARY CONSULT Diabetic Patient
<input type="checkbox"/>	ENDOCRINOLOGY CONSULT Diabetic Patient
.	
Decentralized Labs:	
For patients who are NPO or on Tube Feeding, please select the Q6hrs	
Fingerstick	
<input type="checkbox"/>	FINGERSTICK ACHS
<input type="checkbox"/>	FINGERSTICK Q6HRS
.	

Hypoglycemia

New Treatment Guidelines



"I'm the Blood Sugar Fairy.
If you can see me, yours is too low."

© 2009 Diabetes Health

Hypoglycemia Overview

- Hypoglycemia is defined as a blood glucose level <70 mg/dL
- Overall, severe hypoglycemia (<40 mg/dL) during critical illness should be avoided because it has been associated with increased mortality.



Risk Factors For the Development of Hypoglycemia

- Mismatched insulin dose with meals
- Taking oral pancreas-stimulating medication without adequate carb intake
- History of severe hypoglycemia
- Sedation/Anesthesia/Altered consciousness
- NPO status
- Critical illness
- Advanced age
- Endocrine deficiencies
- Sudden decrease in corticosteroid use
- Emesis
- Medication error

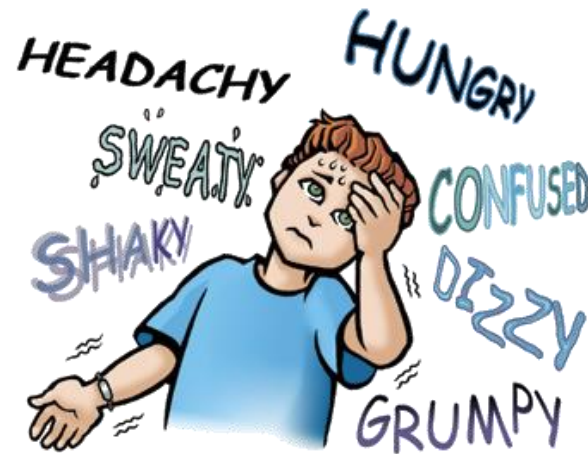


Symptoms of Hypoglycemia



Early Symptoms

- Shakiness/tremors
- Sweating
- Nervousness
- Dizziness
- Weakness
- Irritability
- Increased appetite
- Nausea
- Headache
- Facial pallor
- Tachycardia



Later Symptoms

- Anger
- Staggering gait
- Crying
- Confusion/disorientation
- Blurred vision
- Slurred speech
- Loss of consciousness
- Seizures

Hypoglycemia Protocol

- A hypoglycemia treatment protocol will be automatically contained within the insulin order set. The protocol will be pre-checked to make sure it is ordered for any patient who is receiving insulin therapy. If the practitioner does not want the protocol implemented, they will need to uncheck the box.
- A separate (free-standing, and searchable) order set will also be available in CPOE in case the provider wants to order the hypoglycemia protocol outside of the insulin order set.
- The Hypoglycemia Protocol provides for circumstances outside the general guidelines for treatment of hypoglycemia of any cause:
 - Diabetes
 - Patients being treated with insulin
 - Insulinoma
 - Severe sepsis
 - Metabolic conditions
 - Adrenal insufficiency

Hypoglycemia Protocol

- The treatment of hypoglycemia will be order-driven. A practitioner order is **REQUIRED** for any treatment requiring medication administration (i.e. D50%, Glucagon).
- A grid outlining the various interventions has been created as a resource (Hypoglycemia Treatment Guidelines), and will be available on the nursing website.
- Variations to the protocol may be necessary based upon the individual patient's needs as determined by the practitioner.
- Treatment will vary depending on whether the patient is:
 - responsive and able to eat
 - responsive, but NPO, with IV access
 - responsive, but NPO, without IV access
 - unresponsive, with IV access
 - unresponsive, without IV access

Hypoglycemia Treatment Guidelines

- Upon either obtaining a result or immediate notification of a finger stick (FS) result of < 70 mg/dl, obtain a repeat FS using a new test strip for confirmation of the initial value.
- If the repeat FS is confirmed to be < 70 mg/dl, implement the Hypoglycemia Treatment Guidelines (next slide) per practitioner order.

NEW!

HYPOGLYCEMIA TREATMENT GUIDELINES 2/2016

Practitioner order REQUIRED for any treatment requiring medication administration (i.e. D50%, Glucagon)

	Responsive, Able to Eat		Responsive, NPO, with IV Access		Responsive, NPO, without IV Access	Unresponsive, With IV Access	Unresponsive, without IV Access
Fingerstick (FS)	FS 50-70	FS <50	FS 50-70	FS <50	FS < 70	FS < 70	FS < 70
Medications / Treatment	15 grams simple carbs (4 oz) *	30 grams simple carbs (8 oz) **	½ amp (12.5 Grams) D50% IVP X 1 dose	1 amp (25 Grams) D50% IVP x 1 dose	Glucagon 1mg IM x 1	1 amp (25 Grams) D50% IVP x 1 dose	Glucagon 1mg IM x 1
Practitioner Notification	Required		Required		Required	Required & call RRT	Required & call RRT
Other Interventions					<ul style="list-style-type: none">Turn patient on left side in case of vomitingObtain IV Access		<ul style="list-style-type: none">Turn patient on left side in case of vomitingObtain IV Access
Repeat FS	Repeat FS in 15 minutes		Repeat FS in 15 minutes		Repeat FS in 15 minutes	Repeat FS in 15 minutes	Repeat FS in 15 minutes
Repeat Treatment, prn	If repeat FS remains <100, give 15 grams of simple carbs and obtain FS 15 minutes later. Continue this treatment until FS ≥ 100		If repeat FS remains <100, administer ½ amp D50% IVP and obtain FS 15 minutes later. Continue this treatment until FS ≥ 100		If repeat FS remains <100, <u>If IV access obtained</u> , follow steps for “Responsive, NPO, with IV Access” <u>If IV access unsuccessful</u> , administer Glucagon 1mg IM X 1 and notify practitioner ***Do not administer more than 2 doses of glucagon in total.	If repeat FS remains <100, administer 1 amp D50% IVP and obtain FS 15 minutes later. Continue this treatment until FS ≥ 100	<u>If repeat FS remains <100,</u> <u>If IV access obtained</u> , follow steps for “Unresponsive, with IV Access” <u>If IV access unsuccessful</u> , administer Glucagon 1mg IM X 1 and notify practitioner ***Do not administer more than 2 doses of glucagon in total.
After FS ≥ 100	Once FS is corrected to ≥ 100: <u>If patient is not NPO</u> : if patient is not expected to eat a meal within 1 – 1 ½ hours, a snack (15 grams of carbs AND a protein or fat choice) should be provided to help stabilize blood sugars. Nursing should call the diet office to request a half sandwich or the standard diabetic snack for the day, or if dietary office is closed, provide the Nabisco Ritz cheese cracker sandwiches from the hypoglycemia dietary kit. <u>If patient is NPO</u> , collaborate with practitioner for additional orders.						

*15 grams of simple carbs = 4 oz apple or cranberry juice

**30 grams of simple carbs = 8 oz apple or cranberry juice

AVOID orange juice & AVOID adding sugar packets to juice

*****Notes about Glucagon IM**

- Blood glucose should rise within 10 minutes of injection and peak effect is reached in 30 minutes
- Repeating the Glucagon dose may make nausea/vomiting more likely without raising the blood glucose level any further
- It can cause more insulin to be released and potential for secondary rebound hypoglycemia

Hypoglycemia Kits

- Hypoglycemia kits are supplied by dietary and are readily available on the inpatient units.
- They will contain two (2) 4 oz containers of apple or cranberry juice and one (1) package of Nabisco Ritz cheese cracker sandwiches
- The contents of the kits follow the American Diabetes Association's guidelines for treating hypoglycemia.
- The kit will be listed under the Patient Care Section in POE.

PATIENT CARE						
VERIFY FNS HYPOGLYCEMIA KIT CONTNUOS DAILY UNTIL D/C , AVAIL			12/07	14:05	VER	ROUTINE
(FNS = Food & Nutrition Services)						10



Hypoglycemia Kits

- The hypoglycemia kits will include the following instructions attached to the outside of the kit:

Dietary Hypoglycemic Kit

Void if Seal is Broken

Expires:

Instructions:

1. FS 50-70mg/dl provide 15 gm CHO (4oz clear juice)
- OR**
2. FS < 50mg/dl provide 30gm CHO (2 4oz clear juice)
3. Wait 15 minutes
4. Check FS
 - a. FS < 100mg/dl, provide another 15 gm (4oz clear juice) and repeat FS 15 min later
 - b. FS \geq 100mg/dl provide snack in kit and order meal

Responsive and Able to Eat



- If FS is 50-70 mg/dl
 - Administer **15 grams** of simple carbs (4 oz clear juice – apple or cranberry)
 - If FS is <50 mg/dl
 - Administer **30 grams** of simple carbs (8 oz clear juice – apple or cranberry)
- Notify practitioner
 - Repeat FS 15 minutes after administering the clear juice
 - If repeat FS remains <100 mg/dL, give another 15 grams (4 oz) of simple carbs and obtain a FS 15 minutes later.
 - Continue this treatment until FS \geq 100 mg/dL

Note: no other macronutrients such as protein or fat should be provided until the FS \geq 100 mg/dL as protein and fat interfere with glucose metabolism

Responsive and Able to Eat

- Once FS is corrected to ≥ 100 mg/dL, if patient is not expected to eat a meal within 1 – 1 ½ hours, a snack (15 grams of carbs AND a protein or fat of choice) should be provided. Call the diet office to request a half sandwich or the standard diabetic snack for the day.
- During the night when the kitchen is closed, provide the patient with the Nabisco Ritz cheese cracker sandwiches.
- The combination of simple carbs AND a protein or fat will help stabilize blood sugars.

Documentation of Juice in MAK

- Orders for juice will transfer over to the pharmacy system. The juice order will appear in MAK so that nursing can properly document the intervention.

Hypoglycemia Protocol

If patient is responsive and able to eat

Finger Stick Glucose (FS) 50-70



CLEAR JUICE 1 EA PO PRN PRN Hypoglycemia Cranberry or Apple*

Finger Stick Glucose (FS) <50



CLEAR JUICE 2 EA PO PRN PRN Hypoglycemia Cranberry or Apple*

CLEAR JUICE	2 EACH = 8 OZ	PO	PRN	ACT	ROUTINE	02/19/16 10:30	03/20/16 10:30	CRANBERRY OR APPLE JUICE FS < 50 RESPONSIVE, ABLE TO EAT 8 OZ = 30 GM SIMPLE CARBS REPEAT FS IN 15 MIN FOLLOW HYPOGLYCEMIA PROTOCOL	PRN	HYPOGLYCEMIA
CLEAR JUICE	1 EACH = 4 OZ	PO	PRN	ACT	ROUTINE	02/19/16 10:30	03/20/16 10:30	CRANBERRY OR APPLE JUICE FS 50-70 RESPONSIVE, ABLE TO EAT 4 OZ = 15 GM SIMPLE CARBS REPEAT FS IN 15 MIN FOLLOW HYPOGLYCEMIA PROTOCOL	PRN	HYPOGLYCEMIA



Picture of what the nurse will scan:

1 scan for 4 oz

2 scans for 8 oz

These will be added to the card on the MAK charts

Responsive, NPO, with IV Access

- If FS is 50-70 mg/dL

- Administer **½ amp** (12.5 grams)
D50% IVP x 1 dose

- If FS is <50 mg/dL

- Administer **1 amp** (25 grams)
D50% IVP x 1 dose



- Notify practitioner
- Repeat FS 15 minutes after administering the indicated dose of D50%.
- If repeat FS remains <100 mg/dL, administer ½ amp D50% IVP, and obtain a FS 15 minutes later.
- Continue this treatment until FS \geq 100 mg/dL

Responsive, NPO, without IV Access

Glucagon

- If FS is < 70 mg/dL

- Administer **Glucagon 1mg IM x 1 dose**

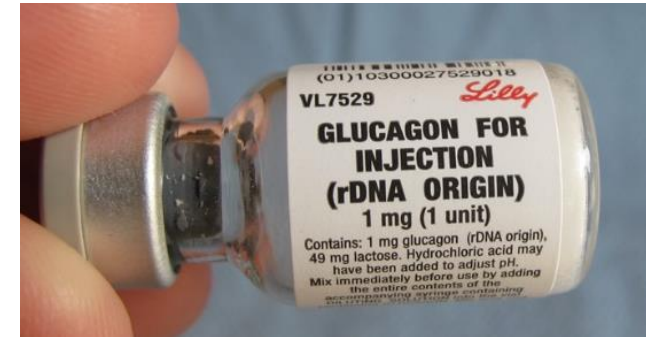
- When giving Glucagon, turn patient on their left side in case of vomiting, and
- Obtain IV access ASAP

- Notify practitioner

- Repeat FS 15 minutes after administering IM Glucagon

- If repeat FS remains <100 mg/dL and IV Access has been obtained, follow the treatment for “Responsive, NPO, with IV Access”

- If repeat FS remains <100 mg/dL, and IV Access has not been successful, administer Glucagon 1mg IM x 1 and notify practitioner



*****Do NOT administer more than 2 doses of glucagon in total*****

Unresponsive, with IV Access

- If FS is < 70 mg/dL
 - Administer **1 Amp (25 Grams) D50% IVP x 1 dose**
 - Notify practitioner and call a RRT
 - Repeat FS 15 minutes after administering the D50%
 - If repeat FS remains <100 mg/dL, administer 1 amp D50% IVP and recheck FS 15 minutes later
 - Continue this treatment (1 amp D50%, FSG 15 min later) until FS \geq 100 mg/dL



Unresponsive, without IV Access

Glucagon

- If FS is < 70 mg/dL
 - Administer **Glucagon 1mg IM x 1 dose**
 - When giving Glucagon, turn patient on their left side in case of vomiting, and
 - Obtain IV access ASAP
 - Notify practitioner and call a RRT
 - Repeat FS 15 minutes after administering IM Glucagon
 - If repeat FS remains <100 mg/dL and IV Access has been obtained, follow the treatment for “Unresponsive with IV Access”
 - If repeat FS remains <100 mg/dL, and IV Access has not been successful, administer Glucagon 1mg IM x 1 and notify practitioner



*****Do NOT administer more than 2 doses of glucagon in total*****

Hypoglycemia Treatment, Screenshot of POE orders

If patient is responsive but NPO with IV Access

Finger Stick Glucose (FS) 50-70

☒ DEXTROSE 50% 25GM/50ML 12.5 GM IV PRN Hypoglycemia

Finger Stick Glucose (FS) <50

☒ DEXTROSE 50% 25GM/50ML 25 GM IV PRN Hypoglycemia

Responsive, NPO, with IV Access

If patient is responsive but NPO without IV Access-

Finger Stick Glucose (FS) <70

☒ GLUCAGON 1 MG IM PRN Hypoglycemia

Responsive, NPO, without IV Access

If patient is unresponsive with IV Access

Finger Stick Glucose (FS) < 70

☒ DEXTROSE 50% 25GM/50ML 25 GM IV PRN Hypoglycemia

Unresponsive with IV Access

If patient is unresponsive, without IV Access



Finger Stick Glucose (FS) <70

☒ GLUCAGON 1 MG IM PRN Hypoglycemia FS < 70

Unresponsive without IV Access

MAK Orders for Dextrose

DEXTROSE

	DEXTROSE 50%-W SYRINGE	25 GM = 50 ML	IV	PRN	ACT	ROUTINE	02/19/16 10:30	03/20/16 10:30	FS < 70 UNRESPONSIVE, WITH IV ACCESS REPEAT FS IN 15 MIN FOLLOW HYPOGLYCEMIA PROTOCOL	PRN	HYPOGLYCEMIA
	DEXTROSE 50%-W SYRINGE	25 GM = 50 ML	IV	PRN	ACT	ROUTINE	02/19/16 10:30	03/20/16 10:30	FS < 50 RESPONSIVE, NPO W/IV ACCESS REPEAT FS IN 15 MIN FOLLOW HYPOGLYCEMIA PROTOCOL	PRN	HYPOGLYCEMIA
	DEXTROSE 50%-W SYRINGE	12.5 GM = 25 ML	IV	PRN	ACT	ROUTINE	02/19/16 10:30	03/20/16 10:30	FS 50-70 RESPONSIVE, NPO W/IV ACCESS REPEAT FS IN 15 MIN FOLLOW HYPOGLYCEMIA PROTOCOL	PRN	HYPOGLYCEMIA

When viewing MAK orders, you must open the expanded view for each medication in order to view the full **directions**.

MAK Orders for Glucagon

GLUCAGON	▼ DR	GLUCAGON	1 MG = 1 ML	IM	PRN	ACT	ROUTINE	02/19/16 10:30	03/20/16 10:30	FS < 70 UNRESPONSIVE, W/O IV ACCESS REPEAT FS IN 15 MIN FOLLOW HYPOGLYCEMIA PROTOCOL	PRN	HYPOGLYCEMIA
	▼ DR	GLUCAGON	1 MG = 1 ML	IM	PRN	ACT	ROUTINE	02/19/16 10:30	03/20/16 10:30	FS < 70 RESPONSIVE, NPO W/O IV ACCESS REPEAT FS IN 15 MIN FOLLOW HYPOGLYCEMIA PROTOCOL	PRN	HYPOGLYCEMIA

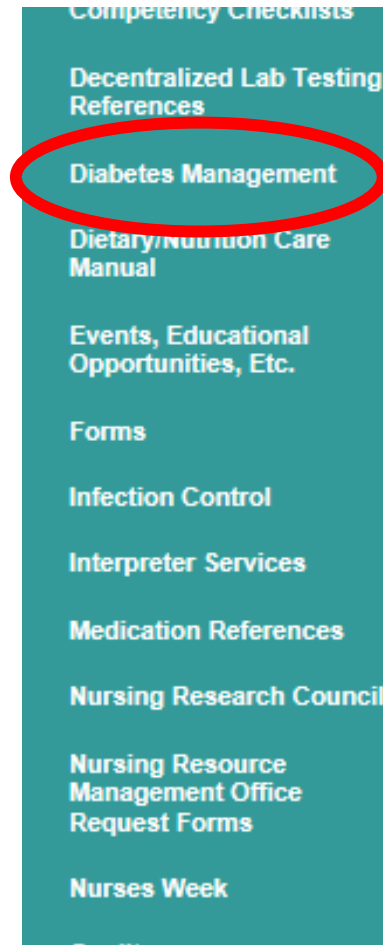
When viewing MAK orders, you must open the expanded view for each medication in order to view the full **directions**.

Diabetes Management Resources

For patients being discharged on insulin therapy, refer to the nursing website for some patient education materials that can be printed on-demand.

It is imperative that patients understand the signs and symptoms of hyper- and hypoglycemia, how to monitor their blood sugar levels, and how to administer their insulin.

A Diabetes Patient Referral Form is also available which allows the practitioner to request ongoing outpatient education.



- Competency Checklists
- Decentralized Lab Testing References
- Diabetes Management**
- Dietary/Nutrition Care Manual
- Events, Educational Opportunities, Etc.
- Forms
- Infection Control
- Interpreter Services
- Medication References
- Nursing Research Council
- Nursing Resource Management Office Request Forms
- Nurses Week
- Quality

Diabetes Management

- ▶ [Introduction to Diabetes \(PDF\)](#)
- ▶ [Basic Diabetes Nutrition \(PDF\)](#)
- ▶ [Blood Glucose Monitoring \(PDF\)](#)
- ▶ [Hyperglycemia - What to Watch for and How to Treat \(PDF\)](#)
- ▶ [Hypoglycemia - What to Watch for and How to Treat \(PDF\)](#)
- ▶ [How to Handle Sick Days \(PDF\)](#)
- ▶ [Facts About Injecting Insulin \(PDF\)](#)
- ▶ [Injection Site Selection \(PDF\)](#)
- ▶ [Different Ways to Take Insulin \(PDF\)](#)
- ▶ [Diabetes Patient Referral Form \(PDF\)](#)
- ▶ [Diabetes Medication Quick Reference Sheet \(PDF\)](#)
- ▶ [Insulin Medication Quick Reference Sheet \(PDF\)](#)
- ▶ [BD \(Becton Dickinson\) Diabetes Education Website](#)

Summary

- Basal-bolus insulin is one of the most advanced approaches to diabetes care, offering a way to closely simulate natural insulin delivery.
- The basal insulins address the glucose the liver makes, while the bolus insulins address the sugar in the foods that are eaten.
- Because some people need more basal insulin, and others need more bolus insulin, this regimen can be customized to the needs of each individual patient.
- Improving glycemic control of hospitalized patients can improve outcomes and reduce healthcare costs.