

Inpatient Glycemic Management 2011



Objectives

- Be able to identify at least 5 reasons why glycemic management is beneficial
- Have a general understanding of the differences in Basal, Mealtime and Correction Insulin dosing
- Be able to identify food groups that have a direct and indirect effect on blood glucose levels
- Understand the benefit of fasting and post meal glucose monitoring in Insulin dosing

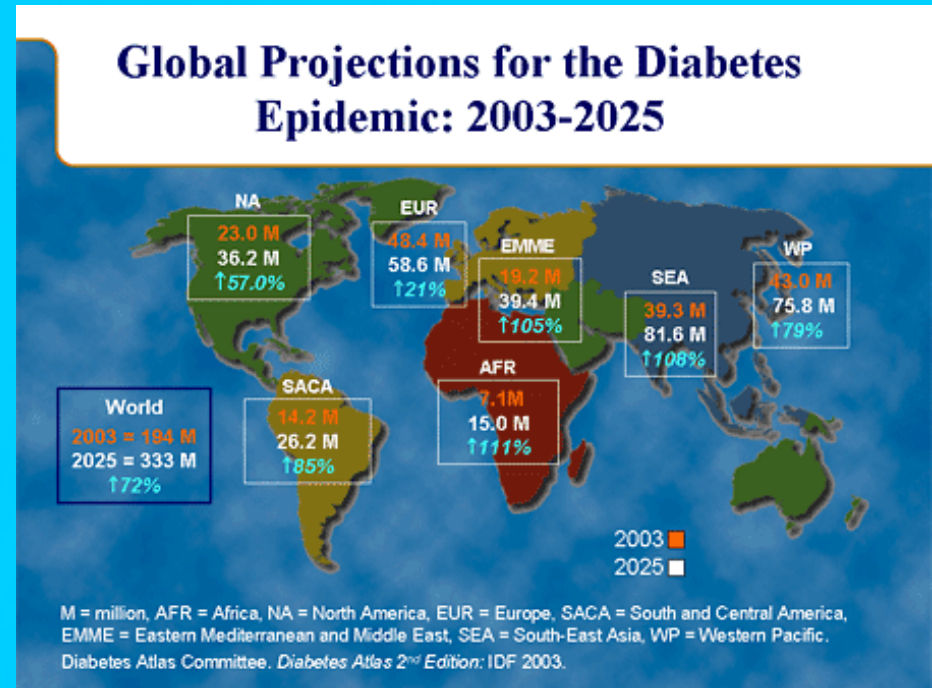


Why do we care about inpatient glycemic management?

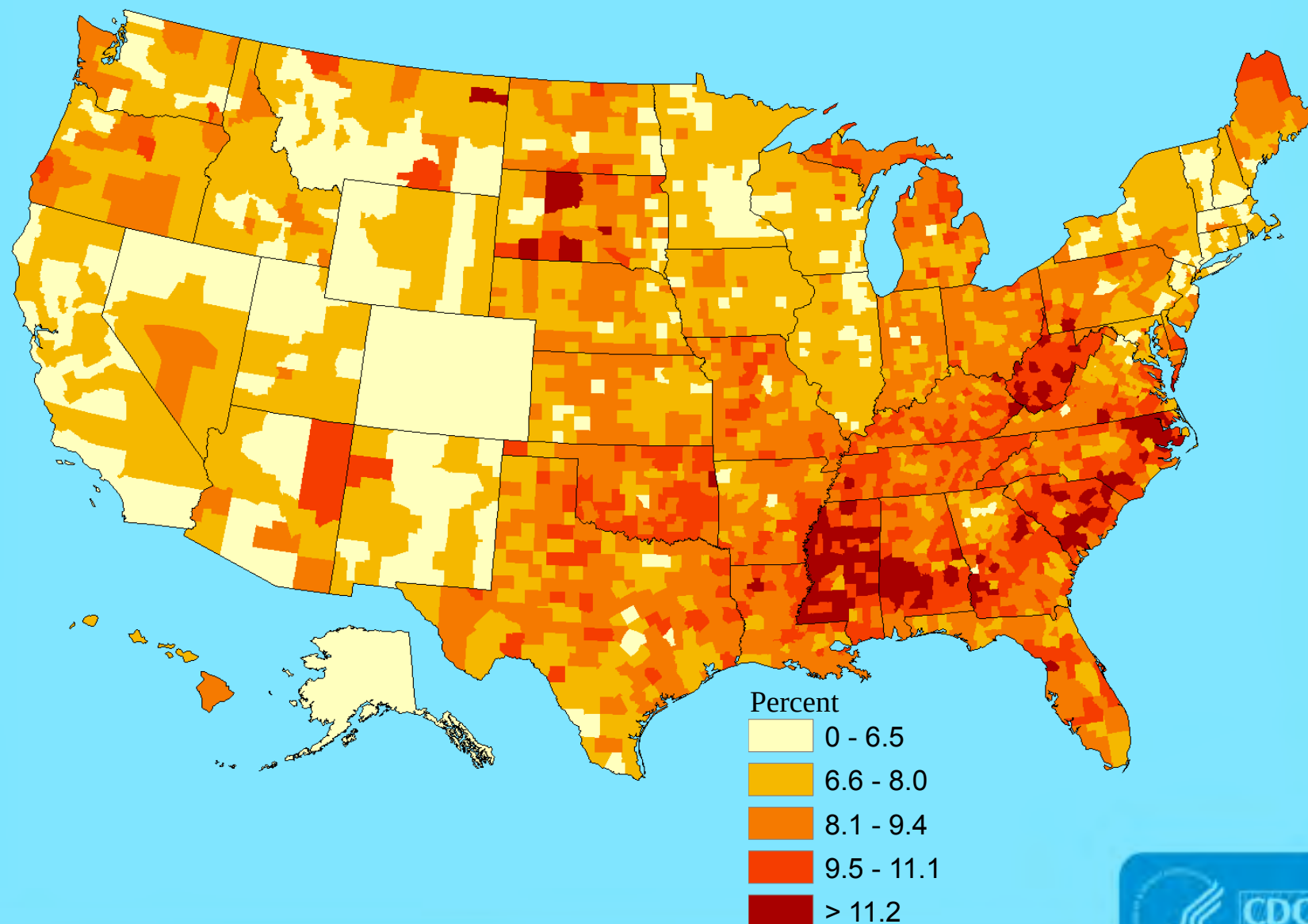
- Diabetes is a world wide epidemic
- Nearly half of all patients admitted to SNLH and SPCH have diabetes listed as a diagnosis
- Hyperglycemia leads to:
 - Decrease in the immune response
 - Poor or delayed healing and tissue building
 - Increased risk of infection
 - Increased length of stay
 - Patients feel bad
- Hyperglycemia is an independent risk factor for outcomes in ICU/CCU patients and MORTALITY of all hospitalized patients

The epidemic of Diabetes

- The United Nations had named two different diseases as “worldwide” epidemics
 - HIV/AIDS
 - Diabetes
- There are ethnic and genetic components to diabetes as well as lifestyle issues



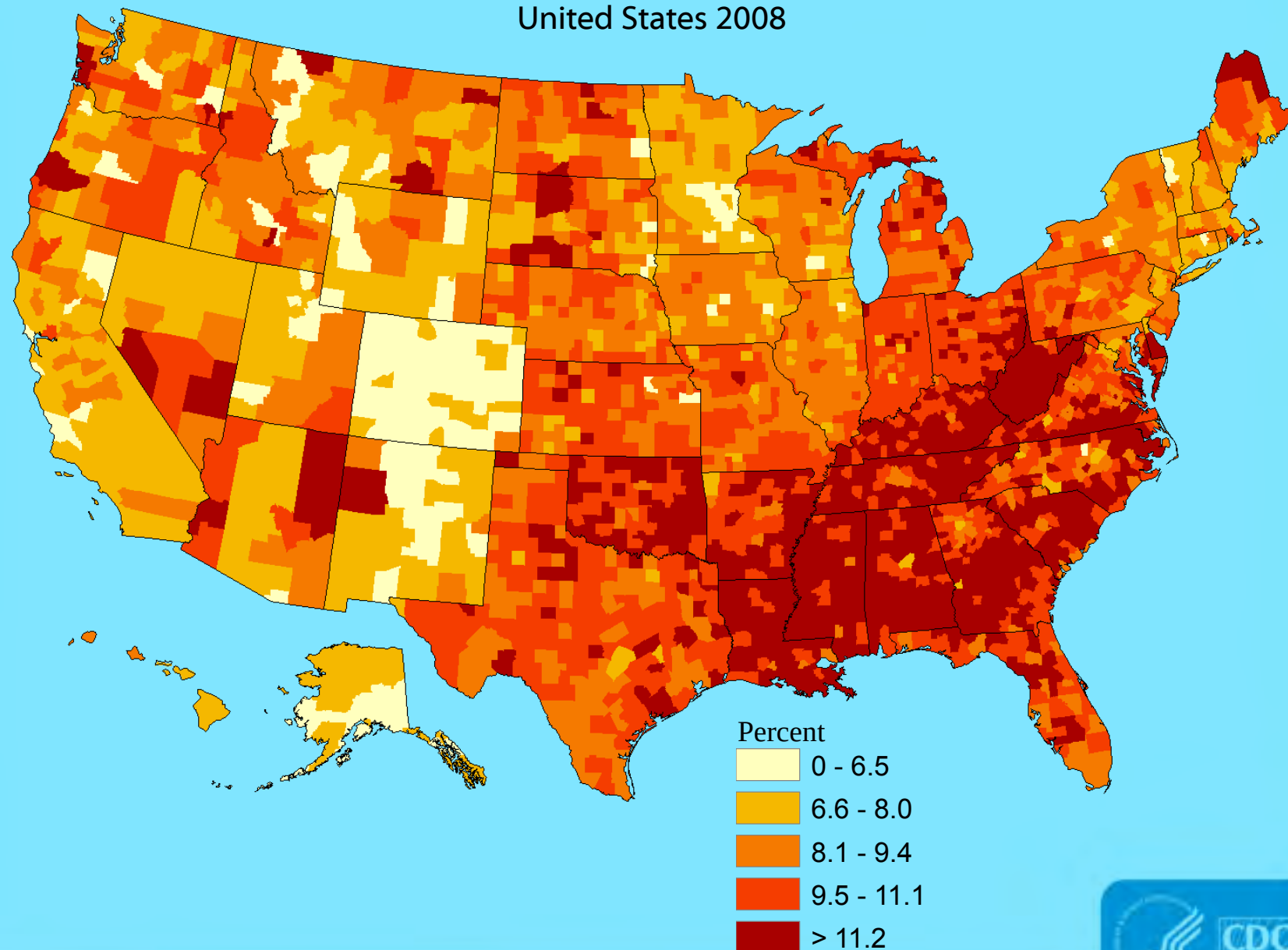
County-level Estimates of Diagnosed Diabetes among Adults aged ≥ 20 years: United States 2004



www.cdc.gov/diabetes



County-level Estimates of Diagnosed Diabetes among Adults aged ≥ 20 years:
United States 2008



www.cdc.gov/diabetes



High blood sugar = poor immune response

- Report in Sept of 2010 detailed why this happens
- Research underway to determine at what level of hyperglycemia is the body still able to fight off bacteria and viruses
- In post open heart, BG of >140 increases length of stay
- BG around 200, wounds will heal slowly, with ABX support, infections can resolve
- At 300 or greater immune response and healing is lousy if at all
- Many standard wound care treatments are contraindicated in pts with high BG

Hyperglycemia and Mood

- High BG leads to
 - Depression
 - Interferes with activities of daily living
 - Decreased cognitive functioning
- Without treatment for depression...

	Diabetes and depression	Diabetes without depression
Divorced	49%	25%
Income < \$25,000	70%	43%
Insurance	11%	41%
No \$ for meds	42%	16%
Use ER to see doc	26%	10%
Health limited activities	63%	9%

Is Inpatient Glycemic Management
Important?

OMG, yes!!!



Samaritan North Lincoln Hospital

Subcutaneous Insulin Orders

- **Qualification/diagnosis** – check all that apply
 - o Type 1 DM
 - o Type 2 DM
 - o Random glucose greater than 180
 - o Fasting glucose greater than 140
 - o Controlled
 - o Uncontrolled (BG greater than 180 x 2)

Goal Pre-meal FSBG:

80-140 mg/dl OR ☐ Other: _____ mg/dl

- Almost always the goal is left at 80 - 140
- Some evidence for higher goal in ICU/CCU pts (110-150)
- Some evidence for tighter goal in post cardiac surgery
- (80 – 110)



ADA Diet:

- **Low** Consistent Carbohydrates
(3-4 carb choices = 45 – 60 carb grams per meal;
1200 – 1500 calories daily)
- **Medium** (*most common*) Consistent Carbohydrates
(4-5 carb choices = 60 – 75 carb grams per meal;
1600 – 1800 calories daily)
- **High** Consistent Carbohydrates
(5-6 carb choices = 75 – 90 carb grams per meal;
2000 – 2200 calories daily)
- Other: _____

Most things we eat fall into one or more of these categories

- Carbohydrates
 - Only foods with direct effect on BG
 - Some contain fiber
 - Very little effect on BG but delays the absorption of carbs
 - Some (non-starchy vegetables) have too few grams to count
- Protein
 - No direct effect, delays the absorption of carbs
- Fats
 - No direct effect, delays the absorption of carbs

Carbohydrate Review

- Carbs that count...
 - Starches = Bread, rice, pasta, pop corn
 - Starchy vegetables = Legumes/beans, potatoes, peas, corn, winter squash
 - Fruit = Apples, pears, melon, berries, juices, grapes,
 - Milk = Skim, 1%, 2%, whole, soy, rice, yogurt
 - Sweets = Ice cream, sherbet, candy, honey, syrup



Carbohydrate Review

Carb Counting

- Count by grams or choices/servings
- One choice = 15 grams
- Average meal is about 4 choices (about 60 gm)
- Average snack is 1 choice
 - Ideally includes some protein with the carb
- SNLH meal tickets include carbs choices/servings for every item

Sunday Lunch
Consistent Carb. Medium

Amount
Consumed

Roast Beef 0 carb

Mashed Potatoes

 with Gravy 1 carb

Peas & Carrots 1 carb

Peaches 1 carb

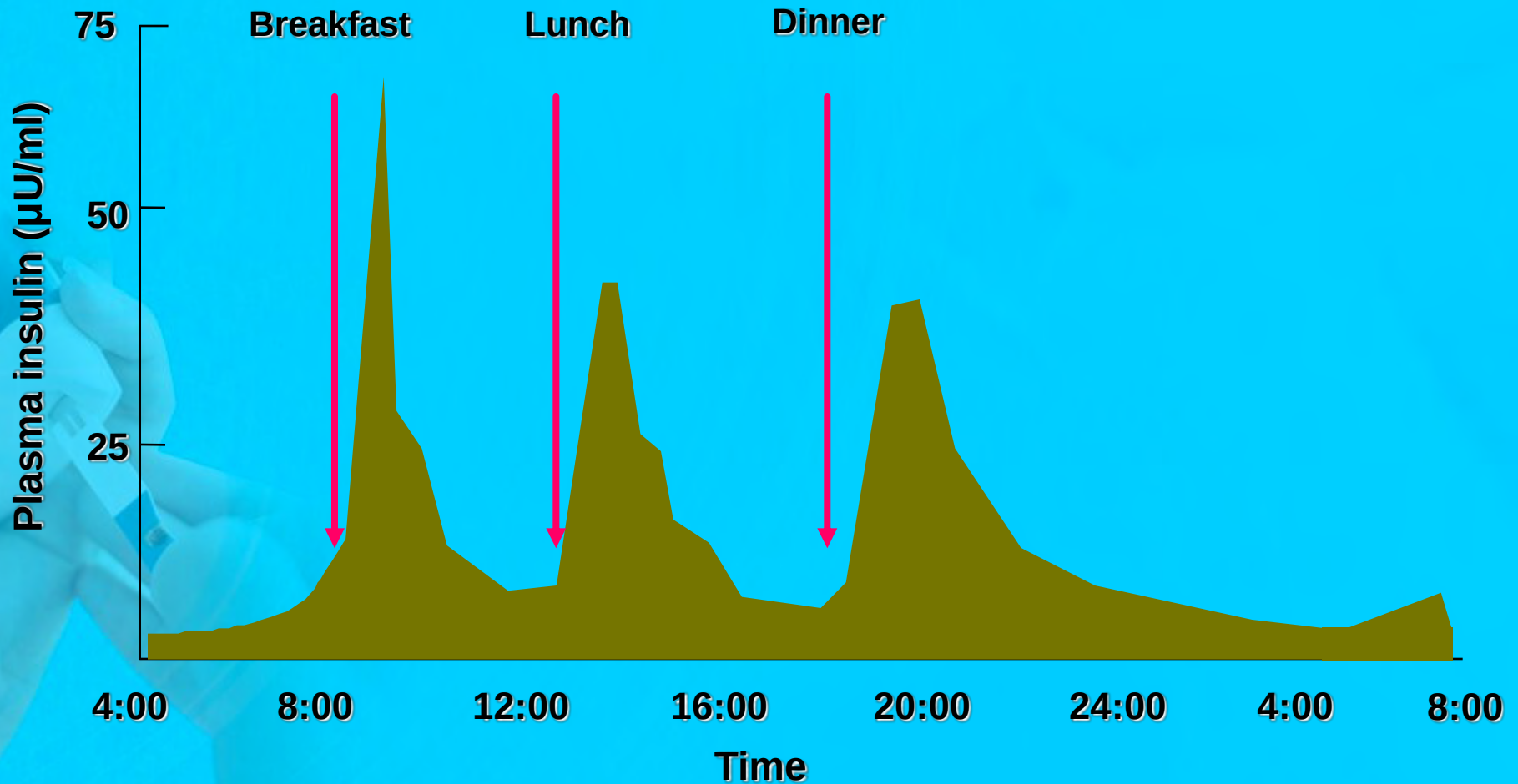
Apple Juice 2 carb

Coffee or Tea 0 carb

Other:

Total Carbohydrate _____

Serum Insulin Profile for Non-Diabetic



Types of Insulin

Type	Drug	Begins	Peaks	Duration
Short	Humalog	5 – 15 min	30 – 75 min	2 to 3 hours
Short	Regular	30 – 45 min	2 to 3 hours	4 to 6 hours
Basal	Lantus	1 to 2 hours	No peak	24 hours
Basal	Levemir	3 to 4 hours	6 to 8 hours	12 to 24 hours
Combo	Novolog 70/30	10 - 20 min	1 to 8 hours	Up to 18 hours
Combo	Humalog 75/25	5 to 15 min	1 to 12 hours	Up to 18 hours

Insulin Dosing - BASAL

- Lantus or Levemir often given once daily at HS
- Doseage is adjusted by the patient's Fasting Blood Glucose
- Occ. see either Lantus and Levemir given BID
 - Some pts don't get a true 24 hour effect
 - Some pts need high enough doses that need two shots
 - Generally this is equal doses given 12 hours apart

Example: The patient with a fasting BG is 345 after getting HS Lantus probably needs more basal insulin.

Insulin Dosing - MEALTIME

- Rapid acting insulin (Regular not ideal choice)
- Ordered for 15 min before or after meal
 - Usually given after
- Dose calculated by Carb to Insulin Ratio
 - Doc orders intensity of dosing
- Could order a set mealtime dose

Example: Pt has 1 unit per 10 grams of carb ordered, eats 30 grams for lunch, gets 3 units of insulin after meal.

Insulin Dosing - **CORRECTION**

- Looks a lot like a traditional sliding scale
- Corrects the pre-meal BG back to goal of 80 – 140.
- Scaled by doc based on insulin resistance and how quickly the pt needs to get into range
- Give with the **MEALTIME** dose after the meal.
- Insulin dose must be given within 45 min of FSBG.

Example: On moderate scale, pts BG is 325 pt gets 11 units of insulin for correction.

Insulin Dosing Summary

- **BASAL** (Lantus or Levemir)
 - Replaces the small amount of insulin that is normally released throughout the day
 - Lowers all the BG
 - Adjust by fasting BG
- **MEALTIME**
 - Mimics the body's normal response to carbs
 - Adjusted by carb to insulin ratio
- **CORRECTION**
 - Corrects the premeal BG to goal

Hypoglycemia

- Defined as a BG <70 mg/dl Symptoms:
 - Sweaty, hungry, dizzy, confusion, palpitations, vision changes, loss of consciousness, coma
- “Relative Hypoglycemia”
 - Symptoms, but BG not low.
 - Usually it is when the pts body has become accustomed to high BG levels
- “Hypoglycemia Unawareness”
 - BG is very low but pt has no symptoms until loss of consciousness

Hypoglycemia Policy- “Rule of 15”

• Check swallow

• Is pt able to swallow?

- Give 15 – 20 gm of quick acting carbohydrate
- Examples:
 - 4-6 oz fruit juice
 - 4-6 oz Regular soda pop
 - 4 glucose tablets
 - 8 oz of non-fat milk

• Is the pt unable to swallow?

- Patent IV
 - Give 25ml of D50 over 2 minutes
- No IV
 - Give 1mg Glucagon IM or SubQ

• Recheck BG in 15 min

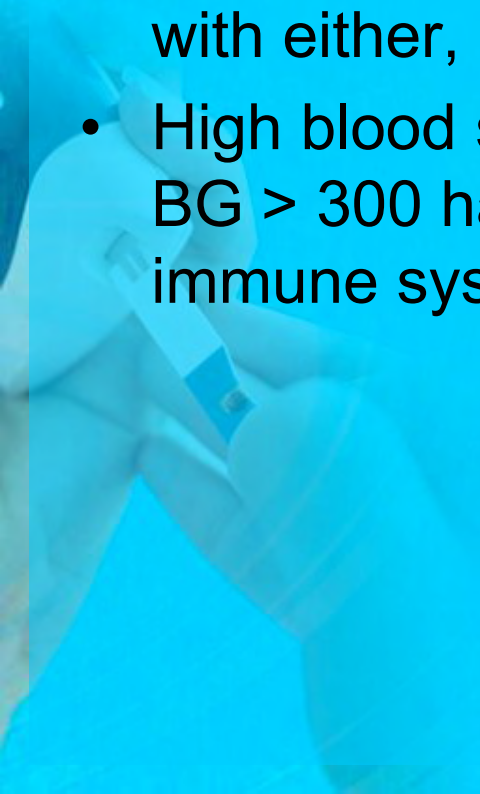
• Repeat treatment if pt remains symptomatic and BG <70

Remember when treating low BG...

- Fast acting carbs start working fairly quick.
- Total effect takes 40 – 70 minutes.
- Be very careful not to over treat!
- Depending on the pts weight, 15 grams of quick acting carbohydrate could raise the BG 45 – 75
- 4 oz of O.J. with 3 pks of sugar = approx. 30grams and could raise the BG 90 – 150 mg/dl.

Don't forget...

- Low blood sugar, while frightening, can be reversed quickly with either, po, IV, or IM glucose
- High blood sugar is slower to reverse and even 3 hours of BG > 300 has “devastating” and “lethal” effects on the immune system.



Documentation in NUR

- Process
 - Finger sticks are entered by CNA performing the test.
 - Nurse “edits” the entry with:
 - Grams of carbs consumed
 - Serum blood sugar
 - Reason for administration
 - Insulin type, dose, time
 - Site of injection
 - Comments if needed

Glucose Monitoring

08/24 1232 PM

===GLUCOSE MONITORING===

FSBS Reference Range (70-99 mg/dL) Carb Grams Serum BS

Reason for Insulin Administration+

Basal Insulin+(?)

Units Time Given

Site+

MealTime/Prandial Insulin+(?)

Units Time Given

Correction Insulin+(?)

Units Time Given Total Correction & Mealtime Units

Continuous Infusion Drip(?)

Rate (units/hr)

Algorithm/Scale

Comment

Site+

24 Hour Total (0000-2359) Basal Units 24 Hour Total (0000-2359) Meal & Correct Units

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===GLUCOSE MONITORING===

Reason for Insulin Responses Lookup

FSBS ReferenSelect Serum BS

Reason for Insulin Adm

Mnemonic Responses

- | | | |
|---|-----|---------------------|
| 1 | B | Basal |
| 2 | C | Correction |
| 3 | I | Continuous Infusion |
| 4 | OTH | Other (Specify): |
| 5 | P | Pre-Meal |
| 6 | PP | Post-Prandial |
| 7 | T | Tube Feed/TPN |

MealTime/Prandial Insu

Correction Insulin+(?)

Total Correction

Site+

<End of list>

Units Time Given

Drip(?)

24 Hour Total (0000-2359) Basal Units 24 Hour Total (0000-2359) Meal & Correct Units

08/24 1232 PM

===GLUCOSE MONITORING===

FSBS Reference Range (70-99 mg/dL) Carb Grams Serum BS

Reason for Insulin Administration+

Correction

Pre-Meal

Basal Insulin+(?)

Units Time Given

Site+

MealTime/Prandial Insulin+(?)

 Units
Time Given

Continuous Infusion Drip(?)

Correction Insulin+(?)

 Units
Time Given Rate (units/hr)

Algorithm/Scale

Total Correction & Mealtime Units

Comment

Site+

24 Hour Total (0000-2359) Basal Units 24 Hour Total (0000-2359) Meal & Correct Units

Practice Patient

- 25 y/o female, wt = 264 (120kg)
 - Low Consistent Carbs
 - Lantus 12 units @ 2100
 - Mealtime 1 unit/15 gm carbs
 - Correction Mild Scale
- BG before breakfast = 324
- Ate 100% of 4 carb choices and confesses that she ate one of friend's egg McMuffin from McDonalds.
- How much Novolog will she need after breakfast?

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SHS News**Local pediatrician to be published in top medical journal**

1/26/2009 4:05 PM

by Betsy Meidinger

Lon McQuillan, MD, a pediatrician with Samaritan Pediatrics in Corvallis, will appear as lead author on two articles in the February online edition of Pediatrics – a medical journal considered by many to be the best pediatric research journal in the...

Volunteers needed for statewide earthquake drill

1/26/2009 2:05 PM

by Ian Rollins

Samaritan Health Services needs your help with a major disaster drill in April.

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Name: Patricia Meagher

Phone: 846414

Dept: Nursing

Area: Lincoln City

Office: SNLH

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High: 50°



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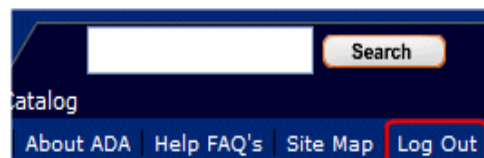
5/8/2008 10:11 AM

by Nick Hurst

This site was created to store department specific documents and information. If you have any questions please contact one of the site administrators listed on this site.

Nutrition Care Manual

The nutrition care manual is often called The Diet Manual. It is used by nutrition services staff, nursing, speech therapy, and physicians to understand the diets.

Nutrition Care Manual Site

Please logout of NCM when exiting

Nutrition Care Manual Documents

Type	Name	Modified By
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Calories in Egg McMuffin

Find nutritional information like calories, carbs, fat, protein and fiber for Egg McMuffin.

McDonald's [\(view more\)](#)

BREAKFAST : [McMuffins, Egg](#) ★★

BREAKFAST : [McMuffins, Sausage, with Egg](#) ★★

MEALS : [Breakfast Extra Value Meals, Egg McMuffin, with Hash Brown & small Coffee](#)

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McDonald's Breakfast: McMuffins, Egg



Choose a Serving Size: x



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Our simple-to-use diary takes the hard work out of counting calories. Better still, our affordable program helps you keep the weight off!

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Nutrition Facts



Calories 300 (1254 kJ)

	% Daily Value ¹	
Total Fat	12g	18%
Sat. Fat	5g	25%
Trans Fat	0g	
Cholesterol	260mg	87%
Sodium	820mg	34%
Total Carbs.	30g	10%
Dietary Fiber	2g	8%
Sugars	3g	
Protein	18g	
Calcium	300mg	

Practice Patient

- How much Novolog will she need after breakfast?
 - Correction Dose for BG 324 =
 - 8 units Novolog
 - Mealtime Dose =
 - Tray = 4 carb choices (60 gms)
 - 4 units Novolog
 - Friend's Egg McMuffin = 30 gms (2 choices)
 - 2 units Novolog
 - Total Novolog = 14 units

Notice any problems with this patient?

- Is she getting enough basal insulin?
- Is she getting enough mealtime +/- correction insulin?



