Welcome!

Remote attendees, please **<u>mute your phones</u>** as a courtesy – thank you!

Diabetes: The Ins and Outs of Insulin

CareOregon Pharmacy

Today's Agenda

Introduction 8:00-8:15am

RN perspective 8:15 – 8:45am

Medication Overview 8:45 – 9:15am

Break 9:15 – 9:30am

Patient cases 9:30 – 10:45am

Break 10:45am – 11:00am

Device demonstrations 11:00 – 11:45pm

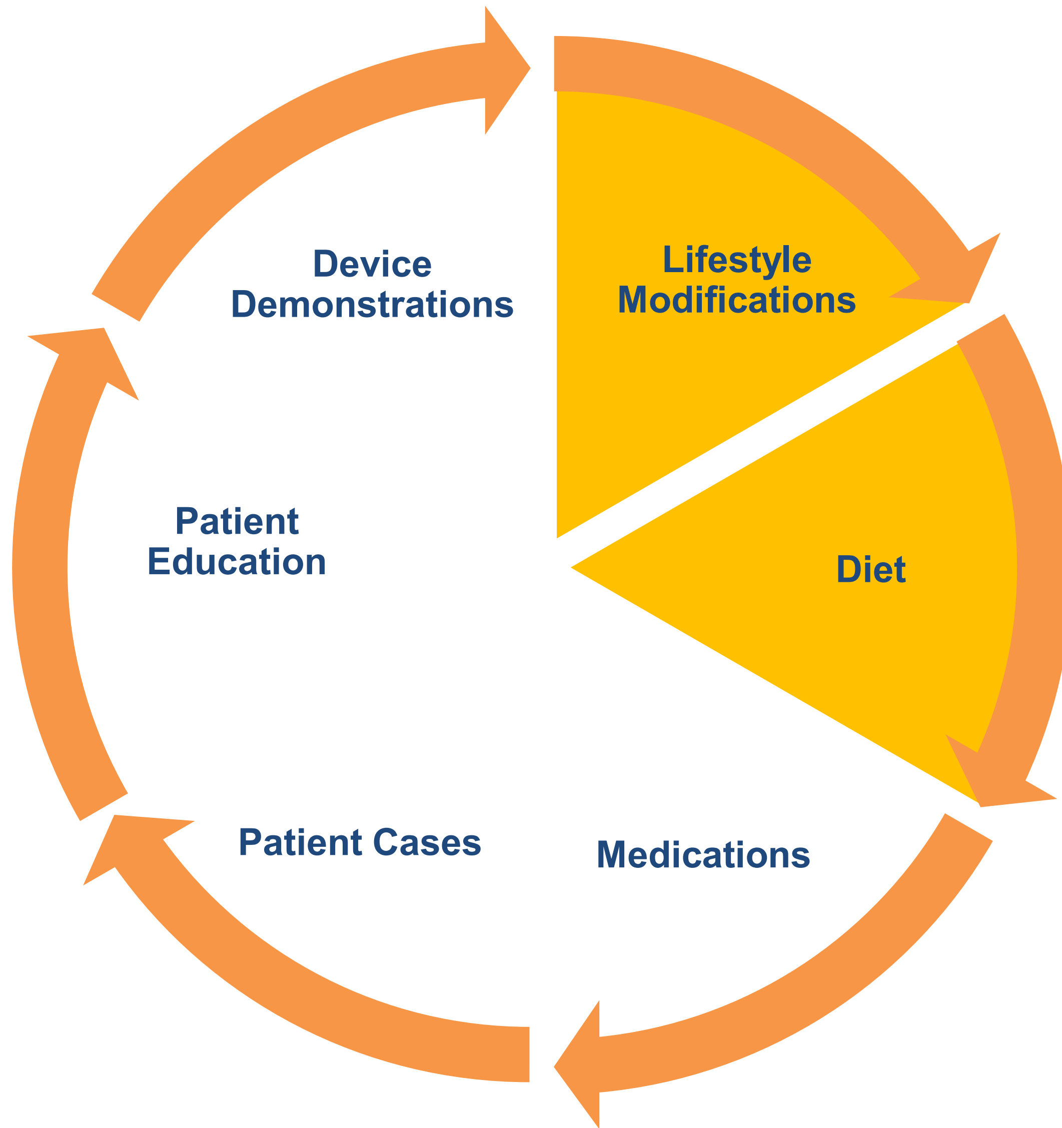
Questions & Closing 11:45am – 12:00pm

Learning Objectives

1. Explain 3 key patient education points on managing diet in diabetes.
2. Summarize advantages and disadvantages of different insulin regimens.
3. Identify potential adjustments to insulin dosing based on patient assessment and blood glucose values.
4. Demonstrate appropriate insulin injection techniques.

Since Last Session

How have you used the information from the Motivational Interviewing MEDS Ed?



Device Demonstrations
Lifestyle Modifications
Patient Education
Diet
Patient Cases
Medications

Lifestyle Modifications

Cheryl Ortner, RN, MSN, CDE
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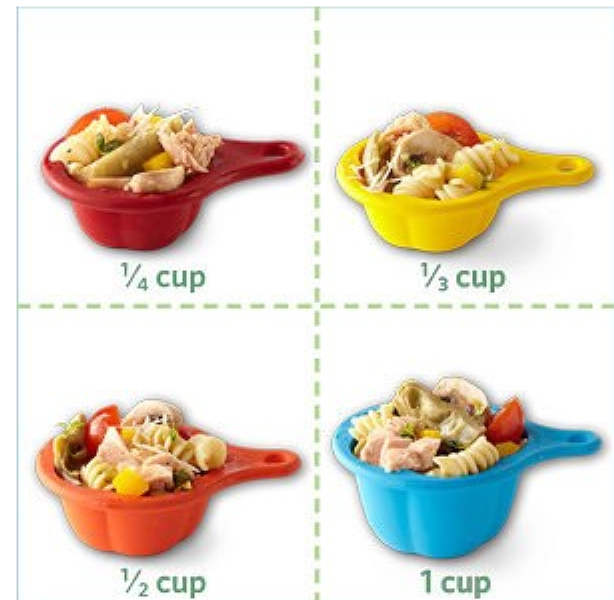
MEDS Ed™

A Day in the Life of a CDE

- Number of patients seen per day
- Appointment length
- Different types of appointments

Educating Patients on Diet

- Carb counting is ideal
- If a patient cannot count carbs
  - Reading nutrition labels
  - Consistent carbs per meal
  - Consistent meal timing



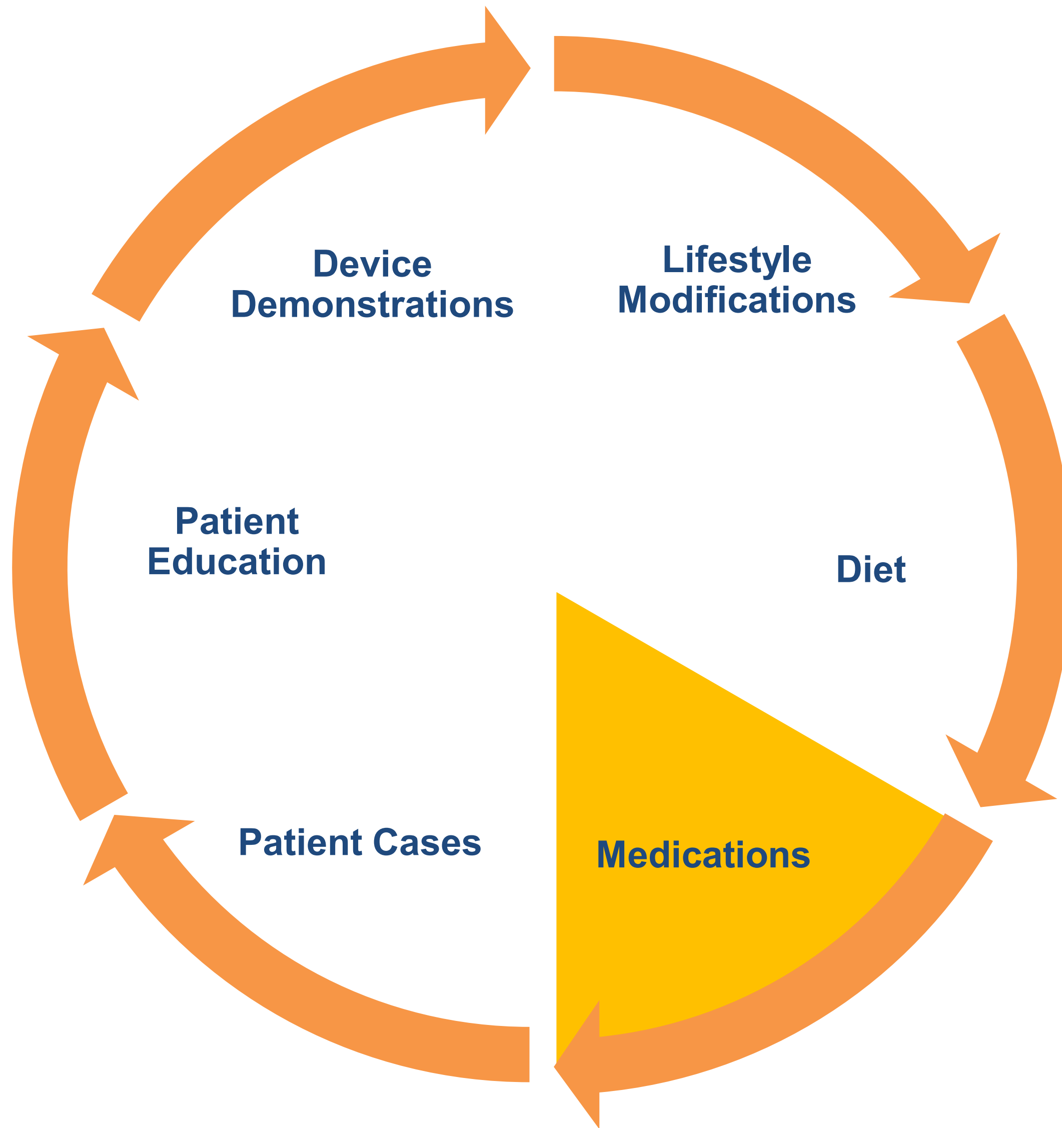
In a Busy Primary Care Setting

- If you only have 5 minutes to talk to a patient about diet….

Exercise

- How to exercise while taking insulin

Handout Review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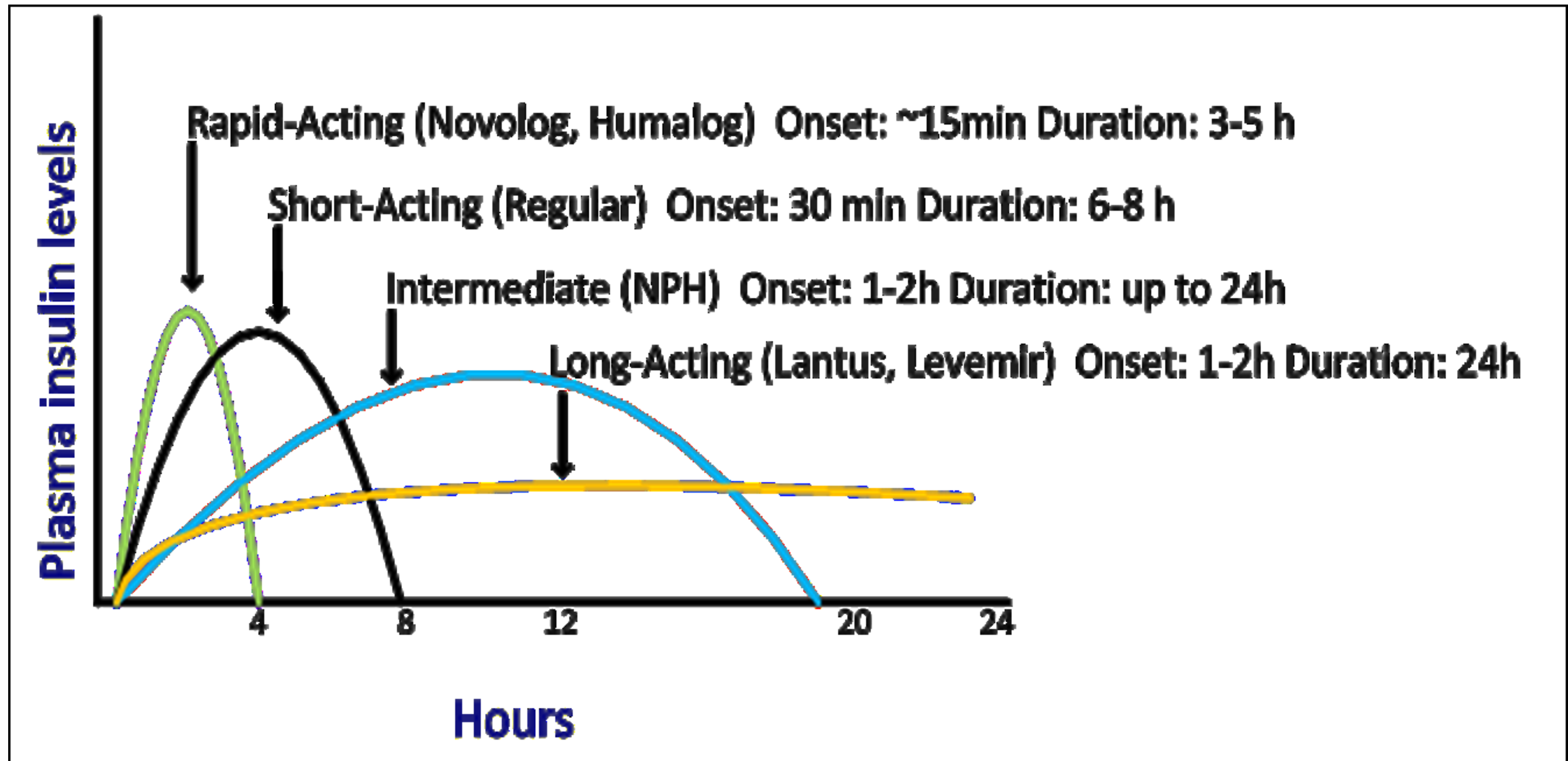
Medication Overview

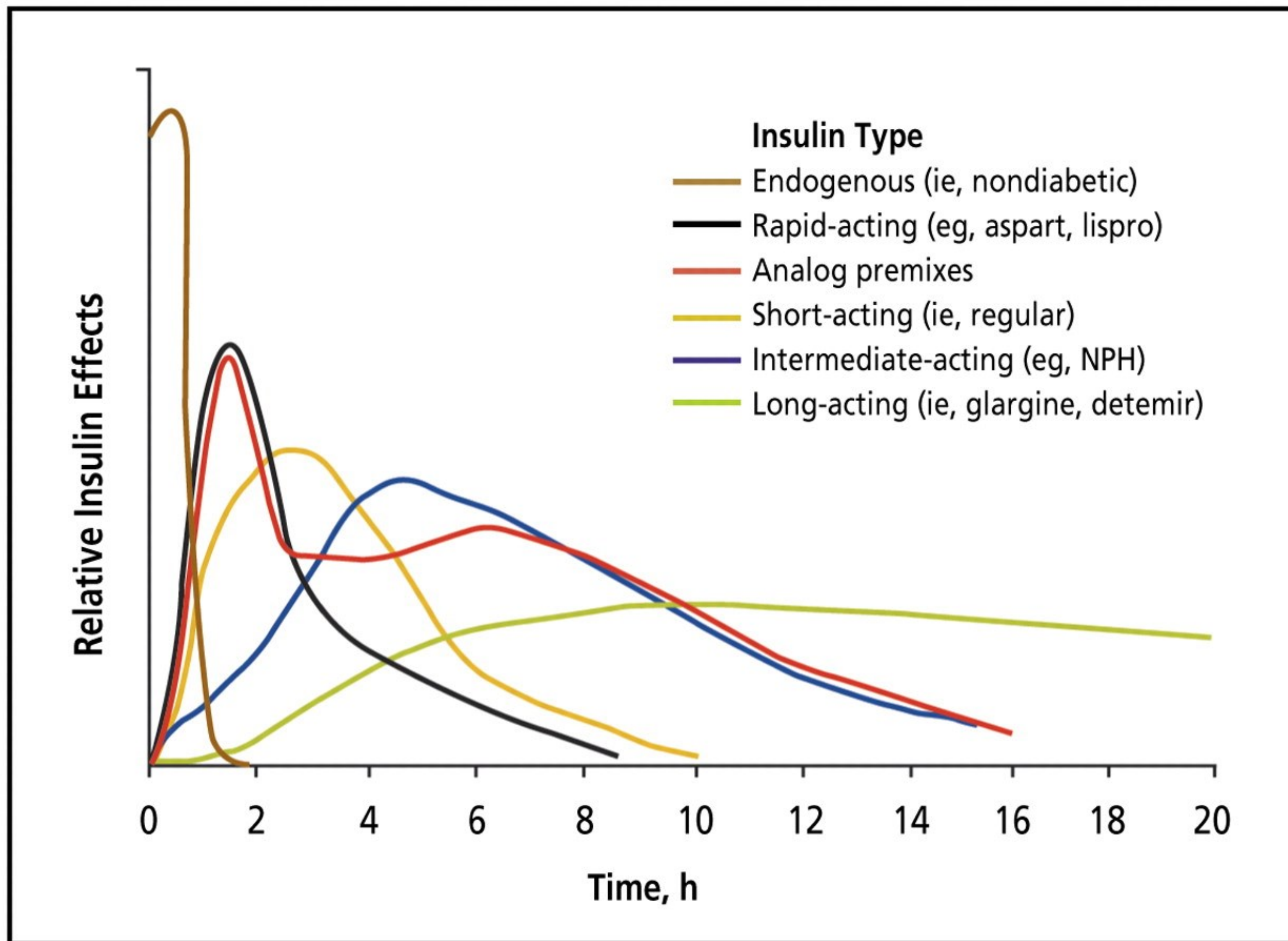
Tara Berkson, PharmD
MEDS Ed Coordinator
CareOregon

INSULIN FOR YOU! INSULIN FOR YOU!
EVERYONE GETS INSULIN!

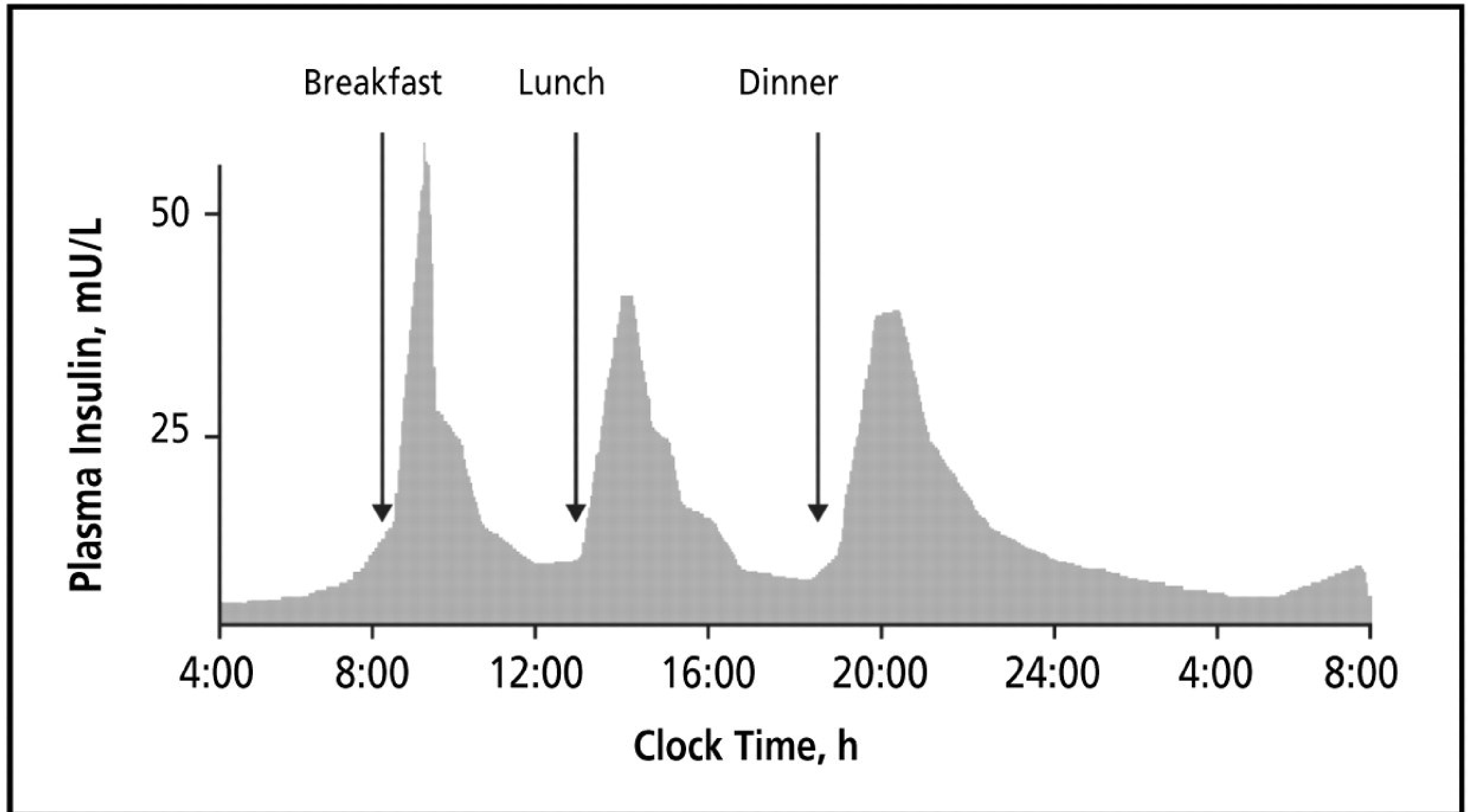
Insulin Profiles



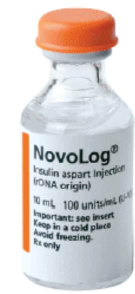
Insulin Profiles – More Detail



Non-Diabetic Insulin Response



Insulin Products



Insulin Mixtures

- Humulin or Novolin 70/30
- Humalog 75/25
- Humalog 50/50

When to Split the Lantus Dose

- How many units?

- Why?

Adding Prandial Insulin

- If not at goal with dose titration after 3-6 months, consider adding prandial insulin
  - Add to largest meal of the day -OR-
  - Check BG before lunch, dinner, and bed
    - Pre-lunch BG out of range – add rapid-acting at breakfast
    - Pre-dinner BG out of range – add rapid-acting at lunch (or NPH at breakfast)
    - Pre-bed BG out of range – add rapid-acting at dinner
- Continue Metformin
- Stop Sulfonylurea

GLP-1 Receptor Agonists

- Lowers A1c 0.5-1%
- Increase glucose dependent insulin secretion
  Decrease postprandial glucagon levels. Slow gastric emptying. Increased satiety.
- Advantages:
  - Low hypoglycemia risk
  - Weight loss 1-4kg

Brand	Generic
Byetta/Bydureon	exenatide
Victoza	liraglutide
Tanzeum	albiglutide
Trulicity	dulaglutide
Adlyxin	lixisenatide

GLP-1 Receptor Agonists

- Side effects: nausea, vomiting, feeling full, acute pancreatitis
- Administration points:
  - Byetta given within 60 min of 2 main meals ≥ 6h apart. Must prime the pen with first use.
  - Victoza is once/day without regards to meals.
  - Bydureon, Tanzeum, Trulicity are once/week without regard to meals or time of day. Do not mix in same syringe with insulin.

DPP-4 Inhibitors

- Lowers A1c 0.5-0.8%
- Increase active incretin hormone levels → Increase insulin secretion
- Decrease glucagon secretion
- Advantages:
  - Low hypoglycemia risk
  - Weight neutral
- May need dose adjustment in renal insufficiency

Brand	Generic
Januvia	sitagliptin
Onglyza	saxagliptin
Tradjenta	linagliptin
Nesina	alogliptin

SGLT2 inhibitors

- Lowers A1c 0.5-1%
- Increase urinary glucose secretion
  - Fasting and postprandial effect
- Advantages:
  - Low risk of hypoglycemia
  - Weight loss
  - Lowers BP
- Side effects:
  - Urinary tract infections
  - Genital mycotic infections
  - Diuretic effect
  - Hypotension
  - Hyperkalemia

Brand	Generic
Invokana	canagliflozin
Jardiance	empagliflozin
Farxiga	dapagliflozin

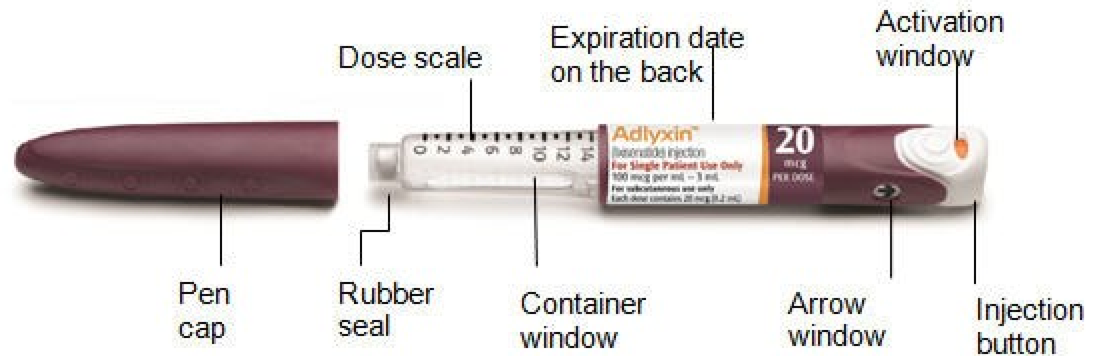
Benefits Buzz

- Insulin pens: require PA – documentation of an inability to inject using a vial and syringe
- GLP-1 agonists
- DPP-4 inhibitors
- SGLT2 inhibitors

In the Pipeline

Lixisenatide (Adlyxin)

- FDA approved July 28, 2016
- Once daily injection
- Similar efficacy and adverse events as other GLP-1 agonists
- CV neutral



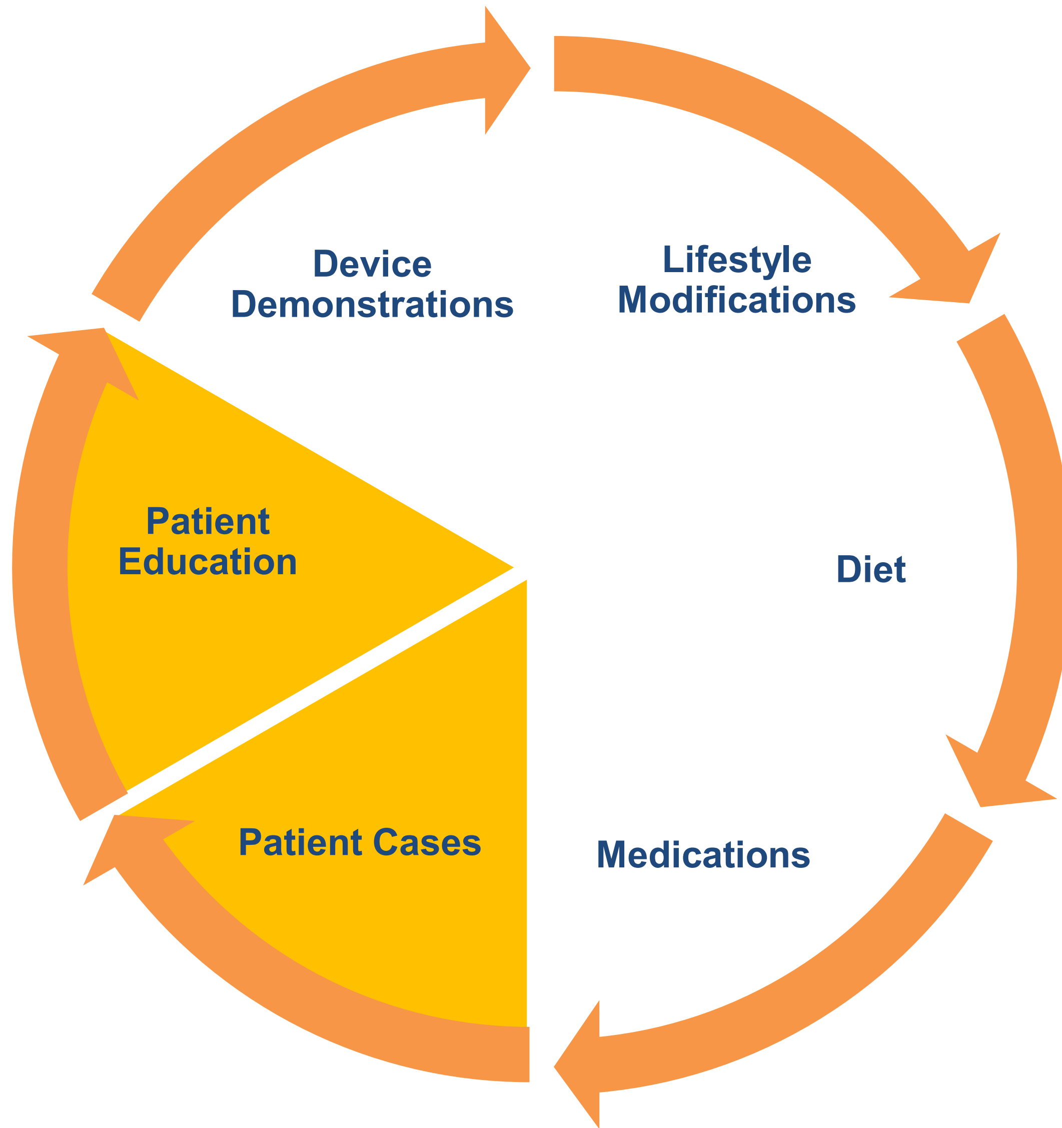
iGlarLixi

- GLP-1 agonist and insulin glargine combination
- Lixisenatide + glargine

Take Home Point

- Knowing the onset and duration of different insulin formulations is helpful for patient education
  - Long acting: Lantus, Detemir
  - Intermediate acting: NPH
  - Short acting: Regular
  - Rapid acting: Aspart, Lispro

eak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Managing Complicated Patients

Leonard Bertheau, DO
Diabetes and Endocrine Center
Adventist Health

CareOregon® MEDS Ed™

Setting the Stage

- Diet
- Checking blood glucose
- Oral medications
  - Metformin
  - Sulfonylureas – Glipizide, Glimepiride, Glyburide
  - Pioglitazone
- Insulin
- GLP-1 agonists, DPP-4 inhibitors, SGLT-2 inhibitors

More Than DM1 and DM2

- LADA, DM1.5
  - Latent Autoimmune Diabetes in Adults
- Double diabetes
- DM1 from secondary causes

When to Start Insulin

- A1c > 9%, not controlled by orals
  - 3 to 6 months
- Newly diagnosed, A1c >10%
  - What insulin do you recommend?

Choosing Insulin

- Basal insulin
  - What dose?
  - What time of day?
  - When to test?

- Bolus insulin
  - When to add?
  - When to test?

- Basal:Bolus ratio = 50:50

Mr. S

- Mr. S has just started on Lantus 10 units at bedtime. When you ask him how his doctor told him to titrate his insulin, he responds “I don’t remember”
  - When should Mr. S test his blood sugar?
  - What are Mr. S’s blood sugar and A1c goals?
  - What is a reasonable titration plan?

One Month Later

- In a follow-up call, Mr. S mentions that he had 2 low blood sugar episodes that he treated with drinking 2 cans of regular soda and 3 slices of leftover pizza.
  - What questions do you ask Mr. S?
  - What key points on management of hypoglycemia do you review with Mr. S?

Hypoglycemia

How low is too low?

- For most patients: **70**
- Gestational diabetes: **60-95**

Why worry?

Can lead to

- Loss of brain cells
- Coma
- Death

Symptoms of low blood sugar

- CNS
  - Headache
  - Confusion
  - Personality changes
  - Blurry vision
- GI
  - Hunger
  - Nausea
  - Gas/upset stomach
- Adrenergic
  - Sweating
  - Anxiety
  - Dizzy/Shaky
  - Fast Heartbeat

A lot of these overlap with symptoms of high blood sugar: patients need to check sugar

Treatment – Rule of 15

- If the patient is awake and able to take oral intake: 15 grams of simple carbs
  - 4 ounces of juice (OJ)
  - 4 glucose tabs
  - 5 lifesavers
  - ½ can regular soda
  - Nothing with fat or protein, as this will slow the absorption of glucose
- If the patient is not awake
  - Glucagon kit

Treatment – Rule of 15

- Recheck sugar in 15 minutes to make sure it is coming up
  - If not, give another 15 grams simple carbs
- If the sugar is normal (above 70) and they can eat, give them something with protein (like peanut butter) or feed them a meal to keep the sugars up

Hypoglycemia

- Normal blood sugars may cause symptoms
  - Treat even if not a true low??
  - May be awhile before 150 feels normal
  - Pay attention: rapid drops can cause symptoms

Mr. S's Next Follow-up

- Mr. S brings in his meter. His sugars are at goal first thing in the morning, but in the 200-300s at lunch and dinner time.
  - What changes to Mr. S's insulin regimen do you recommend?
  - When do you recommend he tests his blood sugar?

One Week Later

- At his last visit, Mr. S was started on Aspart insulin 4 units with breakfast, 6 units with lunch, 6 units with dinner. He brings in his blood sugar log:

Day	Morning	Lunch	Dinner	Bedtime
Sunday	100		101	275
Monday	101	183	175	289
Tuesday	99	193		301
Wednesday	105		310	190
Thursday	99	179	86	264
Friday	103		189	283
Saturday	102	165		299

Next Follow-up

- Mr. S has a follow up phone call. You collect his recent blood sugar values. Over the past week, his sugars have been high first thing in the morning and low at dinner time. Mr. S tells you he loves watching the Olympics, but all of his favorite events are on in the middle of the night.
  - What follow-up questions do you ask Mr. S?
  - What dosing changes do you recommend?
  - What additional education do you provide for Mr. S?

Dawn Phenomenon

- Hormone surge between 2:00 – 8:00am
  - Cortisol, glucagon, epinephrine → hepatic gluconeogenesis → endogenous insulin release
- Patient with diabetes have less endogenous insulin release resulting in high fasting BG
- How to treat/prevent:
  - Find the source: nighttime snacking, medications wearing off
  - Rule out Somogyi Effect

Somogyi Effect

- Blood sugars decrease in middle of night
- Rebound hyperglycemia
- Bad if this is happening because often nighttime insulin gets increased, compounding effect
- If suspect:
  - Can **decrease** Lantus and see if morning sugars go down
  - Refer for continuous glucose monitoring

Pros and Cons of 70/30

Pros	Cons
Basal and prandial coverage	70:30 ratio vs. 50:50
Less injections per day	Less flexible with dose adjustments
Less confusion on units to inject	Requires patient to eat consistently (time and carbs)
One insulin vial – may be more realistic option for patients with unstable housing or no place to store	

Mr. T

- Mr. T said he was too busy to remember to take his insulin. He works in a warehouse loading trucks with locally made bike bags. His job requires that he take lunch and breaks at regular times to coordinate with his coworkers' breaks. Mr. T's doctor started him on 70/30 insulin 20 units 30 minutes before breakfast and dinner.
  - Why is it important for Mr. T to take his insulin 30 minutes before breakfast and dinner?
  - How can you double check that the dose seems reasonable?

Two Weeks Later

- You call Mr. T for a follow up. Last week, he had 2 low blood sugars in the afternoon. He said his job has been stressful since one of his co-workers has been calling in sick. He's had to skip lunch twice to cover his shift.
  - What could be causing Mr. T's low blood sugars?
  - What education will you provide Mr. T?

When to Refer

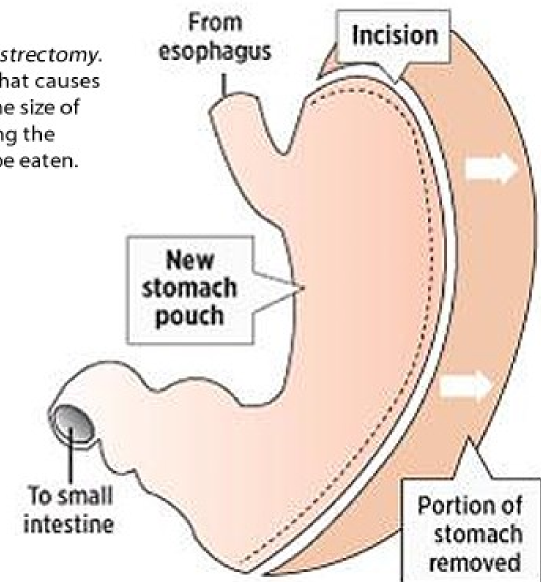
- New onset DM2 with A1c > 12%
- Uncontrolled DM2 on basal/bolus insulin
- Gestational diabetes
- DM1
- Insulin pumps
  - Note that pump manufacturers can address pump malfunctions

Bariatric Surgery

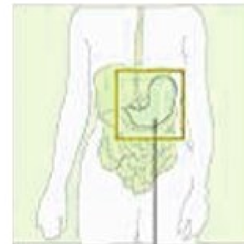
- Gastric sleeve then gastric bypass

GASTRIC SLEEVE

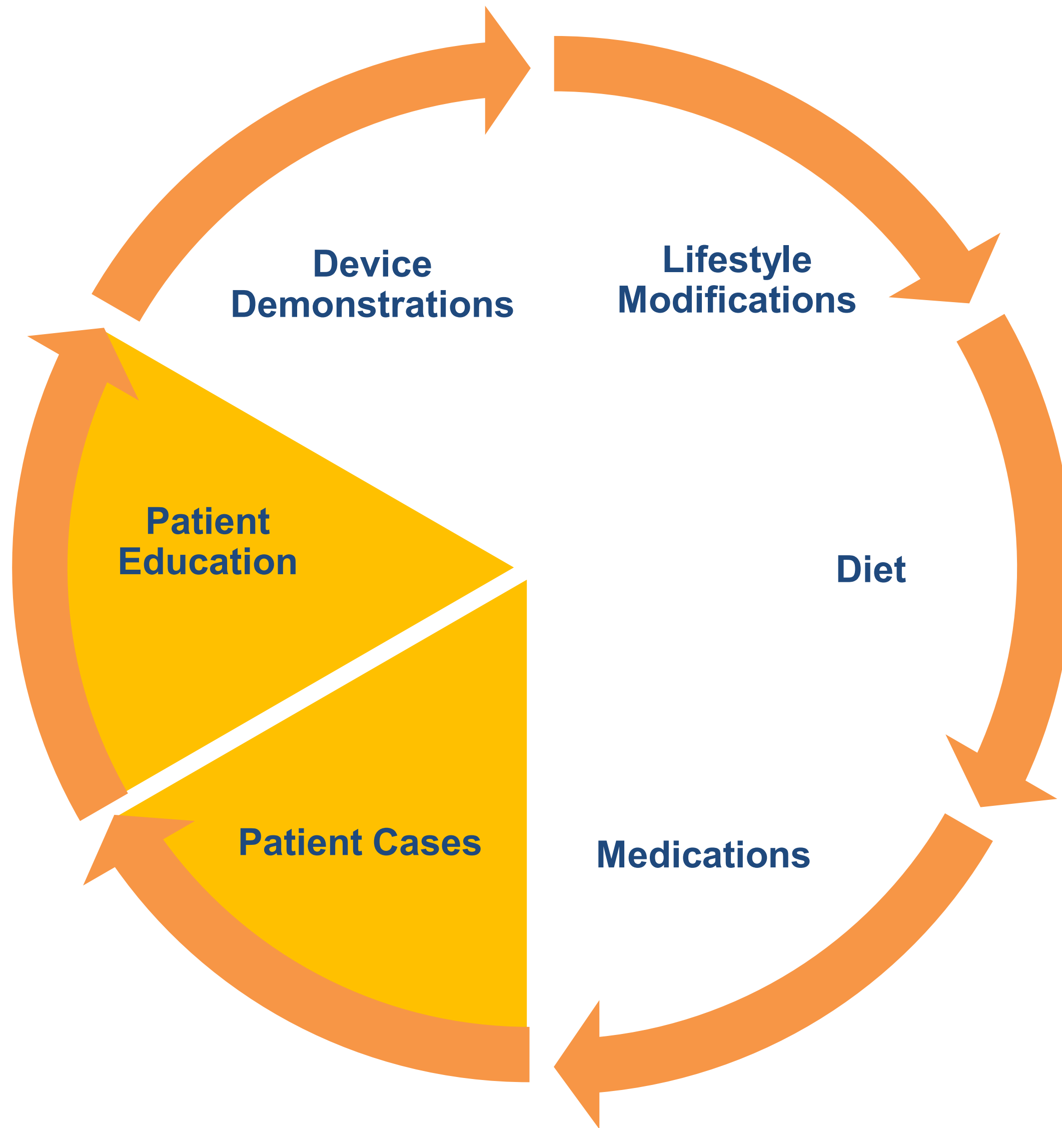
Also known as *Vertical Gastrectomy*. It is a surgical procedure that causes weight loss by reducing the size of the stomach and restricting the amount of food that can be eaten.



DIGESTIVE SYSTEM PRIOR TO SURGERY



STOMACH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Case Review

Case # 1

- Mr. Tubby is a 42 year old DM-2 who weighs 310 pounds comes in for hyperglycemia.
- He has been on orals since he was diagnosed 12 years ago and he has never been in good control.
- His wife Telly states that his sugars are in the 200's in the AM, but then 300 – 400 later in the day and evening after he eats.

Case # 1

- He was given a bolus of insulin in the ER and now his sugar is 130.
- His A1c is 14%.
- No using 70/30!
- Let’s come up with a basal bolus regimen and sensitivity factor for this guy.

Case # 1

- He will likely need about 70 units Lantus (start about 55 units as he is insulin naive)

- Carb ratio would be 1:3.5 (one may start 1:10 and jump to 1:5 if his PP numbers are high)

Case # 1

- Sensitivity is 10.6 (I would start with the high dose algorithm, but he may need an individualized one like 1 unit for every 15 over 150)

Case Study #2

- 44 yo male Routine random serum glucose was 271
- Symptoms for the past year and a half:
  - frequent infections
  - polyuria
  - polydipsia
  - weight loss

Case Study #2

- Diagnostic of DM, but what type???

Case Study #2

- Weight loss
- He is 5’9”, 197 pounds (BMI of 29)
- His Maternal grandmother was a DM-2 later in life and she was very obese
- No signs of insulin resistance (AN)
- A1c was 12.5% (blood sugars range from 178 – 508)

Case Study #2

- DM-2
- DM-1
- LADA (DM-1.5)
- Double Diabetes
- DM-1 from secondary causes

Case Study #2

- I did not know
  - LADA or DM-2
- Autoantibodies
  - Anti insulin
  - Anti GAD
  - Anti islet cell
- Fasting C-peptide with a fasting serum glucose

Case Study #2

- Auto-antibodies were all negative
- C-peptide was low
- So I still did not know

Case Study #2

- He checked his sugars at home:
  - Fasting - 178 - 298
  - 2 hours after breakfast - 395 - 508
  - One HS reading - 295.
- Treatment?

Case Study #2

- Basal/bolus insulin therapy
- Ensure control if he is a LADA
- Reverse the glucose toxicity if this is a DM-2.
  - After about 6 – 8 weeks on insulin, will need to DC.

Case Study #2

- He continues to use basal/bolus insulin
- He is a LADA
- Last A1c was 6.6% (with no low blood sugars)

Case #3

- 43 yo male
- 6’2”, 114 pounds (was down to 90)
- 2 - 3 years prior he had his BS checked by his partner's dad's meter and it was over 500
- At the time he did not know what that meant

Case #3

- He was formally diagnosed with diabetes 6 months prior
- He had lost 60 pounds in 1.5 years
- He was eating a lot
- Felt like he was going to die
- A1c 10.2%

Case #3

- Referred by wound care/foot ulcer
- No other symptoms
- He has chronic diarrhea, eight times a day
- Oily stools
- History of heavy alcohol consumption

Case #3

- What type of DM?

Case #3

- DM2
- DM1
- LADA (DM1.5)
- Double Diabetes
- DM1 from secondary causes

Case #3

- DM1 secondary to:
- Chronic pancreatitis from Alcoholism
- Abdominal CT can confirm diagnosis
  - And rule out Pancreatic CA

Case #3

- He was not checking his sugars prior to his initial visit
- Treatment?

Case #3

- Basal/bolus insulin therapy
- Pancreatic enzymes

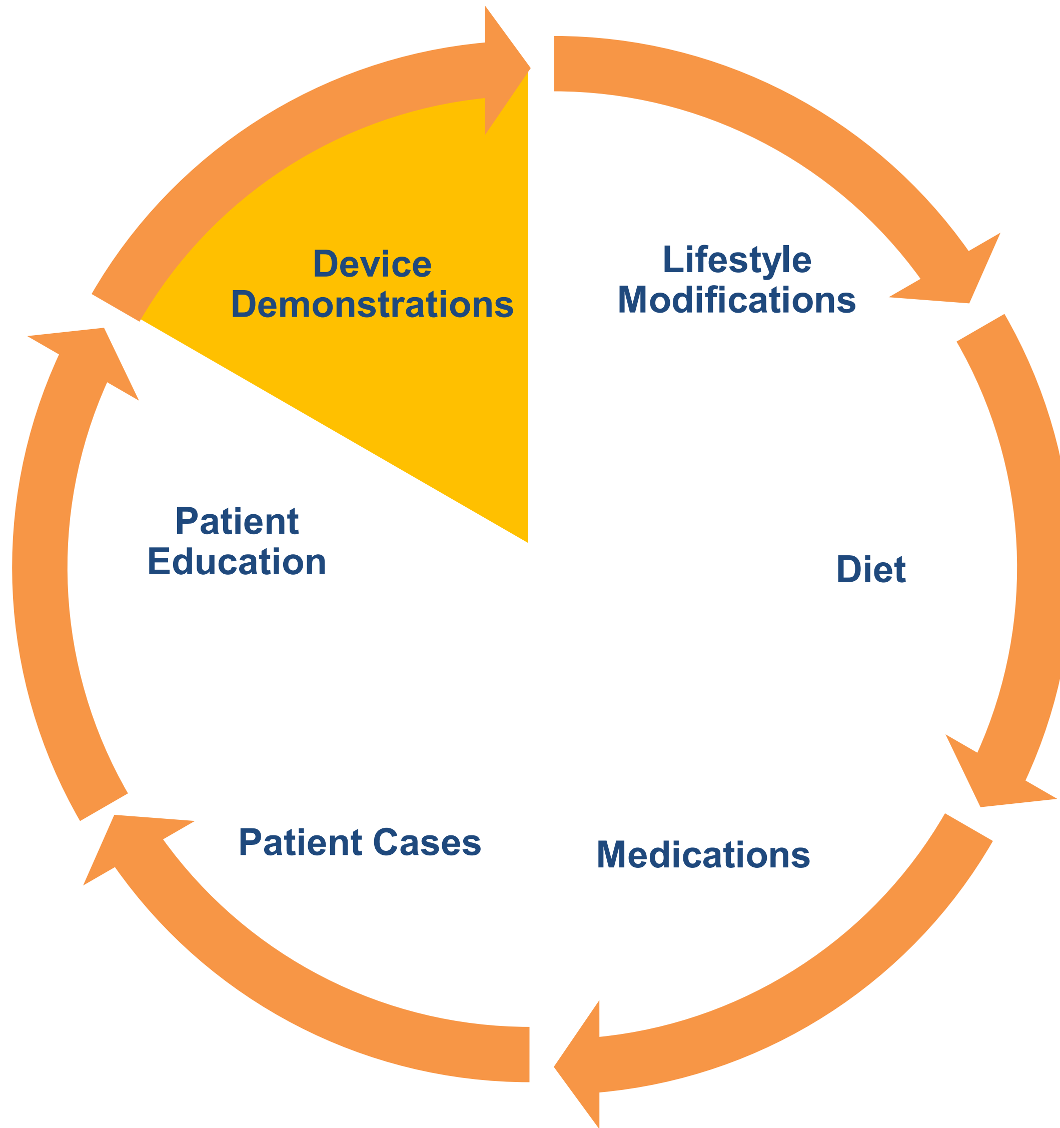
Case #3

- Update
- No more diarrhea
- His weight is up to 136 pounds
- A1c is 6.8% (some low blood sugars)
- He has cut back on Etoh, but continues to drink

Take Home Points

- Evaluating blood glucose readings helps identify potential issues with diet and/or medications
- Educating patients on the timing of their insulin dosing is key
- Insulin regimens should be individualized to a patient's schedule, lifestyle, and social determinants

eak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Questions?

Next Session:

Transgender Care

October 27th 2016

Summary

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Thank you!