Insulin Pump Meeting
Insulin Pump Therapy

• Continuous Subcutaneous Insulin Infusion (CSII)

• Insulin pumps deliver insulin needed for an actual 24 hour period (basal), as well as the insulin needed to cover food intake or high blood sugars (bolus)

• Insulin pumps are the most physiological form of insulin delivery known today.
Insulin Injection Therapy

Insulin Delivery with Intensive Conventional Therapy (ICT)

[Graph showing insulin delivery compared to time]
Continuous Subcutaneous Infusion

Insulin Delivery with Continuous Subcutaneous Insulin Infusion (CSII)
Basal vs. Bolus

- **Basal** insulin – the insulin that the pump delivers at a continuous rate every hour

- **Bolus** insulin – the insulin that is given to cover food or correct a high blood sugar
Basal and Bolus Insulin

MN Basal 11:59pm

Bolus
Carb to Insulin Ratio

• The amount of insulin (quick acting) given to cover the carbohydrates eaten at each meal

• Example: 15:1 (1 unit insulin for every 15 grams of carbohydrates eaten)
Correction Bolus

The purpose is to lower or correct a high blood sugar to the target level. To do this you need to understand the following variables:

• Correction Factor/Insulin Sensitivity Factor
• Duration of insulin action
• Insulin on board
• Target glucose level
Correction Factor/Insulin Sensitivity Factor

• The amount the blood sugar would decrease when given 1 unit of insulin.

• Example: Correction Factor of 75 mg/dl
  1 unit will lower the blood sugar 75 points
Correction Dose Example

- Current blood sugar = 180 mg/dl
- Target blood sugar = 120 mg/dl
- Correction Facor = 30 mg/dl

- $180 - 120 = 60$
- $60$ divided by $30 = 2$
- 2 units of insulin will return the blood sugar to target
Duration of Insulin Action

• The amount of time that insulin effectively lowers blood sugar.
• Humalog/Novolog/Admelog starts working within 15 minutes and works in the body for about 3-5 hours.
• Each pump can be set for your specific duration time 2-8 hours.
Insulin on Board

- The amount of insulin that is still active in the body from a previous bolus. This feature is designed to prevent over-blowing and stacking of insulin which are major causes of low blood sugars.
Stacking insulin can lead to low blood sugars
Smart Pumps

• Accurate boluses through carb ratios, targets, and correction factors

• Avoid insulin stacking

• History to improve analysis
Dexcom G6
MiniMed Sensor
Freestyle Libre
Benefits of Insulin Pump Therapy

• Flexibility of lifestyle
  - mealtimes
  - sleeping in

• Less fluctuation of blood sugar levels
  - tighter blood sugar control
  - more physiological release of insulin

• Prevent/prolong long-term complications
Insulin Pump Myths

• I won’t have to take another insulin shot again
• I can eat whatever I want, whenever I want
• The pump is a cure for diabetes
• I don’t have to test my blood sugars on the pump because the pump reads my blood sugars and then gives me insulin
• I can’t be on a pump because I play sports/am too active
Contraindications For Pump Therapy

• Unwillingness to admit they have diabetes to others
• Body-image conscious
• Poor compliance of with current regimen and keeping scheduled appointments
• Lack of consistent blood sugar monitoring (<4x/day) and unable to calculate carbohydrates eaten
Risks of Pump Therapy

- Accelerated DKA
- Catheter/tubing occlusion
- Pump failure
- $$$$
- #1 risk the pump is that it only works as well as the person using it
Diabetes Ketoacidosis (DKA)

• Due to lack of insulin to transport sugar into our cells
• Body begins to burn fat for energy
• Acids build up from burning fat
• Common symptoms includes fruity odor to breath, nausea, vomiting, drowsiness
• #1 reason for hospitalization in children with diabetes
• Early detection and treatment of ketones prevents hospitalization
Causes of DKA

- Incorrect/forgotten insulin dosing
- Interruption of insulin
- Sickness/Stress
- Pump malfunction
- Catheter problems
- Insulin that has lost potency

Missing the insulin bridge
Homework/Responsibilities

• Demonstrate mastery of basic diabetes skills

• Blood sugar records for 2 weeks
  - Record checks before meals, 2 hours after meals
  - Record checks at Midnight and 3am 3xweek
  - Record any other checks (low or ill)
  - Record all insulin given (meals and corrections)
Pump Process

• Turn in homework packet to Diabetes Team once complete
• Diabetes Team will contact you once the homework is reviewed
• Choose which pump you would like and contact that pump company to start the process of getting the pump
• Once the pump is received, training will be scheduled with the diabetes nurse, dietitian and a certified pump trainer
• After starting on the pump, frequent calls to the office to adjust doses are needed
Living with a pump

- Disconnecting and reconnecting for sports, swimming, bathing, etc.
- Catheter care and insertion sites
- Batteries/Charging
- Alarms
- Wearing the pump – day and night
- Adjusting for exercise, sick day, and travel
Troubleshooting Checklist

• Assess the infusion site
• Assess the infusion set tubing
• Assess the reservoir/cartridge
• Assess the pump
• Assess the insulin
Pumps with tubing

- **Infusion set**: The tubing that connects from the cartridge in the pump to the infusion site.
- **Cartridge**: The “syringe” that serves as the insulin container in the pump. Can hold a two to three day supply of insulin
Medtronic 630G/670G
Tandem T-Slim
Omnipod PDM /DASH
We’ve Come A Long Way!
Questions?