Making Sense of Sensors
A Primer on CGM

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Objectives

- Provide an overview of CGM technology
- Awareness of the benefits and limitations of this therapy
- Importance of patient training and education
- Availability of Real-Time and Retrospective Data
What exactly is Real-Time CGM?

- A three-piece system that continuously measures glucose levels in the interstitial fluid.
CGM-RT systems

Medtronic/Minimed
Paradigm® Real-Time

DexCom™ STS™

Medtronic/Minimed
Guardian® RT

Freestyle Navigator™
How does it work?

- A sensor
- A transmitter
- A receiver
How the sensor works

Glucose Oxidase

Interstitial Fluid

SENSOR

Current
Physiology of Blood and Interstitial Glucose

- Sensor Lag: delay while glucose moves from the blood into the interstitial fluid & the sensor registers the change in glucose concentration
- Can be up to 30 minutes

Sensor measures glucose in the interstitial fluid in the subcutaneous tissue under the skin
Practical Implications of Lag: What happens during the recovery from a low

If you rely on the sensor to decide if you need to eat more, you may end up overtreating the low. Check fingerstick to decide if you need more to treat the low.
Practical Implications of Lag: What happens after a meal

At this time sensor = 150
blood = 180
Features

- Continuous glucose measurements
  5” intervals
- Personalized settings for low and high alarms
- Graphing of glucose trends
- Software capabilities
- Trending arrows (device specific)
- Alarms !!!
CGM

Upside:
- Fine Tuning
- Detect, prevent hypo/hyper
- Behavior Modification
- Q of L
- Big Picture View
- Trending

Downside:
- Not replace finger sticks
- Indwelling sensor
- Lag time
- Skin irritation
- Info overload
- Limited Insurance coverage
Dex Com: 9 hour trend screen
Medtronic CareLink™ Personal Reports

Sensor Overlay by Meal for John Smith
Mar 18 - Mar 21, 2006
(7 days)

Pump/Paradigm 722
#09456

HbA1c: No Data

Insulin Delivery

Carbohydrates and Exercise

Summary

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Navigator Download
Post-Meal Touch-Up Bolus
Post-Meal Touch-Up Boluses
The “SPIKE”

Cornflakes, Banana & Milk
Reducing the “SPIKE”

Oatmeal & Blueberries
Considerations

- Clinical / Candidate
- Putting it into perspective
- Important points for success
Joslin CGM Program

- Real-Time Continuous Glucose Monitoring: Is it for You?
  - The basics of CGM
- Pros and cons of CGM
- CGM devices and sensors
- Sensor Logic
- Basal & bolus insulin
- Active insulin/insulin-on-board (IOB)
- Impact of food on glucose levels
- Analyzing glucose patterns
- Optimizing glucose patterns by changing insulin delivery and/or food choices
“Pearls” for the patient

✓ Try NOT to get hung up on the discrepancies between the sensor and fingersticks

✓ Try NOT to get upset with every glucose spike

✓ Try NOT to view your continuous glucose tracings as a judgment on your performance in managing the diabetes

Just view it as information to help you improve your control
Dr. Howard Wolpert's' words of wisdom:

- When your glucoses are in range, patients should take credit

- When your glucoses are off track, blame the diabetes and vow to make better decisions tomorrow
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Questions?