Self Monitoring Blood Glucose (SMBG)

- 5 second results
- 0.3 - 0.6 µL sample size
- Refill capability
- Can be uploaded to software or in some cases to the cloud or phone

No More Finger pokes?

REMOTE MONITORING SOFTWARE

Some software is specific to products (e.g., CareLink for Medtronic products and Clarity for Dexcom).

Some programs allow device downloads and data viewing in a single system:
- Glooko: compatible with >50 glucose meters, multiple insulin pumps, CGMs, and fitness trackers; costs ~$60/year
- Tidepool (Blip): compatible with multiple glucose meters, insulin pumps, and CGMs; HIPAA-compliant cloud; free

Diabetes Technology
Where have we been and where are we going?

Sarit Polsky, MD and Christie Beatson, RD, CDE
Insulin Pumps (Continuous Subcutaneous Insulin Infusion)

First Pump 80’s
- Basal Insulin or Basal Rate: A programmable continuous delivery of short-acting insulin to cover liver glucose production. Replaces long-acting insulin.
- Meal Bolus: A spurt of insulin given at meal time. The amount given is usually calculated based on your insulin to carb ratio.
- Correction Bolus: A spurt of insulin given to bring a high blood sugar back into range. It can be given with the meal bolus or between meals.

1980s – 1990s

Current Pumps
- Basal Insulin or Basal Rate: A programmable continuous delivery of short-acting insulin to cover liver glucose production. Replaces long-acting insulin.
- Meal Bolus: A spurt of insulin given at meal time. The amount given is usually calculated based on your insulin to carb ratio.
- Correction Bolus: A spurt of insulin given to bring a high blood sugar back into range. It can be given with the meal bolus or between meals.

Continuous Glucose Monitoring (CGM)

FDA approval 2001

Accurate about 60% of the time compared to glucose meter

Today’s CGM have similar accuracy as blood glucose meters

Today

Continuous Glucose Monitoring (CGM)

Pros
- “Real time” update of glucose every 5 min.
- Arrows indicating direction and rate of change.
- Alarms can be set when high or low thresholds are reached.
- Can see what is happening with glucose levels at times when we don’t typically check BG (e.g., overnight and after meals).

Cons
- Not covered by some insurance policies (Medicare and Medicaid).
- “Lag time” between BG meter results and sensor glucose (SG) readings.
- Possible tendency to over-react and over treat highs and lows.
- More devices to wear and rotate.

Sensor Augmented Pump

A sensor-augmented insulin pump (SAP) combines the technology of an insulin pump with a continuous glucose monitoring sensor that transmits glucose readings to the pump.

Sensor Data is displayed on insulin pump:
- Animas Ping: Animas Pump + Dexcom G4
- T:Slim G4: Tslim pump + Dexcom G4

Pump responds to sensor data:
- Medtronic 530G and 630G + Guardian sensor
- Pump suspends insulin for up to 2 hours if Low Threshold alarm is ignored.
ARTIFICIAL PANCREAS (HYBRID CLOSED LOOP)

What is it?
- An Insulin Pump and CGM system that works together to control blood sugars.
- The system continuously adjusts the amount of insulin delivered (micro-boluses) based on the sensor glucose value and rate of change.
- The system learns over time.
- The patient must still give a bolus for meals (hybrid closed loop).
- Medtronic 670G approved by FDA in Fall of 2016 and will be available in 2017.

[Image of artificial pancreas device]

[Graph showing glucose levels over time]

Top Patterns
1. 184 high
2. 68 low
3. 2.0 hypoglycemia risk

- Not this!
- This!