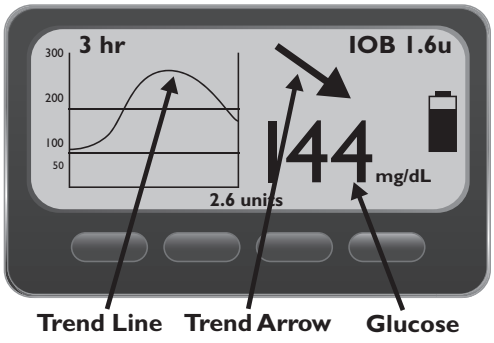
1.1 Recommended Goals

- A1c 7.0% or less, or 14-day average glucose of 154 mg/dL (8.5 mmol/L) or less
- Time in range over 70%
- Time below range less than 3% and none below 54 mg/dL (3 mmol/L)
- Glucose variability below 30%

1.2 Pump with CGM Receiver



1. **Glucose values** are updated every 5 min.
2. **A glucose trend line** on the screen shows glucose direction and change rate over 1, 3, 6, 12, and 24 hours.
3. **Trend arrows** with an approximate direction and rate of change in glucose.
4. **IOB** – units of active insulin on board.

1.3 How a Manual Insulin Pump Delivers Insulin

Basal Rates	Steady, around-the-clock basal insulin delivery matches background insulin needs to keep glucose levels steady and in range when fasting. Basal rates provide about half of the **total daily dose (TDD) of insulin**.
Carb Boluses	Spurts (boluses) of insulin are manually entered and delivered to counterbalance the glucose rise from carbs (and some fat and protein) after food.
Correction Boluses	Spurts of insulin that correct for insulin deficits in basal rates or carb boluses.

1.4 Why Wear a CGM?

- Better glucose outcomes
- Alerts warning of lows and highs
- Avoid frequent lows & hypo unawareness
- Seeing the impact of food and exercise
- Know ahead of time a child is going low
- Lower glucose before & during pregnancy
- Security while asleep or living alone
- Safer driving, travel, high-risk profession
- Sharing glucose data
- AID systems require CGM readings

1.5 Check Your CGM Reading

Before breakfast - Start the day well to improve the rest of the day. Testing the night basal improves breakfast readings.

Before lunch and dinner - Shows how carb boluses cover the carbs eaten at breakfast and lunch, respectively.

After meals - Correct highs or lows sooner.

At Bedtime - Cover dinner better and prevent night lows.

Before driving and during long trips - Keeps you and others safe.

Before, during, and after increased activity - Better performance and safety.

Any time you may be low or high - Stop lows and correct highs faster.

1.6 CGM Calibration Tips:

- Use the most accurate glucose meter available.,
- Use clean fingers and non-expired strips.
- Enter meter readings into the CGM receiver right away.
- Calibrate when the glucose is flat.

Replace CGM sensor if readings don't improve after 2 cals.

1.7 When to Verify a CGM Reading with a Fingerstick

- Calibrate your CGM any time the CGM reading differs from a finger-stick reading by over 20 mg/dL (1.1 mmol/L) at a glucose below 200 mg/dL (11.1 mmol/L) or by 30 mg/dL (1.7 mmol/L) for readings above 200 mg/dL.
- Any time your symptoms differ from the CGM's reading.
- When recent CGM readings have been erratic.
- When a correction bolus does not lower a high glucose within 3 hours.
- Before driving, especially if your trend line or arrow is falling.
- When the CGM reads low at night but the sensor was possibly compressed by sleeping on it.

After treating a low glucose, fingerstick readings are more accurate than the CGM for 20 to 30 minutes.

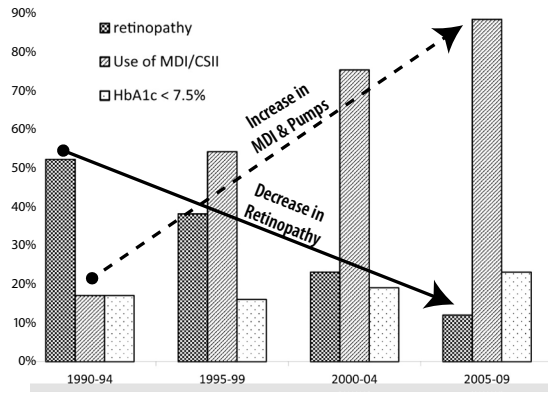
1.8 U.C. Panther Program Compares AIDs

The University of Colorado Barbara Davis Center for Diabetes provides complete information about available AID systems at www.pantherprogram.org/device-comparison.

1.9 Considerations When Choosing a Pump, CGM, and AID System

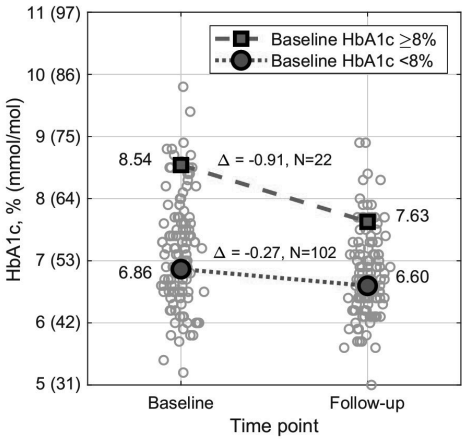
1. Can you easily bolus, adjust settings, and change a cartridge, infusion set, and sensor?
2. Can you hear the pump alerts or feel alert vibrations?
3. Does the pump cartridge hold 2 to 4 days of insulin?
4. Can you read the text on the screen?
5. Will your smartphone communicate with the AID and CGM?
6. Can you press the pump or screen buttons?
7. Can you upload or print data for clinic visits?
8. Can a caregiver quickly learn to operate the devices for a child or someone ill?
9. Do you like its look, feel, colors, features, and accessories (clips and cases)?
10. How good are 24-hour customer support, insurance coverage, and the warranty?

1.10 Use of Pumps & MDI Lessens Retinopathy



Between 1990 and 2009, retinopathy (in the solid line) declined significantly as the use of MDI and pumps (in the dashed line) increased among 1,604 adolescents and young adults with Type 1 diabetes.[15]

1.11 AID Systems Lower High A1cs



These 2021 A1c values are for 124 adults, 14–70 years old, before and three months after starting on an Omnipod 5. The bottom line shows how the A1c changed for a starting A1c below 8.0%. The upper line shows the change for those with a starting A1c above 8.0%.[19]

1.12 Differences in the Three Major Types of Diabetes			
	Type 1	**Type 2 with antibody or loss of insulin production**	**Type 2**
Avg. age at start	12	46	61, now falling with the increase in teen onset
Typical age at start	3 - 40*	15-70*	35-80*
% of all diabetes	5% (20%**)	15%	80%
Insulin problem	absence	deficiency	resistance
Time to insulin start	days	months or years	years, decades, or never
Antibodies	IA-2A, GAD65, IAA, ZnT8Ab, ICA***	mostly GAD65, some IA-2	none
Other helpful tests	low C-peptide	low or normal C-peptide	normal or high C-peptide, low HDL, high TGs

* May occur at any age
** With inclusion of all antibody positive cases, i.e. Type 1 and Type 2 with +antibodies
*** For free antibody testing, visit TrialNet.org/participate or AskHealth.org

1.13 Medications That May Reduce Post-Meal Spiking						
Type	**Brand Names**	**Dose Timing**	**FDA Approval**	**Action**	**Effect on Insulin**	**Cautions**
GLP-1 Agonist & Incretins	Ozempic Trulicity Mounjaro	Weekly injection	For Type 2 (and Type 1)	Lower weight, delay food absorption, decrease appetite, and lower glucagon levels, less CVD and renal disease	Lowers insulin doses	Nausea, diarrhea, vomiting, headaches, dizziness, sweating, indigestion, constipation
Amylin	Symlin	Injected before meals	For Type 1 and Type 2	Delays gastric emptying, decreases glucagon secretion, decreases appetite	Lowers insulin doses	Use glucose for lows, nausea, vomiting, poor appetite, stomach pain, headache
SGLT-2 Inhibitors	Farxiga Invokana Jardiance Steglatro	Pill	For Type 2,	Blocks reabsorption of glucose in kidney	Lowers insulin doses	Urinary tract and kidney infections, fungal infections, DKA (dehydration, coma)
DPP-4s	Januvia Nesina Onglyza Tradjenta	Pill	For Type 2	Raises GLP-1 by blocking dipeptidyl peptidase-4 enzyme	Lowers insulin doses	Nausea, diarrhea, stomach pain, headache, runny nose, painful skin rash