ZSFG Diabetes e-Newsletter

The Point

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Making diabetes care better, less frustrating and more fun since 2008

SPECIAL ISSUE: Understanding Insulin Pumps

We get many great questions from patients and providers about insulin pumps. More recently, insulin pumps that communicate with continuous glucose monitors (CGM) offer even more potential benefits, especially for folks with type 1 diabetes.

Medicare and medi-cal coverage have also improved. The 2024 American Diabetes Association's Standards of Care have strongest evidence that youth and adults with type 1 diabetes who are capable of using the device safely by themselves or a caregiver *should* be offered insulin pumps due to improvements in A1C, reduction in hypoglycemia, and increase in quality of life. (Pumps *can* be offered to youth and adults with type 2 diabetes who require multiple daily injections of long-acting and short-acting insulin).

Insulin pumps are not just for tech savvy younger patients . With time, support and coaching, we know that less tech savvy, non-English speaking, older patients and others can successfully use insulin pumps. Diabetes Clinic is dedicated to our patients' journeys and reducing the burden of diabetes. Please refer any patient who wants to learn more!

Key highlights

- Most pumps require **some pre-programmed settings** that are individualized for each patient. Settings may include a basal rate, insulin-to-carb ratio, correction factor +/- weight
- **All pumps work best when the user enters carbohydrate grams (or size of meal) into the pump *before* meals. Being carb aware and learning to estimate carbohydrates is a great skill to have and offers flexibility for anyone on mealtime insulin whether on a pump or not**
- **Wearing a pump +/- CGM still requires day-to-day diabetes management.** Some functions are automatic, some still require user interaction
- Most pumps are supplied through a DME supplier (Omnipod 5 comes

from pharmacy) and infusion sets are typically changed out every 2-3 days. CGMs are supplied through DME supplier or pharmacy depending on insurance, and sensors are changed out every 10-14 days depending on brand. **It's important for patients to be able to keep track of all their supplies**

- **Because pumps are only filled with rapid-acting insulin, there is a higher risk of diabetic ketoacidosis (DKA) if insulin delivery is disrupted for whatever reason.** Patients must be able to troubleshoot, change out the pump infusion set and/or resume using insulin pens

- There are 4 FDA-approved pump + CGM systems. Each system's algorithm determines how CGM input affects insulin delivery; each algorithm has its own nuances and pros/cons. **Some require smartphones that support specific apps**

Want to know more?

In order to understand what pumps do, first understand the physiologic basis for insulin replacement:

- Long-acting (**BASAL**) insulin--typically a slow, time release insulin 24 hrs/day--balances glucose that is continuously produced by the liver
- Rapid-acting insulin is a short burst of insulin (**BOLUS**) that balances glucose from carbs and can be used to correct high glucoses. Its effect is gone in about 4 hours
- The combination of basal-bolus insulins is thus the most physiologic way to replace insulin needs whether by multiple daily injections or by an insulin pump

So what does an insulin pump do?

- Insulin pumps contain a reservoir of rapid-acting insulin that is delivered continuously into the SQ tissue via an infusion set with a small catheter at a pre-programmed rate (to mimic total basal insulin needs)
- Long acting insulin is **no longer used** when a patient transitions to a pump
- The user interacts with the pump to deliver boluses for carbs and corrections for high glucose
- Pump infusion set/reservoir are changed every 2-3 days
- **If there is interruption to insulin delivery, DKA develops much more quickly and will require prompt action to prevent it**

What happens when the pump communicates with a CGM sensor?

- Each system's algorithm requires connectivity between the pump and its compatible CGM

- The algorithm automatically increases/decreases/suspends the basal rate in response to CGM trends. This automatic adjustment takes some of the burden off the user, can also help to avoid overnight hypoglycemia, and partially mitigates hyperglycemia
- **The user can get the most out of these systems by still entering carbohydrate grams (or meal *size* for iLet pump)**
- Pump infusion set/reservoir are changed every 2-3 days. CGM sensor is changed every 10-14 days depending on brand
- **If there is interruption to insulin delivery, DKA develops much more quickly and will require prompt action to prevent it**

Click on chart for a brief comparison of the four FDA-approved options:

Why isn't everyone on a pump?

Disparities in access to diabetes technology exist. There are differences based on geographic location, insurance coverage, socioeconomic status, race/ethnicity. Multiple studies show that more white, English-speaking, higher SES patients with type 1 diabetes are using diabetes technology disproportionately over non-white, non-English speaking, lower SES patients with type 1 diabetes. It's on us as healthcare providers to address these inequities.

- Insurance hurdles, PA process are getting better in California
- Healthcare providers should not be the gatekeepers to technology. We cannot assume we know what will work best for each person, but rather, our role is to provide the information, resources and coaching for patients to succeed
- **It takes time to address patient concerns** : trust in diabetes technology, reluctance to wear devices on-body, not comfortable carb counting yet, pumps that are only available in English (some in Spanish), lack of smartphone that supports necessary apps, skills to troubleshoot when something goes wrong, and multiple other competing demands

Is your patient ready for more?

- Set realistic expectations for what a pump can and can't do
- Support in being carb aware and learn carb counting. Nutritionists can help!
- Stress importance of diabetes self-management skills, can't just wear a pump and forget it, need to still engage in all their diabetes self-management skills

Please refer to ZSFG Diabetes Clinic! We review pros/cons of various systems with patients, discuss realistic expectations, understand patient preferences and troubleshoot smartphone apps. We help patients build their skills in carb counting, navigate the PA process, develop initial pump settings, coordinate pump training and do ongoing review of pump downloads and adjustments to pump settings.

See our website sfghdiabetes.org-->Provider-->Diabetes Technology section for links to patient and provider-facing resources.

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sfghdiabetes.org