ECHO IDAHO

Diabetes and Metabolic Conditions

Insulin Pump Fundamentals and Carb Coverage Strategies for the Primary Care Clinic

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Disclosures

- Family Health Services (Megan) receives financial reimbursement as a certified pod trainer for Omnipod for time spent training patients. All relevant financial relationships with ineligible companies have been mitigated.
- Dr. Turcotte has no financial disclosures.
- Pump brand names are used due to no generic available.

Learning Objectives

- Demystify insulin pumps
- Learn the fundamental principles of how an insulin pump works
- Speak the language of insulin pumps
- Determine if a patient with Type 2 diabetes is appropriate for pump therapy and direct them to available options.
- Apply carb coverage strategies in practice

Principles of fast-acting insulin

Carb coverage

3-4 hours

100

~100

insulin

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Carb ratio (ICR)

- How much insulin is required to cover a certain amount of CHO
- Examples:
  - ICR 15: 1 unit of insulin will cover 15 grams of CHO
  - ICR 5: 1 unit of insulin will cover 5 grams CHO

Carb coverage

3-4 hours

100

60 grams CHO

ICR 15

4U insulin

~100

Correction?

3-4 hours

300

60 grams CHO

ICR 15

4U insulin

~300

Didn’t address the fact that starting glucose was 300

Correction

300

insulin

3-4 hours

Yeah, but how much insulin??

100 = target

Correction factor

aka insulin sensitivity factor (ISF)

- How much 1 unit of insulin will lower blood sugar
- Examples
  - ISF 50: 1 unit lowers BG 50 mg/dL
  - ISF 25: 1 unit lowers BG 25 mg/dL (or 2 units will lower it 50)
  - ISF 10: 1 unit lowers BG 10 mg/dL (or 10 units will lower it 100)
  - ISF 100: 1 unit lowers BG 100 mg/dL

Correction: ISF 50

4 units insulin

3-4 hours

Target 100
300 minus 100 = 200
200 divided by 50 = 4

100 = target

Correction: ISF 20

300

10 units insulin

3-4 hours

300 minus 100 = 200
200 divided by 20 = 10

100 = target

Putting it all together

BG 200 points too high
ISF 50
4 units correction

300

8U insulin

3-4 hours

60 grams CHO
ICR 15
4 units carb coverage

100 = target

The real world

BG 227 points too high
ISF 42
5.4 units correction

327

3-4 hours

13.07 U insulin

92 grams CHO
ICR 12
7.67 units carb coverage

100 = target

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Basal insulin and AID

- There is no basal insulin with an insulin pump
- Basal insulin (glargine, degludec, etc) replaced by a steady drip rate of fast-acting insulin (aspart, lispro)
  - Theoretically the amount of basal insulin can be divided by 24
  - Glargine (Lantus) 24 units daily = basal rate 1 U/hr
- Automated insulin delivery (AID): dosing algorithm in the pump adjusts basal insulin in response to glucose

Automated insulin delivery (AID)

- Adjusts basal insulin in response to CGM glucose
- Advantages
  - Reduction in hypoglycemia
  - Assistance with hyperglycemia

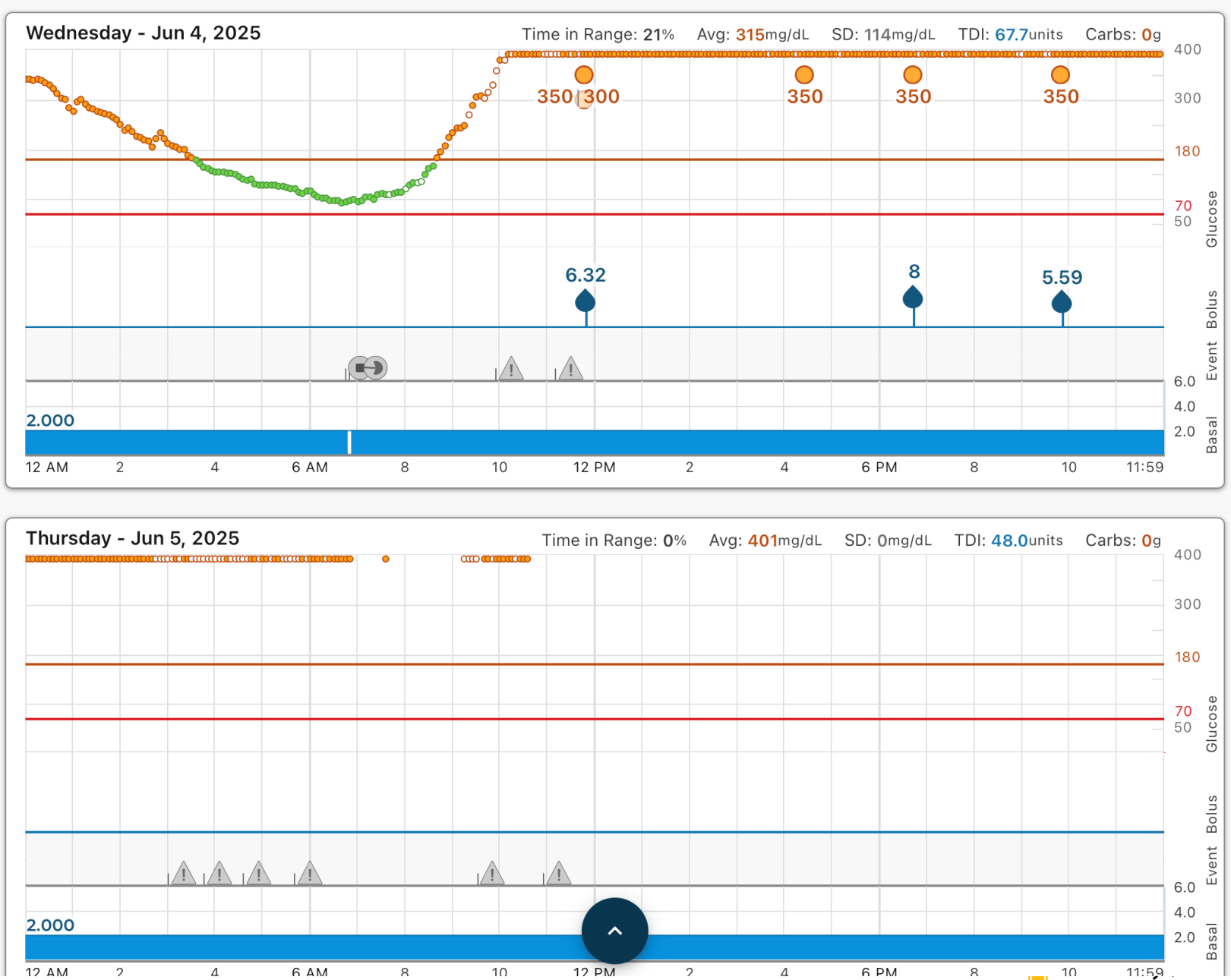
- Patient retains responsibility for carb coverage

Advantages of a pump

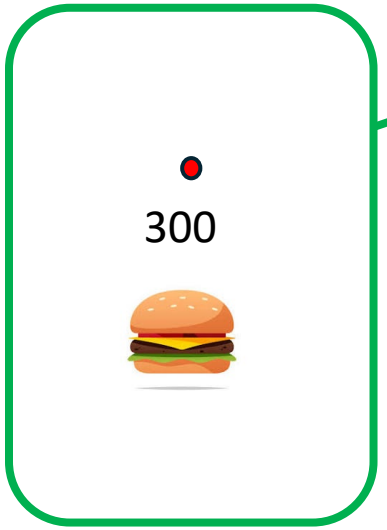
- Does all the math
- Great for patients who are insulin sensitive
- Insulin is always with you
- Only one insulin instead of two
- Typically a reduction in total insulin use
- With AID
  - protection from hypoglycemia
  - assistance with hyperglycemia

Risks

Site failure
DKA



Who does what



Patient responsibility
- BG
- Carbs

Clinician responsibility
- ISF
- ICR
- Target
- Basal rate
- (active insulin time)

Carb coverage strategies

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AID in Type 2 Diabetes

- **7.25a** AID systems are the preferred insulin delivery method over MDI, CSII, and sensor-augmented pumps in people with type 1 diabetes, **A** adults with type 2 diabetes, **A** children and adolescents with type 2 diabetes, **E** and those with other forms of insulin-deficient diabetes. **B**, **C**, **D**, **E** Choice of an AID system should be made based on the individual's circumstances, preferences, and needs. **E**

- AID outperforms CGM alone for A1C and TIR in T2DM…IYKYK!

If it is the best…why isn't everyone doing it?

- Clinician knowledge gap
- $$$-Insurance
- Patient Education Level-lack of carb counting
- Patient Socio-Economic Level

Jumping in may lower health disparities!

Getting Started:

- CGM!
- Familiarize yourself

diabeteswise.org

Back to Device Library

Beta Bionics iLet Pancreas

Omnipod 5

Print

Share

Summary

The iLet Bionic Pancreas is the first and only commercially-available, automated insulin delivery system that determines 100% of insulin doses without carb counting - offering better results with less work.

The iLet only needs a user's weight to get started. It then learns and adapts to the user's insulin needs based on their meal announcements and CGM data (Dexcom CGM or FreeStyle Libre 3 Plus sensor).

The first FDA-approved tubeless, waterproof pump that can be controlled entirely from a compatible Android smartphone. The system combines the Omnipod patch pump with the Dexcom continuous glucose monitor (CGM) to automatically adjust insulin delivery in response to glucose trends. It's easy to use and allows bolus dosing directly from a compatible smartphone.

Components

Beta Bionics iLet Pancreas : Pump

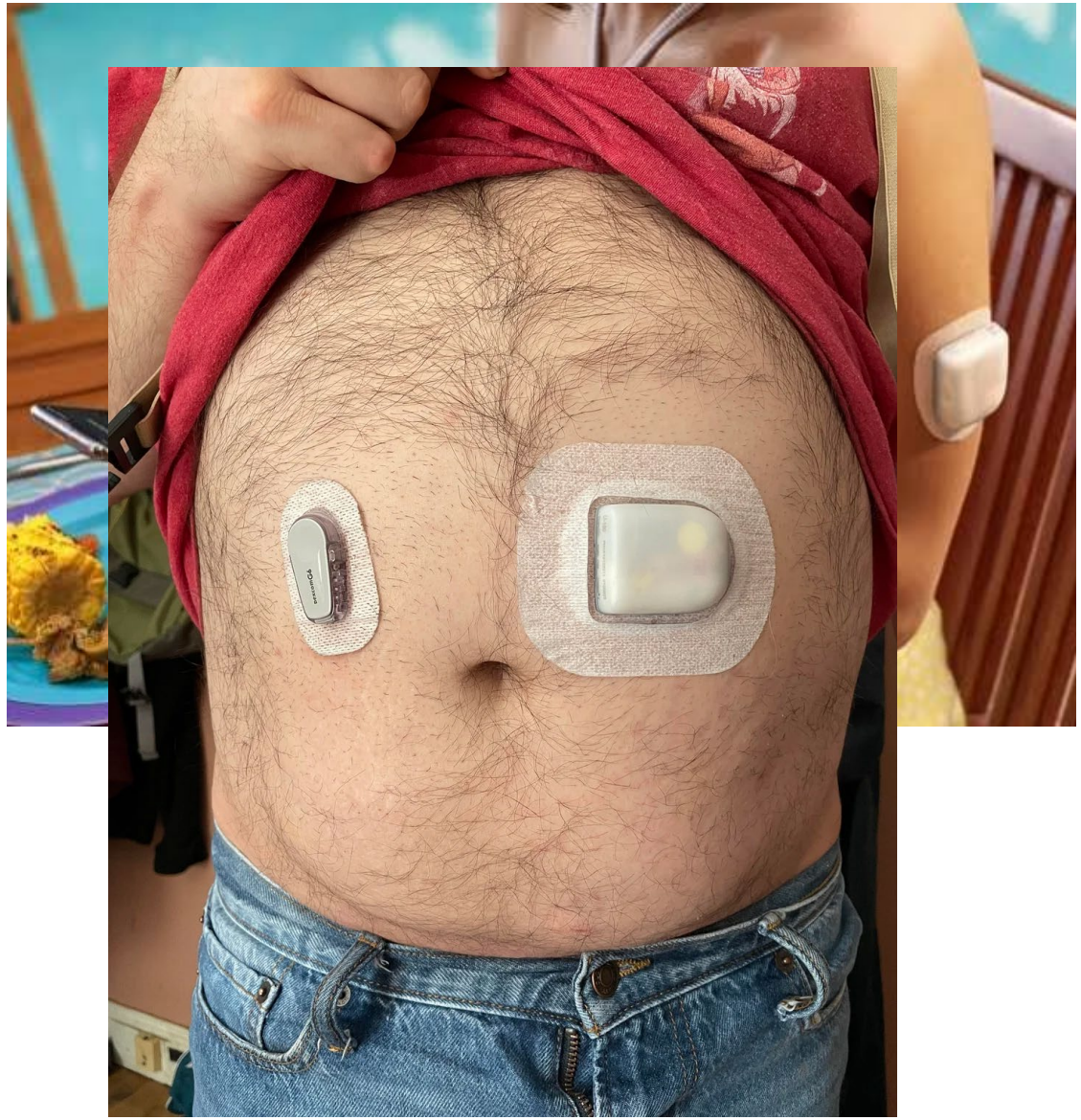
Omnipod 5 : Pump

Getting Started:

- CGM!
- Familiarize yourself
- Pick something, meet the reps, develop a process
- Does the pt have and can manage a smartphone on their own?

Omnipod 5

- AID -Tubeless
- 200 units-up to 3 days
- Compatible with ~~G6~~/7 and Libre3+
- Compatible with Apple & Android
- Pharmacy Benefit



Carb Strategies

- Traditional Carb Counting

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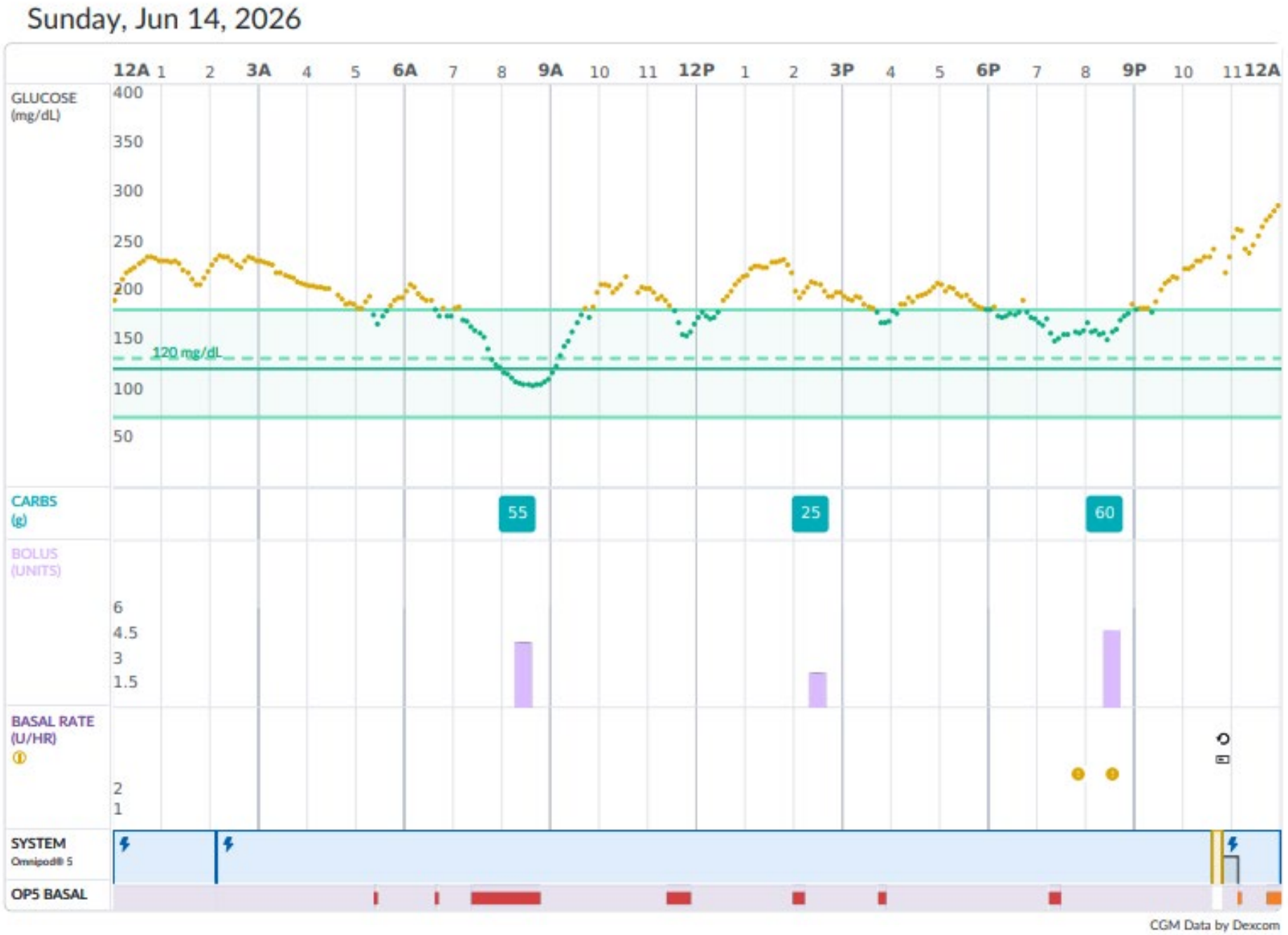

Carb Strategies

- Traditional Carb Counting

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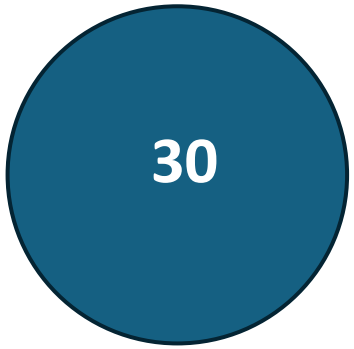
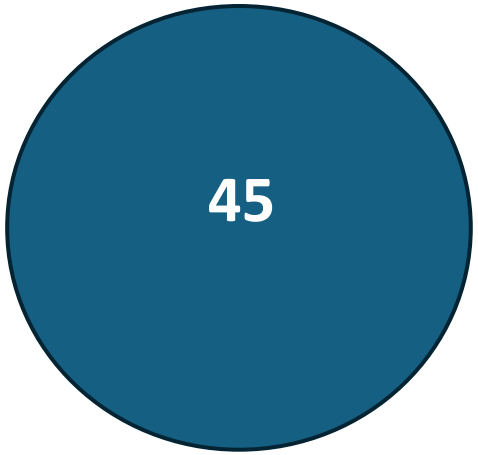
Carb Strategies

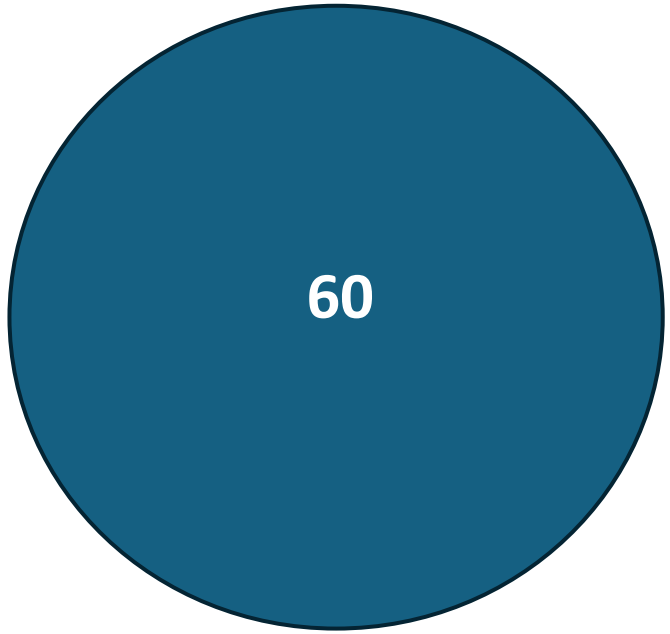
- Pre-set doses/ meal sizes.
  - Baseline meal assessed, then comparable carbs programed in to “small,” “medium,” and “large” meals.



2 units



3 units



4 units

Carb Strategies

- Something is better than nothing

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“Outside of systemic barriers, people still face barriers in accessibility. Health care providers (HCPs) can serve as gatekeepers to technology access, either intentionally or inadvertently. Health care providers may lack sufficient education and training needed to AID uptake and onboarding and may not offer it to their patients. The recent JDRF Pathway to Choice survey, which aimed to increase knowledge of and access to T1D technologies, reported a leading barrier to device uptake as: ‘My clinician/nurse has not recommended it to me.’”

Navigating the Unique Challenges of Automated Insulin Delivery Systems to Facilitate Effective Uptake, Onboarding, and Continued Use

References

- Diabetes Technology: Standards of Care in Diabetes—2026, *Diabetes Care 2026;49*(Supplement_1):S150–S165.
- A Randomized Trial of Automated Insulin Delivery in Type 2 Diabetes, *N Engl J Med 2025 May 8;392(18):*1801-1812.
- Tanenbaum ML, Commissariat PV, Wilmot EG, Lange K. Navigating the Unique Challenges of Automated Insulin Delivery Systems to Facilitate Effective Uptake, Onboarding, and Continued Use. *J Diabetes Sci Technol*. 2025 Jan;19(1):47-53.