ECHO IDAHO

Diabetes and Metabolic Conditions

Insulin Pump Essentials for General Practice

A Clinical Deep Dive

October 15, 2026

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St. Luke's Internal Medicine

None of the planners or presenters for this educational activity have relevant financial relationship(s) to disclose with ineligible companies whose primary business is producing, marketing, selling, re-selling, or distributing healthcare products used by or on patients.

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Disclosures

- I have no relevant financial relationships to disclose.

Learning Objectives

- Identify candidates for insulin pump use
- Understand how automated insulin delivery works
- Become familiar with the pumps on the market
- Learn how to get patients started on an insulin pump

Insulin Fundamentals



Early reusable glass-and-metal insulin syringe, 1938

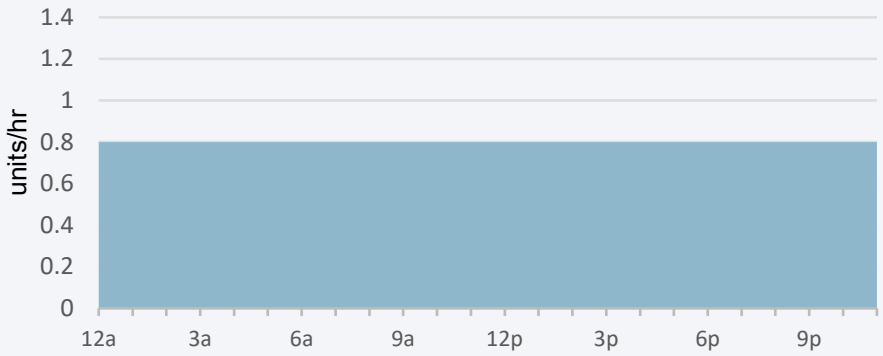
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Basal Rate and Carb Ratio

Basal Rate

A steady "drip, drip" of rapid-acting insulin, set in units per hour. Replaces long-acting insulin (insulin glargine, insulin degludec).



Example: 0.8 units/hr × 24 hr ≈ 19 units/day of basal insulin

Insulin-to-Carb Ratio (ICR)

How many grams of carbohydrate one unit of insulin will cover.

EXAMPLE

ICR = 1 unit : 10 g carb

Meal = 60 g carb

60 g ÷ 10 g per unit

= 6 units for the meal

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Correction Factor and Active Insulin

Correction Factor, aka Insulin Sensitivity Factor (ISF)

Also called the correction factor: how much one unit of insulin is expected to lower blood glucose (mg/dL).

EXAMPLE

ISF = 50 mg/dL per unit

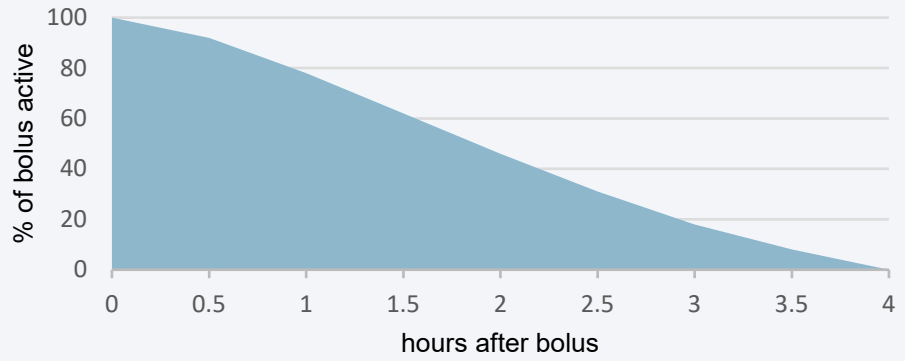
Current BG 300, target 100 mg/dL

(300 − 100) ÷ 50

= 4 units to correct

Active Insulin Time (AIT)

The pump's assumption of how long a bolus keeps working, so it can track insulin still active and help prevent stacking doses.



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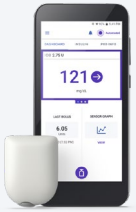
Nuts and Bolts



MiniMed 502, MiniMed's first insulin pump (1983)

Parts of an Insulin Pump





Tubeless pod:
pump + reservoir + cannula in one

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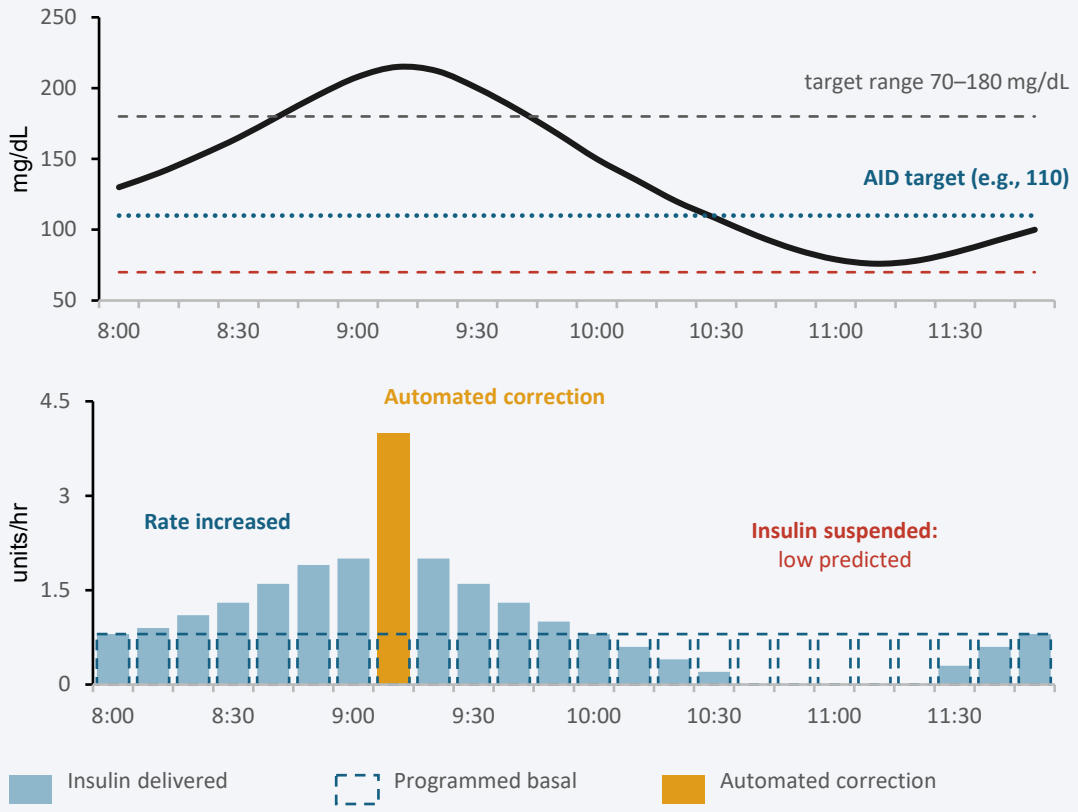
Automated Insulin Delivery (AID)

> **"AID systems use CGM-informed algorithms to modulate insulin delivery."**
>
> ADA Standards of Care 2026, Section 7

Insulin pump | **CGM** | **Algorithm**

- Adjusts insulin every 5 minutes
- Target glucose: 87–180, varies by system
- Automated corrections
- Proprietary algorithms; terms vary
- Still needs carb entry

How AID responds to CGM readings (illustrative)



Source: ADA. Diabetes Care 2026;49(Suppl 1):S150–S165.

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Who Should Use an Insulin Pump?

Recommendations from ADA guidelines

Type 1 diabetes

AID preferred over injections & older pumps

ADA 7.25a · Grade A

Type 2 diabetes (adults)

On MDI: AID preferred over MDI

ADA 7.25a · Grade A

Basal only, not at goal: consider AID

ADA 7.25b · Grade B

No C-peptide, antibodies, or minimum time on insulin required ADA 7.8a

Assess: can the patient manage the logistics? Site changes, recognizing alerts, troubleshooting problems, CGM use

Source: ADA Standards of Care in Diabetes—2026, Section 7. Diabetes Care 2026;49(Suppl 1):S150–S165.

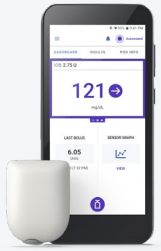
Insulin Pumps on the US Market



iLet Bionic Pancreas

Beta Bionics

Type 1



Omnipod 5

Insulet

Type 1 + Type 2



MiniMed 780G

MiniMed

Type 1 + Type 2



MiniMed Flex

MiniMed

Type 1 + Type 2



twiist

Sequel Med Tech

Type 1



t:slim X2

Tandem

Type 1 + Type 2



Mobi

Tandem

Type 1 + Type 2

Framed = FDA-cleared for adults with type 2 diabetes using insulin

Listed alphabetically by manufacturer. All systems shown are automated insulin delivery (AID) systems. FDA clearance status as of October 2026; refer to current product labeling.

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How do you and the patient choose one?

1	**Type 1**	Most options; patient preference rules
2	**Hates tubing**	Omnipod 5: the only tubeless AID (for now)
3	**Medicare + type 2**	Omnipod 5 is easiest (Part D)
4	**Commercial + type 2**	Stick to FDA-cleared for type 2
5	**Local support**	Account for relationships with CDEs and device reps

Getting Your Patient Started on a Pump

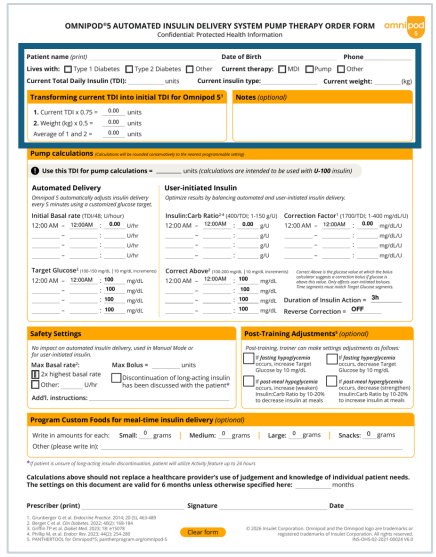


Leonard Thompson, the first person treated with insulin (Toronto, 1922)

Writing Pump Orders

1 Starting TDD

Current dose × 0.75, weight × 0.5, average



OMNIPOD®5 AUTOMATED INSULIN DELIVERY SYSTEM PUMP THERAPY ORDER FORM

Confidential: Protected Health Information

Patient name *(print)* _____ Date of Birth _____ Phone _____

Lives with: ☐ Type 1 Diabetes ☐ Type 2 Diabetes ☐ Other Current therapy: ☐ MDI ☐ Pump ☐ Other

Current Total Daily Insulin (TDI): _____ units Current insulin type: _____ Current weight: _____ (kg)

Transforming current TDI into initial TDI for Omnipod 5[1]

1. Current TDI x 0.75 = 0.00 units
2. Weight (kg) x 0.5 = 0.00 units

Average of 1 and 2 = 0.00 units

Notes *(optional)*

Pump calculations *(Calculations will be rounded conservatively to the nearest program/table setting)*

ⓘ Use this TDI for pump calculations = _____ units *(calculations are intended to be used with U-100 insulin)*

Automated Delivery

Omnipod 5 automatically adjusts insulin delivery every 5 minutes using a customized glucose target.

Initial Basal rate (TDI×48; U/hour)

12:00 AM – 12:00AM : 0.00 U/hr

_____ – _____ : _____ U/hr

_____ – _____ : _____ U/hr

_____ – _____ : _____ U/hr

Target Glucose[2] (100-150 mg/dL | 10 mg/dL increments)

12:00 AM – 12:00AM : 100 mg/dL

_____ – _____ : 100 mg/dL

_____ – _____ : 100 mg/dL

_____ – _____ : 100 mg/dL

User-initiated Insulin

Optimize results by balancing automated and user-initiated insulin delivery.

Insulin:Carb Ratio[2,3] (400/TDI; 1-150 g/U)

12:00 AM – 12:00AM : 0.00 g/U

_____ – _____ : _____ g/U

_____ – _____ : _____ g/U

_____ – _____ : _____ g/U

Correct Above[2] (100-200 mg/dL | 10 mg/dL increments)

12:00 AM – 12:00AM : 100 mg/dL

_____ – _____ : 100 mg/dL

_____ – _____ : 100 mg/dL

_____ – _____ : 100 mg/dL

Correct Above is the glucose value at which the bolus calculator suggests a correction bolus if glucose is above this value. Only affects user-initiated boluses. Time segments must match Target Glucose segments.

Correction Factor[2] (1700/TDI; 1-400 mg/dL/U)

12:00 AM – 12:00AM : 0.00 mg/dL/U

_____ – _____ : _____ mg/dL/U

_____ – _____ : _____ mg/dL/U

_____ – _____ : _____ mg/dL/U

_____ – _____ : _____ mg/dL/U

Duration of Insulin Action = 3h

Reverse Correction = OFF

Safety Settings

No impact on automated insulin delivery, used in Manual Mode or for user-initiated insulin.

Max Basal rate[4]: ☐ 2x highest basal rate ☐ Other: _____ U/hr

Max Bolus = _____ units

☐ Discontinuation of long-acting insulin has been discussed with the patient[4]

Addtl. instructions: _____

Post-Training Adjustments[5] *(optional)*

Post-training, trainer can make settings adjustments as follows:

☐ *If fasting hyperglycemia* occurs, increase Target Glucose by 10 mg/dL

☐ *If fasting hypoglycemia* occurs, decrease Target Glucose by 10 mg/dL

☐ *If post-meal hyperglycemia* occurs, increase (weaken) Insulin:Carb Ratio by 10-20% to decrease insulin at meals

☐ *If post-meal hyperglycemia* occurs, decrease (strengthen) Insulin:Carb Ratio by 10-20% to increase insulin at meals

Program Custom Foods for meal-time insulin delivery *(optional)*

Write in amounts for each: Small: 0 grams | Medium: 0 grams | Large: 0 grams | Snacks: 0 grams

Other (please write in): _____

*If patient is unsure of long-acting insulin discontinuation, patient will utilize Activity feature up to 24 hours

Calculations above should not replace a healthcare provider's use of judgement and knowledge of individual patient needs. The settings on this document are valid for 6 months unless otherwise specified here: _____ months

Prescriber (print) _____ Signature _____ Date _____

1. Grunberger G et al. *Endocrine Practice*. 2014; 20 (5), 463-489
2. Berget C et al. *Clin Diabetes*. 2022; 40(2): 168-184
3. Griffin TP et al. *Diabet Med*. 2023; 18: e15078
4. Phillip M, et al. *Endocr Rev*. 2023; 44(2): 254-280
5. PANTHERTOOL for Omnipod®5; pantherprogram.org/omnipod-5

Clear form

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Others have similar forms

Patient name *(print)* _____ **Date of Birth** _____ **Phone** _____

Lives with: ☐ Type 1 Diabetes ☐ Type 2 Diabetes ☐ Other **Current therapy:** ☐ MDI ☐ Pump ☐ Other

Current Total Daily Insulin (TDI): _____ units **Current insulin type:** _____ **Current weight:** _____ (kg)

Transforming current TDI into initial TDI for Omnipod 5[1]

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2. Weight (kg) x 0.5 = 0.00 units

Average of 1 and 2 = 0.00 units

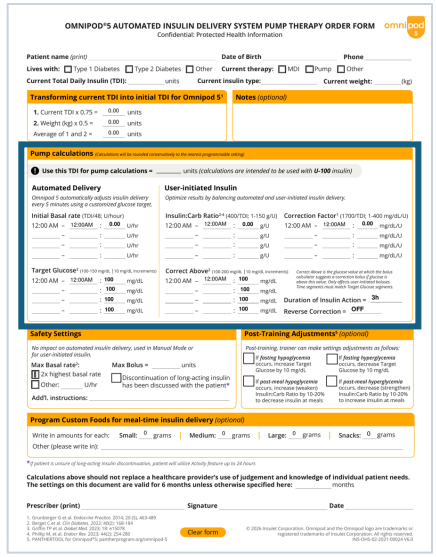
Notes *(optional)*

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Writing Pump Orders

2 Pump settings Basal, carb ratio, correction, target



OMNIPOD®5 AUTOMATED INSULIN DELIVERY SYSTEM PUMP THERAPY ORDER FORM

Confidential: Protected Health Information

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Lives with: ☐ Type 1 Diabetes ☐ Type 2 Diabetes ☐ Other Current therapy: ☐ MDI ☐ Pump ☐ Other

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Notes *(optional)*

Pump calculations *(Calculations will be rounded conservatively to the nearest programmable setting)*

❗ **Use this TDI for pump calculations =** _____ units *(calculations are intended to be used with **U-100** insulin)*

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– : U/hr

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12:00 AM – 12:00AM : 0.00 g/U

– : g/U

– : g/U

– : g/U

Correction Factor[1] (1700/TDI; 1-400 mg/dL/U)

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– : mg/dL/U

– : mg/dL/U

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Correct Above[2] (100-200 mg/dL | 10 mg/dL increments)

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Carb ratio

400 ÷ TDD

Correction factor

1700 ÷ TDD

Pump calculations *(Calculations will be rounded conservatively to the nearest programmable setting)*

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– : g/U

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Pump Initiation: Using TDD

55-year-old woman, type 2 diabetes · A1C 8.2% · CGM time in range 52%

Insulin degludec 20 units daily + insulin aspart 3–5 units/meal (often missed)

Estimated TDD ≈ 35 units · post-meal highs worsen as the day goes on

1 Reduce TDD 25%

35 × 0.75 = 26.25

26 units/day

2 Basal = 50%

26 × 0.5 = 13 units
÷ 24 hours

0.50 units/hr

3 Carb ratio: rule of 450

450 ÷ 26 = 17.3

17 g/unit

4 Correction: rule of 1700

1700 ÷ 26 = 65.4

65 mg/dL/unit

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Pump Initiation: Using Weight

68-year-old man, type 2 diabetes, 145 kg · A1C 10.1% · CGM GMI 11.6%

Insulin glargine 55 units twice daily (110 units/day, basal only)

Also: tirzepatide 15 mg weekly, dapagliflozin 10 mg daily, metformin 1000 mg twice daily

1 Use weight to estimate TDD

145 kg × 0.5 = 72.5

72.5 units/day

2 Basal = TDD ÷ 48

72.5 ÷ 48 = 1.51

1.50 units/hr

3 Carb ratio: rule of 450

450 ÷ 72.5 = 6.2

6 g/unit

4 Correction: rule of 1700

1700 ÷ 72.5 = 23.4

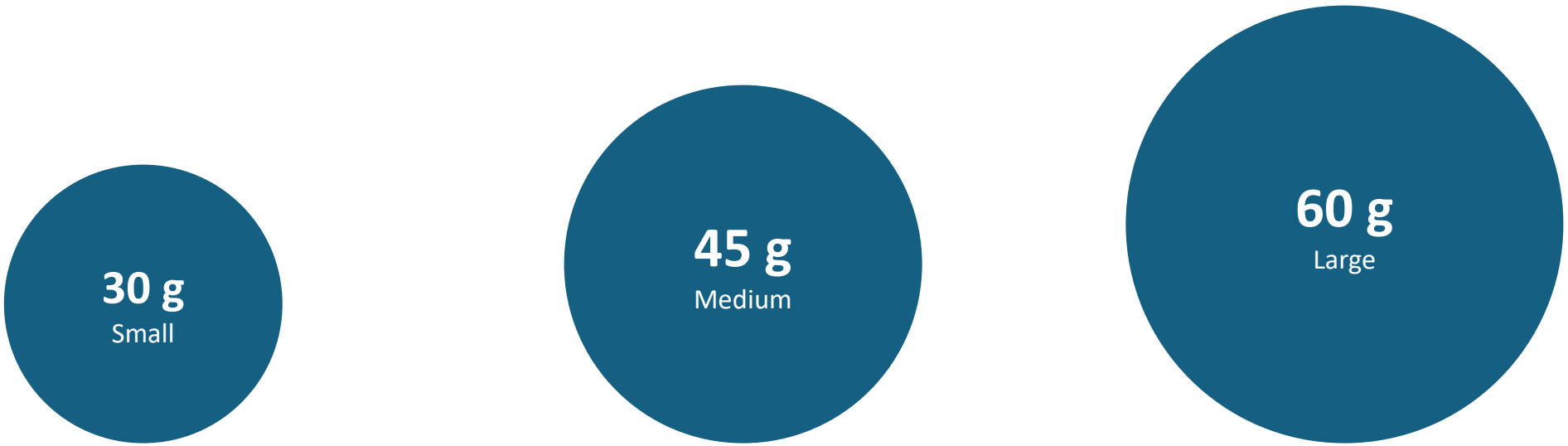
23 mg/dL/unit

What About Carbs?

Courtesy of Rachel Myers, RD

Pre-set doses / meal sizes

Assess a baseline meal, then program comparable small, medium & large meals



2 units **3 units** **4 units**

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Caution

The pump is not autonomous

Patients must enter carbs to be successful

- Every meal, every time
- Or use pre-set meal sizes

Practical Considerations

1 Insulin needs are hard to predict

Most of the time TDD is reduced

2 Reservoir size

200 units (Omnipod, Mobi)
300 units (all others)

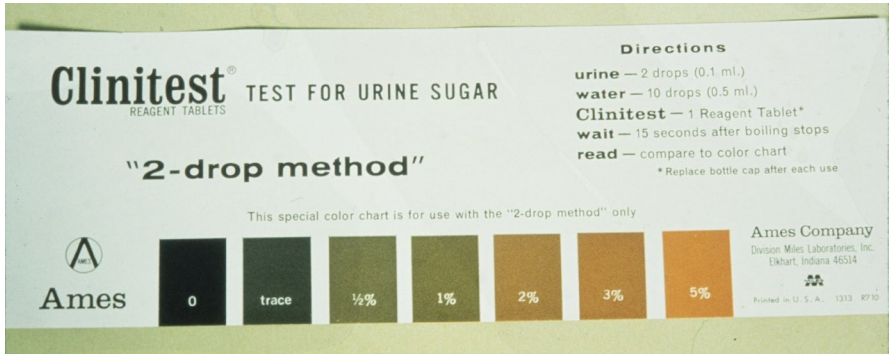
3 Medicare coverage

Omnipod 5: Part D
Other pumps: Part B DME

4 Other medications

Metformin, GLP-1
SGLT-2i
Basal insulin, sulfonylurea

Monitoring Treatment

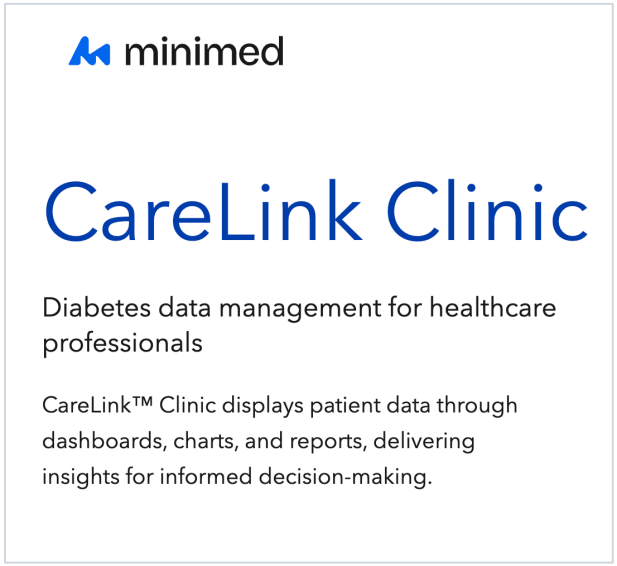


Clinitest urine sugar testing (Ames; introduced 1941)

Accessing Pump Data

CareLink

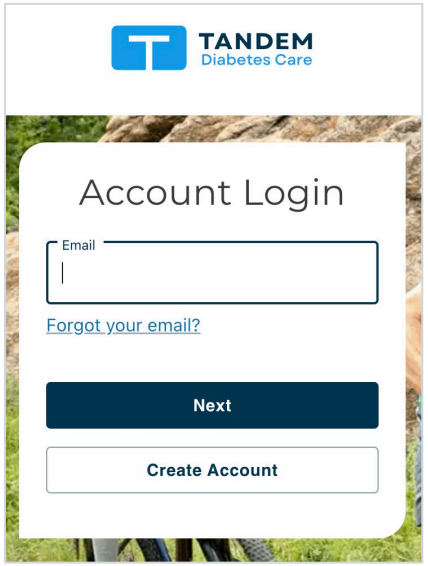
MiniMed



carelink.medtronic.com

Tandem Source

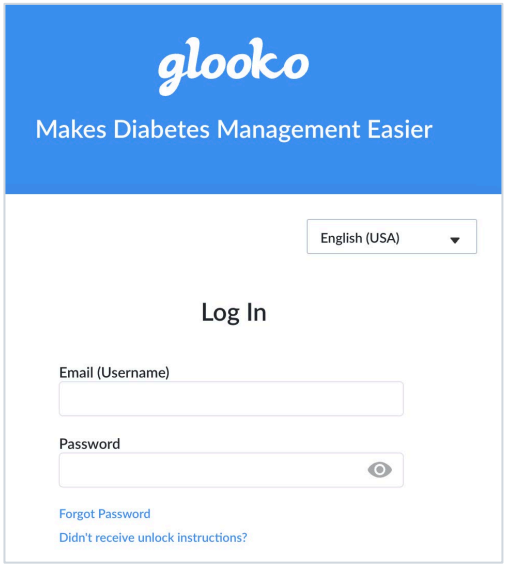
Tandem



source.tandemdiabetes.com

Glooko

Omnipod 5



my.glooko.com

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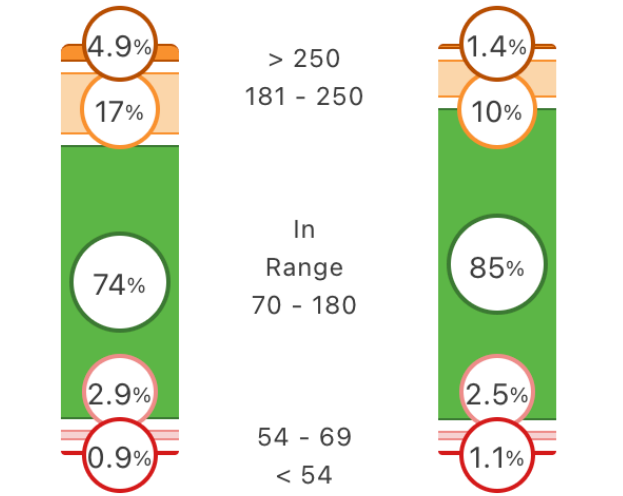
Aggregate Data: 2-Week Summary

Tandem Mobi pump · data from Tandem Source

CGM summary

Average reading	147 mg/dL
Time in range	74 %
Time CGM in use	99 %
Standard deviation	53 mg/dL
Coefficient of variation	36 %
GMI	6.8 %

Time in range comparison



Control-IQ summary

Time active	100 %	13 d 13 hr
Control-IQ off	0 %	0 hr 0 min
CGM inactive	0 %	1 hr 15 min
Pump inactive	0 %	0 hr 7 min

Average sleep		Average exercise	
Duration	8 hr	Duration	0 hr
Weekly	7 times	Weekly	0 times

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Aggregate Data: 2-Week Summary

Tandem Mobi pump · data from Tandem Source

Insulin summary

Average daily dose		24.46 units
Basal	51 %	12.50 units
Bolus	49 %	11.97 units
Average daily boluses		14 boluses
Manual	66 %	9 boluses
Control-IQ	34 %	5 boluses
Average daily carbs		33 g

Bolus review (daily average)

Type		
Food	31 %	3.70 units
Correction	35 %	4.18 units
Override	4 %	0.46 units
Control-IQ	30 %	3.63 units
Delivery Method		
Standard	70 %	8.33 units
Extended	0 %	0.00 units
Quick	0 %	0.00 units
Control-IQ	30 %	3.63 units

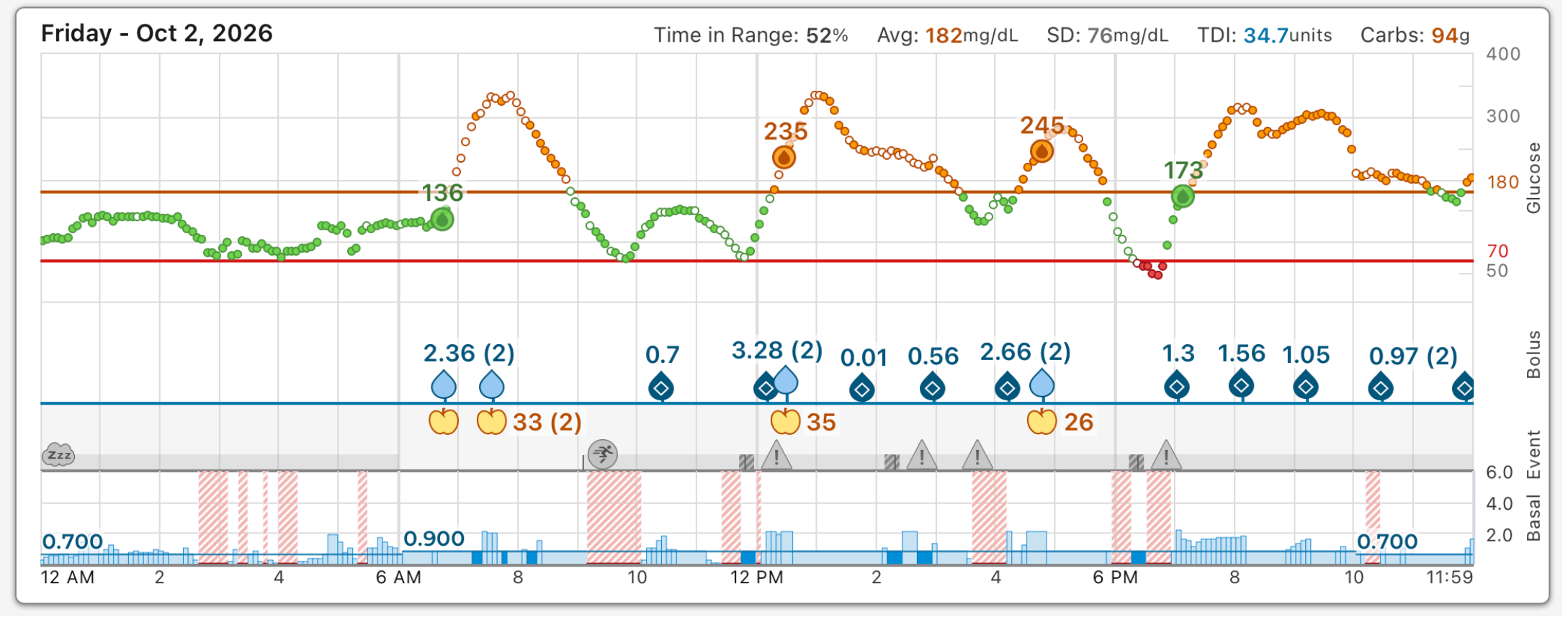
Load activity

Cartridge change	every	4.9 d
Tubing fill	every	4.9 d
Cannula fill	every	4.9 d

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Reviewing a Daily Tracing



Auto suspend | Automated basal | Auto bolus | Food bolus | Correction | Carbs (g) | Sleep mode | Override

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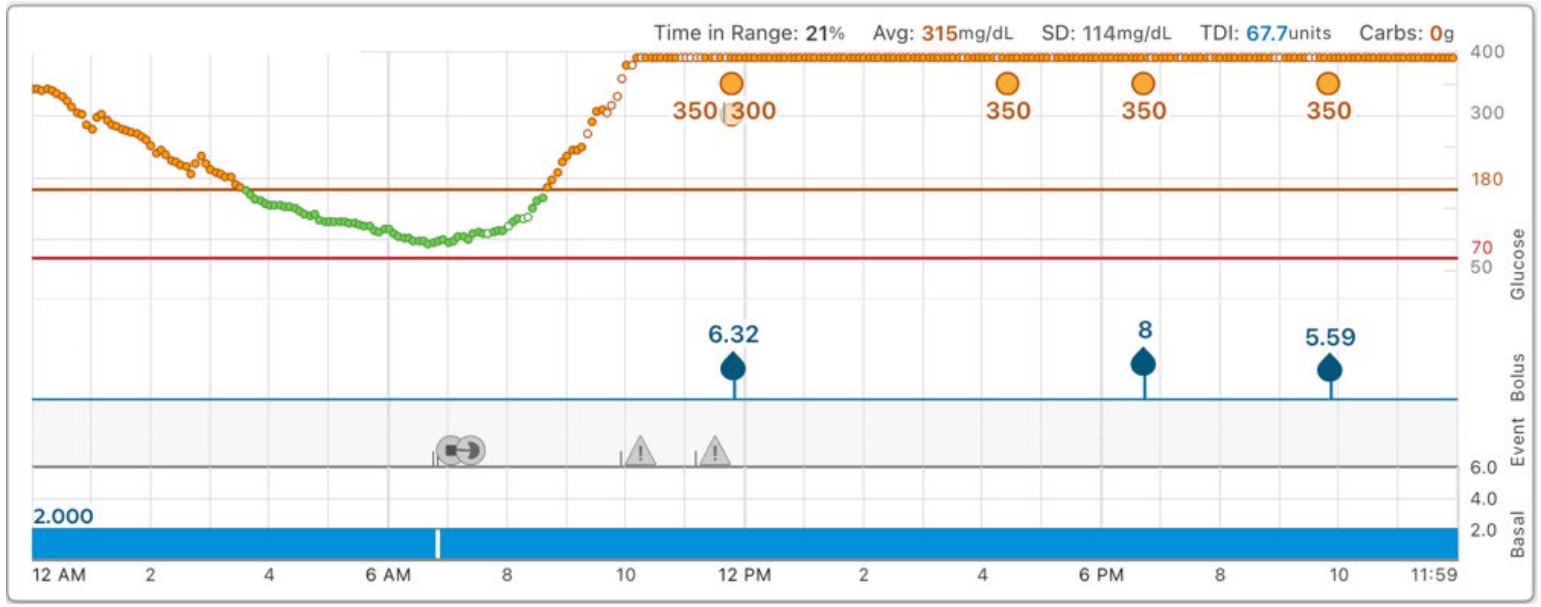
Risks

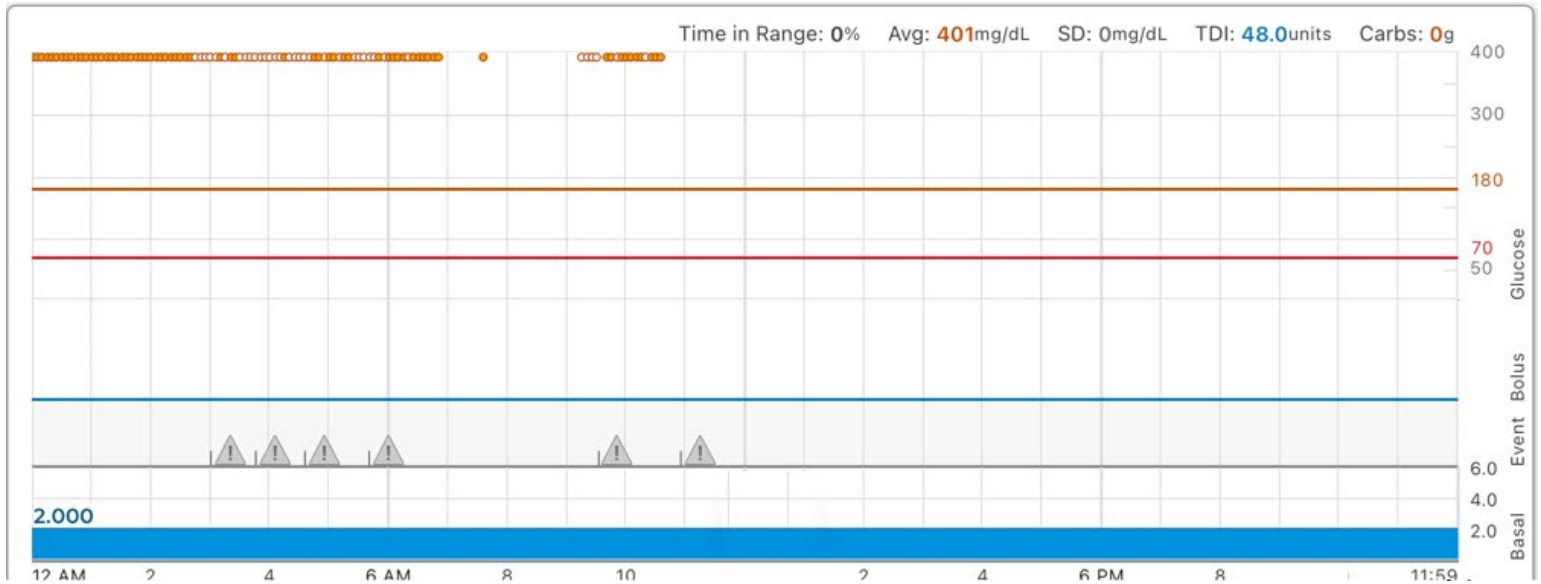
Day 1

Site failure

Day 2

DKA





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Key Takeaways

1. **AID is the preferred treatment** for all type 1 and many insulin-treated type 2
2. **Have a carb strategy**
3. **Settings don't have to be perfect**
4. **Teach patients to recognize site failure**
5. **Collaborate!** Clinician | Pump rep | CDE | Dietitian | Pharmacist
6. **Pumps will only keep improving,** so now is the time to make them part of your practice!

References

- American Diabetes Association Professional Practice Committee. 7. Diabetes technology: Standards of Care in Diabetes—2026. Diabetes Care 2026;49(Suppl 1):S150–S165.
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