Going from Pump Therapy to MDI

A practical, safety-first framework for planned or temporary transitions to injections

Core idea

Replace automated / programmed basal with long-acting insulin, while keeping rapid-acting insulin for meals and corrections.

Safety first: use a clinician-specific plan whenever possible.

Why people switch from pump therapy to MDI

The transition may be planned, temporary, or urgent.

Planned break

Skin irritation, diabetes distress, cost/insurance, travel, sport, preference

Supply issue

Unusable recalled supplies, infusion sets, pods, transmitter/app issues, battery/charging problems

Device failure

Manufacturer recall, pump damaged, occlusion alarms, unexplained highs despite site changes

Every pump user should have an injection backup plan.

The mental model: what the pump was doing

MDI separates basal insulin from bolus insulin.

Pump / AID

Tiny rapid-acting doses every few minutes

Basal = continuous micro-dosing

Switch

MDI

Long-acting basal + rapid-acting boluses

Basal = one or two planned injections

Bolus insulin still covers: carbohydrates, correction doses, and sometimes protein/fat adjustments.

Before stopping the pump: collect the numbers

This is the information needed to build a safe MDI plan.

Dose data

- Current total daily dose (TDD)
- Total programmed basal or delivered basal
- Insulin-to-carb ratios by time of day
- Correction factor / insulin sensitivity
- Glucose targets and active insulin time

Supplies

- Long-acting insulin prescription
- Rapid-acting pens/vials + needles/syringes
- Ketone strips and sick-day plan
- CGM + meter backup supplies
- Pump settings screenshot or download

Do not remove the pump for an extended period without replacing basal insulin unless your clinician specifically instructed you to do so.

Timing the handoff: avoid an insulin gap

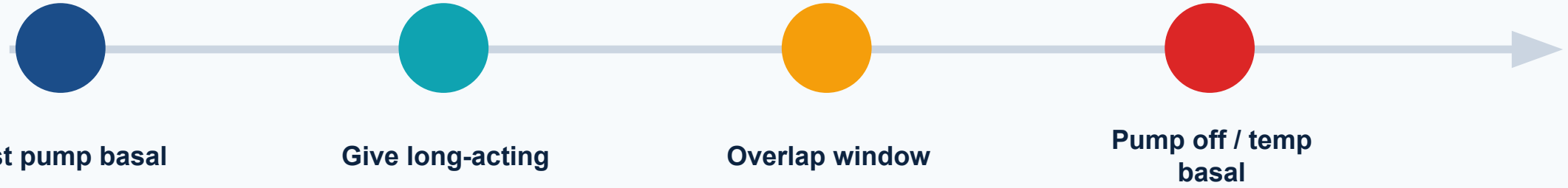
The danger zone is stopping pump basal before long-acting insulin is active.

Planned transition

Coordinate the timing of long-acting insulin and pump basal with the diabetes team.

Pump failure

Give backup insulin per plan and check glucose/ketones more often.



When restarting a pump after long-acting insulin, avoid “double basal.” Use your team’s instructions for timing or temporary basal reduction.

Building the starting MDI dose

The “right” dose is individualized; this slide gives the logic, not a prescription.

1

Find basal need

Use recent pump basal delivery and TDD trends. Automated systems may have variable basal delivery.

2

Choose basal insulin

Examples include glargine, degludec, detemir, or NPH—timing differs by insulin and plan.

3

Keep bolus math

Start with known carb ratios/correction factors, then adjust using patterns

Ketones develop quickly when insulin delivery is interrupted because rapid-acting insulin has a short duration.

How to figure out the basal dose

Use pump data first; use total daily dose only when pump basal data are unavailable.

Best starting point: total daily pump basal

Add all programmed basal rates over 24 hours OR use recent delivered basal if AID/manual patterns make that more realistic.

Common starting estimate: about 80–100% of the 24-hour pump basal as long-acting insulin, individualized for recent lows/highs, activity, illness, and insulin sensitivity.

Round conservatively and re-check patterns within the first 24–72 hours.

If only total daily dose is known

Estimate basal as roughly 40–50% of total daily insulin, then individualize.

Example: TDD 40 U → estimated basal range 16–20 U/day.

Do not copy AID algorithm micro-adjustments directly into MDI without judgment; MDI basal cannot turn itself down.

For children, pregnancy, recurrent severe lows, recent DKA, kidney disease, or very low insulin needs, get individualized medical guidance before dosing.

Sources: ADCES pump backup plan; RCH insulin pump malfunction guide; Johns Hopkins Diabetes Guide.

Use programmed basal for calculations

Not what's listed for basal at the bottom of nightscout

Database records

Valid from: 5/27/2026, 10:58:03 AM

default

Units: mg/dl

DIA: 10

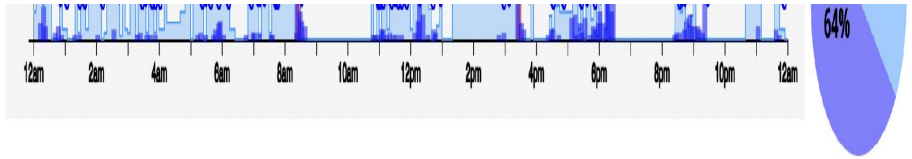
Timezone: America/New_York

Carbs activity / absorption rate: 9

Insulin to carb ratio (I:C):
00:00 : 6
17:00 : 7

Insulin Sensitivity Factor (ISF):
00:00 : 60
07:00 : 50
09:00 : 80

Basal rates [unit/hour]:
00:00 : 0.8
08:00 : 1.1
10:00 : 0.85



TDD average: 35.6U **Bolus average:** 61% **Basal average:** 39% **(Base basal average:** 58%) **Carbs average:** 39g **Protein average:** 0g **Fat average:** 0g

Calculating carb ratio and ISF on MDI

The math is similar to pump bolusing, but you must manually track timing and active insulin.

Meal insulin

Carb bolus = grams carbohydrate ÷ carb ratio.

Example: 45 g ÷ 10 = 4.5 U.

Correction insulin

Correction = (current glucose − target glucose) ÷ ISF.

Example: (220 − 120) ÷ 50 = 2 U.

Final MDI dose

Total dose = meal bolus + correction − active insulin adjustment.

Use the same CR/ISF from pump settings initially unless the clinician changes them.

Correction doses are usually spaced several hours apart unless instructed otherwise because insulin action overlaps.

Sources: mySugr Bolus Calculator manual; NHS rapid-acting insulin guidance; ADCES app listing.

If you do not have long-acting insulin

This is an emergency bridge plan, not the ideal plan for a full pump vacation.

Immediate priorities

Confirm delivery problem: site/tubing, cartridge, battery, pump error, expired insulin.

Give needed rapid-acting correction by pen/syringe, not through the failed site.

Check glucose/CGM often and have ketone testing readily available.

Rapid-acting basal replacement

Bridge with rapid-acting insulin every 2–3 hours until basal insulin or pump therapy is restored.

Estimate: hourly basal rate × number of hours being covered, then add meal/correction insulin as separate calculations.

Avoid stacking: track dose time and insulin-on-board manually.

Emergency option

In the U.S., some human insulins such as Regular and NPH are available without a prescription, but they are not interchangeable with rapid analogs/glargine.

Regular is slower; NPH has a peak. Ask a pharmacist/clinician before using.

Escalate urgently for moderate/large ketones, vomiting, dehydration, persistent glucose >300 mg/dL, or inability to keep insulin down.

Sources: Children's Diabetes Centre pump failure guidelines; FDA insulin types; ADCES pump backup planning.

Preferred temporary basal insulin options

For short pump breaks, the goal is basal coverage that does not linger too long when restarting pump basal.

Often easiest: 24-hour basal

Glargine U100 options: Lantus, Basaglar, Rezvoglar, Langlara or unbranded glargine.

Typically once daily, about a 24-hour planning window, and easier to time the pump restart.

May be useful: split basal

Detemir/Levemir is often split twice daily.

A split dose can offer more flexibility.

Less ideal for short breaks

Degludec/Tresiba has a very long tail and can complicate pump restart timing.

NPH can work as a backup in emergency but has a noticeable peak and requires a different meal/safety plan. Not recommended.

Use the patient's backup prescription and diabetes team instructions whenever possible; do not wait until the pump fails to request basal insulin.

Sources: Maryland Endocrine pump backup plan; Pediatric Endocrine Society pump failure guide; Diabetes Care/ScienceDirect pump transition guidance.

Bolusing on MDI: meals, corrections, and stacking

The math may be familiar; the workflow is different.

Meal dose

Carbs ÷ insulin-to-carb ratio.

Pre-bolus when safe and appropriate.

Correction dose

Current glucose − target, divided by correction factor.

Account for insulin on board.

Recheck rhythm

Use CGM trend + fingerstick if symptoms do not match.

Avoid repeated corrections too close together.

MDI does not automatically subtract IOB unless an app/calculator is used.

Apps and tools for calculating MDI doses

Choose tools that handle carb ratio, correction factor, target glucose, dose history, and active insulin.

Prescription/device-linked

InPen app: dose calculator + active insulin tracking when paired with the smart pen.

Some meter or pen ecosystems include calculators depending on country and device.

Standalone calculators

BolusCalc

T1D1 Insulin Calculator

Glucose Buddy

Check availability

mySugr Bolus Calculator and GlucoLog RapidCalc offer bolus calculator features in select countries/regions.

Safety rule: app settings should come from the diabetes care team; the app does not know illness, ketones, exercise plans, pregnancy, or recent severe lows.

Sources: ADCES Danatech app listings; BC Children's BolusCalc; mySugr and GlucoLog documentation.

First 72 hours: pattern-based monitoring

The first days are about safety, not perfection.

Overnight / fasting	Is basal too strong or too weak?	Waking low/high trends
Between meals	Is basal holding steady?	Rise/fall without food
After meals	Are ratios/timing working?	2–4 hour patterns
Activity	Does plan prevent lows/highs?	Need carbs or dose reduction

Make changes based on repeated patterns unless there is a safety issue. Keep your diabetes team involved for dose adjustments.

Common transition problems and practical responses

Use pattern recognition and safety rules.

Morning/Evening highs

Basal may be too low, timing may not cover dawn phenomenon or growth hormone, or late meals/corrections may be contributing.

Afternoon lows

Basal may be too strong, bolus ratio may be aggressive, or activity needs more planning.

Post-meal spikes

Pre-bolus timing, carb counting, meal composition, or ratio may need review.

Frequent corrections

Correction factor may be off—or corrections may be stacked too close together.

Restarting pump therapy after MDI

The main risk is overlapping long-acting insulin with pump basal.

Before restart

- Confirm long-acting dose and timing
- Check pump settings match current plan
- Use fresh insulin/site/pod/reservoir
- Monitor closely for several hours

Ask about

- Temporary basal reduction
- Delayed pump restart
- How to handle meal boluses during overlap
- When to call for help

Restart plans vary by insulin type and dose timing. The safest plan is written and individualized.

How to transition back to the pump

The main safety issue is overlap between injected basal and pump basal.

1. Rebuild pump settings before reconnecting: basal profile, CR, ISF, targets, DIA/insulin action, max bolus, max basal, alerts.
2. Confirm the last long-acting insulin time and dose.
3. If glargine was used, many pump-failure guides recommend waiting about 24 hours after the last long-acting dose before resuming full pump basal.
4. Alternative: reconnect earlier with pump basal set to 0% (settings, devices, your pump, set temp basal) or significantly reduce with an override until the long-acting insulin has worn down — only with clear instructions and close monitoring.
5. Restart automation/AID cautiously after basal overlap risk is gone; watch the first overnight closely.

Do not run full pump basal on top of active long-acting insulin unless a clinician specifically designed that plan.

Sources: Pediatric Endocrine Society; TCOYD backup plan; pump failure guidance from Children's Diabetes Centre.

Patient handout: MDI backup plan checklist

Keep this written down before the pump fails.

Numbers to save

- Total daily basal from pump
- Usual total daily dose
- Carb ratios by time of day
- ISF/correction factor by time of day
- Targets and insulin action time/DIA
- Ketone action thresholds and emergency contacts

Supplies to keep current

- Rapid-acting insulin vial/pen + syringes/pen needles
- Long-acting backup insulin + written dose plan
- Ketone strips or blood ketone meter
- Meter/strips even if using CGM
- Low treatment and glucagon
- Pump company support number

A backup plan is only useful if insulin is not expired and the dose instructions are easy to find.

Sources: ADCES AID & pump backup plans; RCH insulin pump malfunction guidance.

Key references & resources

Use these to build a patient-specific written backup plan.

American Diabetes Association. Standards of Care in Diabetes—2026: Diabetes Technology; Pharmacologic Approaches to Glycemic Treatment.

ADCES Danatech. AID & Insulin Pump Back-Up Plans.

Pediatric Endocrine Society. Insulin Pump Failure: A Guide for Families.

Children’s Diabetes Centre / pump failure guidelines: rapid-acting insulin every 2–3 hours if no long-acting insulin is available.

Royal Children’s Hospital Melbourne. Insulin pump malfunction guidance.

Maryland Endocrine. What to do when your insulin pump is not available: backup basal insulin options and Tresiba caution.

FDA insulin types overview: regular human insulin, NPH, rapid-acting and long-acting categories.

BC Children’s Hospital BolusCalc; ADCES T1D1 Insulin Calculator; mySugr Bolus Calculator documentation; GlucoLog RapidCalc documentation.

Clinical reminder: this deck is educational and should be adapted to a person’s prescribed insulin plan, age, pregnancy status, activity level, ketone plan, and clinician instructions.