

# Insulin Therapy in Type 2 Diabetes

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**Please Note:** This algorithm is intended for adults who are initiating and/or optimizing insulin therapy to achieve glycemic targets. It is not intended for situations where aggressive insulin therapy may be needed (e.g., diabetic ketoacidosis), for people with type 1 diabetes, or for the treatment of children, or women who are or could become pregnant.

**Individualize Glycemic Target Ranges:** choose ranges based on age, duration of diabetes, patient preference, comorbidities, hypoglycemia risk, and other factors. (See [Glucose Management Algorithm](#)).

## Step 1: Start Basal insulin

Start basal insulin 10 units or 0.1-0.2 units/kg daily or divided BID.  
Titrates dose based on Fasting Plasma Glucose (FPG).  
Increase by 2-4 units or 10-15% every 3-4 days until FPG within target range, generally 80-130mg/dL (individualize).

If A1C not within target range but FPG at target and/or basal insulin dose >0.7-1 unit/kg

## Step 2: Add Bolus insulin before largest meal

Start bolus insulin 4 units or 0.1 units/kg or 10% of basal insulin dose before largest meal.  
Titrates dose based on next meal's Premeal Glucose.  
Increase by 1-2 units or 10-15% every 3-7 days until next meal's Premeal Glucose within target range, generally 80-130mg/dL

If A1C not within target range

## Step 3: Add Bolus insulin before other meals

Start additional bolus insulin 4 units or 0.1 units/kg or 10% of basal insulin dose before other meals (focus on one meal at a time).  
Titrates dose based on next meal's Premeal Glucose.  
Increase by 1-2 units or 10-15% every 3-7 days until next meal's Premeal Glucose within target range, generally 80-130mg/dL\*

\* If Premeal glucose targets achieved but A1C remains elevated, consider checking Post-Prandial Glucose: targets generally <180mg/dL 1-2 hours after meals.

Patients on insulin should receive education that includes appropriate injection and dosing technique, hypoglycemia management, and timing of doses and meals.

If hypoglycemia occurs, determine and address the cause.  
Review blood glucose patterns and decrease the dose of insulin that is likely causing hypoglycemia by 10-20%.

Basal Insulin	Onset (hrs)	Peak (hrs)	Duration (hrs)
<b>NPH (Novolin N®)</b>	1-2	4-14	10-24
<b>Detemir (Levemir®)</b>	1	-	8-24
Glargine (Lantus®/Basaglar®)	1	-	up to 24
Glargine U-300* (Toujeo®)	6	-	24 - 36
Degludec U-100, U-200* (Tresiba®)	1	-	up to 42

Bolus Insulin	Onset (hrs)	Peak (hrs)	Duration (hrs)
<b>Regular (Novolin R®)</b>	0.5-1	2-4	6-12
Aspart (Fiasp®)	2.5 min	1	5-7
<b>Aspart (Novolog®)</b>	< 15 min	1-2	3-5
Lispro U-100, U-200* (Humalog®)	15 min	1-2	3-5
Glulisine (Apidra®)	< 30 min	1-2	3-6

Dual Action Insulin	Onset (hrs)	Peak (hrs)	Duration (hrs)
Regular U-500* (Humulin®)	varies with dose	varies with dose	8-24

Pre-Mixed Insulin	Onset (hrs)	Peak (hrs)	Duration (hrs)
<b>NPH/Reg (Novolin® 70/30)</b>	0.5	2-12	18-24
<b>NPA/Aspart (Novolog Mix® 70/30)</b>	0.25	1-4	12-24
NPL/Lispro (Humalog Mix® 50/50)	0.5	1-4	6-12
NPL/Lispro (Humalog Mix® 75/25)	0.5	1-4	6-12

Consider for people who cannot mix insulin or who would benefit from a simpler regimen.

- When **starting**, use 10-12 units or 0.3 units/kg per day:  
Give 2/3 in AM and 1/3 in PM before meals or  
1/2 in AM and 1/2 in PM before meals.
- When **switching** to pre-mixed insulin, divide current daily insulin dose:  
Give 2/3 in AM and 1/3 in PM before meals or  
1/2 in AM and 1/2 in PM before meals.
- Increase dose by 1-2 units or 10-15% every 3-7 days

\* The standard concentration of insulin is U-100 (100 units/ml). There are currently multiple products available with higher concentrations of insulin: U-200 (200 units/ml), U-300 (300 units/ml) and U-500 (500 units/ml). (See [Concentrated Insulins Handout](#).)

Medications on the **IHS National Core Formulary** are in **BOLD** above.

Ref: ADA Clinical Practice Recommendations, Diabetes Care; 2019, 42, Supplement 1 ePocrates (May 2018). Retrieved from: <https://online.epocrates.com/tables/3201/Insulin-Comparisons>