



Produced by Diabetes Clinical Working Group and RDTC

On behalf of the GMMM Pathways and Guidelines Development Subgroup

# GMMM Insulin Prescribing Aid for Adults with Type 2 Diabetes:

- *Insulin initiation guidance*
- *Profiles of formulary insulins*
- *Insulin titration guidance*

**DOCUMENT CONTROL PAGE**

<b>Title</b>	Greater Manchester Medicines Management Group Prescribing Aid for Adults with Type 2 Diabetes: <ul style="list-style-type: none"><li>• Insulin initiation guidance</li><li>• Profiles of formulary insulins</li><li>• Insulin titration guidance</li></ul>
<b>Supersedes</b>	None
<b>Minor Amendments</b>	March 2020: Insuman Comb 15 removed from <i>Profiles of formulary insulins</i> due to product discontinuation.
<b>Author</b>	GMMMG Pathways and Guidelines Development Subgroup: Diabetes Clinical Working Group RDTC
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<b>Application</b>	
<b>Circulation</b>	Proposed: All Greater Manchester GP Practices, Non-Medical Prescribers, Provider Organisations, LPCs
<b>Review</b>	November 2022

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FIRST CHOICE: MEDIUM-ACTING HUMAN NPH (ISOPHANE) INSULIN	
<b>START</b>	10 units once daily at the same time; not food dependent
<b>TITRATE</b>	Increase by 2 units every three days until individualised fasting glucose levels are reached without hypoglycaemia; <b>encourage self-titration</b>
Consider starting with lower doses (6-10 units) in those who are frail/elderly or have renal complications	
<b>FORMULARY CHOICE</b>	Insuman Basal, <i>Insulatard</i> (alternative choice), <i>Humulin I</i> (alternative choice)

ALTERNATIVE CHOICE: LONG-ACTING INSULIN ANALOGUES	
Can be considered for:	
<ul style="list-style-type: none"> <li>those who <b>require assistance</b> with insulin administration</li> <li>those who experience <b>problematic hypoglycaemia</b></li> </ul>	
<b>START/TITRATE</b>	As for <b>FIRST CHOICE INSULINS</b>
Consider starting with lower doses (6-10 units) in those who are frail/elderly or have renal complications	
<b>FORMULARY CHOICES</b>	Semglee, Abasaglar, <i>Levemir</i> (alternative choice)

**IF HBA1C REMAINS ABOVE TARGET**  
(despite fasting blood glucose at individualised target level/ adequately-titrated insulin): **consider adding prandial insulin**

PRANDIAL INSULIN:	
<b>ADD</b>	4 units once daily, at the same time as the meal with the largest post-prandial excursion
<b>TITRATE</b>	Increase by 2 units twice weekly until individualised post-prandial glucose target is reached; <b>encourage self-titration</b>
<b>FORMULARY CHOICES</b>	<i>Analogue</i> Insulin lispro Sanofi, Apidra, <i>Novorapid</i> (alternative choice)

**IF HBA1C REMAINS ABOVE TARGET**  
(despite fasting blood glucose at individualised target level/ adequately-titrated insulin): **consider stepwise addition of prandial insulin with other meals**

**INSULIN RESISTANCE:**  
if there is little response to insulin dose titration as directed; **seek specialist advice**

**IF HBA1C AND BMI ARE DECREASING:**  
consider down-titrating insulin, based on blood glucose readings

PRE-MIX INSULIN:	
A twice daily pre-mix insulin can also be considered. If blood glucose is not controlled on twice daily pre-mix, consider referral to the diabetes specialist team.	
<b>FORMULARY CHOICES</b>	See <a href="#">GMMMG Prescribing Aid: Profiles of Formulary Insulins in Adults with Type 2 Diabetes for suitable preparations</a>

**What additional information and advice should I give people with type 2 diabetes when starting on insulin?**  
[NICE CKS](#) contains helpful counselling points on aspects such as injection technique, advice when fasting, holidays and travel, driving, and insurance etc.

## PROFILES OF FORMULARY INSULINS IN ADULTS WITH TYPE 2 DIABETES

FORMULARY CHOICE	INSULIN	ORIGIN	ADMINISTRATION TIME	ONSET*	PEAK*	DURATION*
<b>MEDIUM ACTING/ ISOPHANE</b>						
FIRST CHOICE(S)	Insuman Basal®	Human	45-60 mins before food	<1 hour	3-4 hrs	11-20 hrs
ALTERNATIVE(S)	Insulatard®	Human	Once or twice daily; not food dependent	<1.5 hrs	2-18 hrs	24 hrs
	Humulin I®	Human	Once or twice daily; not food dependent	30-60 mins	6.5 hrs	22 hrs
<b>LONG ACTING</b>						
FIRST CHOICE(S)	Semglee® ▼	Analogue	Once daily at the same time; not food dependent	1-2 hrs	No peak	24 hrs
	Abasaglar® ▼	Analogue	Once daily at the same time; not food dependent	1-2 hrs	No peak	24 hrs
ALTERNATIVE(S)	Levemir®	Analogue	Once daily at the same time or twice daily 12 hrs apart; not food dependent	30-60 mins	No peak	24 hrs
<b>RAPID ACTING/PRANDIAL</b>						
FIRST CHOICE(S)	Apidra®	Analogue	Just before/with/just after food	10-20 mins	1hr	3-5 hrs
	Insulin Lispro Sanofi® ▼	Analogue	Just before/with/just after food	15 mins	30-70 mins	2-5 hrs
ALTERNATIVE(S)	Novorapid®	Analogue	Just before/with/just after food	10-20 mins	40-60 mins	3-5 hrs
<b>BIPHASIC / MIXED</b>						
FIRST CHOICE(S) <i>Soluble/ Isophane Mixtures</i>	Humulin M3®	Human	30-45 mins before food	30-60 mins	2-10 hrs	~22 hrs
	Insuman Comb 25®	Human	30-45 mins before food	30-60 mins	2-4 hrs	12-19 hrs
	Insuman Comb 50®	Human	20-30 mins before food	<30 mins	1.5-4 hrs	12-16 hrs
ALTERNATIVE(S) <i>Intermediate Acting Analogue Mixtures</i>	NovoMix 30	Analogue	Just before/with/just after food	10-20 mins	1-4 hrs	24 hrs
	Humalog Mix25®	Analogue	Just before/with/just after food	15 mins	30-70 mins	24 hrs
	Humalog Mix50®	Analogue	Just before/with/just after food	15 mins	30-70 mins	24 hrs
<b>Longer acting and high strength insulins such as Toujeo® and Insulin Degludec are <b>NOT RECOMMENDED FOR ROUTINE USE</b> in people with T2D and should only be considered in line with <a href="#">GMMMGM recommendations</a>.</b>						
*Onset, peak and duration are interpreted from individual product <a href="#">SPCs</a> / information provided by the manufacturer. The details above are intended as guidance only- individual variability will depend on factors such as size of dose, site of injection, temperature, and physical activity of the patient. <b>SEEK ADVICE WHERE NECESSARY.</b>						

**INSULIN SHOULD ALWAYS BE PRESCRIBED BY BRAND, USING THE FULL PRODUCT NAME.**  
See [GMMMGM formulary](#) for further information.

# INSULIN TITRATION GUIDANCE IN ADULTS WITH TYPE 2 DIABETES

**THIS GUIDANCE APPLIES TO PATIENTS ON ESTABLISHED INSULIN REGIMENS**

## PRINCIPLES OF TITRATION

**Before adjusting doses, consider:**

- Diet / level of activity / injection sites e.g. lipohypertrophy
- 'Sick day guidance'- if vomiting/ dehydrated check capillary blood glucose (CBG) 3-4 hourly.

**If blood glucose levels are >20mmol/L, consider testing for ketones:**

- Check ketones at lower blood glucose levels if patient is unwell and taking an SGLT2 inhibitor

**Glucose targets should be individualised e.g:**

- If CKD 4-5, elderly, and/or reduced hypo-awareness then 5-9mmol/L before meals might be appropriate
- In end of life care: the aim is for the patient to be free from osmotic symptoms

**Unless you are concerned about hypoglycaemia, AVOID changing insulin doses based on one-off blood glucose levels:**

- look at blood glucose patterns over 4 to 7 days

**ALWAYS USE YOUR CLINICAL JUDGEMENT AND SEEK ADVICE WHERE NECESSARY**

BASAL	
Pre-breakfast CBG (mmol/L)	ACTION
< 4	Reduce insulin by 10%
4 to 7	No change
7.1 to 15	Increase insulin by 10%
15.1 to 20	Increase insulin by 15%
>20	Increase insulin 20%

BASAL BOLUS					
CBG (mmol/L)	< 4	4 to 7	7.1 to 14	14.1 to 20	> 20
Pre-breakfast	Reduce <b>basal</b> insulin by 10%	No change	Increase <b>basal</b> insulin by 5-10%	Increase <b>basal</b> insulin by 15-20%	Increase insulin by 20%
Pre-lunch	Reduce <b>breakfast</b> insulin by 10%	No change	Increase <b>breakfast</b> insulin by 5-10%	Increase <b>breakfast</b> by 15-20%	
Pre-tea	Reduce <b>lunch</b> insulin by 10%	No change	Increase <b>lunch</b> insulin by 5-10%	Increase <b>lunch</b> insulin by 15-20%	
Pre-bed	Reduce <b>teatime</b> insulin 10%	No change	Increase <b>teatime</b> insulin by 5-10%	Increase <b>teatime</b> insulin by 15-20%	

TWICE DAILY					
CBG (mmol/L)	< 4	4 to 7	7.1 to 14	14.1 to 20	> 20
Pre-breakfast	Reduce <b>teatime</b> insulin by 10%	No change	Increase <b>teatime</b> insulin by 10%	Increase <b>teatime</b> insulin by 15%	Increase insulin by 20%
Pre-tea	Reduce <b>breakfast</b> insulin by 10%	No change	Increase <b>breakfast</b> insulin by 10%	Increase <b>breakfast</b> insulin by 15%	
Pre-bed	Reduce <b>teatime</b> insulin by 10%	No change	Increase <b>teatime</b> insulin by 10%	Increase <b>teatime</b> insulin by 15%	

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