GMMMG Insulin Prescribing Aid for Adults with Type 2 Diabetes:

- Insulin initiation guidance
- Profiles of formulary insulins
- Insulin titration guidance
| **Title** | Greater Manchester Medicines Management Group Prescribing Aid for Adults with Type 2 Diabetes:  
• Insulin initiation guidance  
• Profiles of formulary insulins  
• Insulin titration guidance |
<table>
<thead>
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<tbody>
<tr>
<td><strong>Supersedes</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Minor Amendments</strong></td>
<td>March 2020: Insuman Comb 15 removed from <em>Profiles of formulary insulins</em> due to product discontinuation.</td>
</tr>
</tbody>
</table>
| **Author** | GMMMG Pathways and Guidelines Development Subgroup:  
Diabetes Clinical Working Group  
RDTC |
| **Ratification** | GMMMG Pathways and Guidelines Development Subgroup: November 2019  
GMMMG: December 2019 |
| **Application** | Proposed: All Greater Manchester GP Practices, Non-Medical Prescribers, Provider Organisations, LPCs |
| **Review** | November 2022 |
CONTENTS

Insulin initiation in adults with type 2 diabetes .............................................. 4
Profiles of formulary insulins in adults with type 2 diabetes ............................... 5
Insulin titration guidance in adults with type 2 diabetes .................................. 6
REFERENCES: ........................................................................................................ 8
### Insulin Initiation in Adults with Type 2 Diabetes

**Following the Decision to Initiate Insulin:**

#### First Choice: Medium-Acting Human NPH (Isophane) Insulin

- **Start:** 10 units once daily at the same time; not food dependent
- **Titrate:** Increase by 2 units every three days until individualised fasting glucose levels are reached without hypoglycaemia; encourage self-titration

**Formulary Choice:** Insuman Basal, Insulatard (alternative choice), Humulin I (alternative choice)

#### Alternative Choice: Long-Acting Insulin Analogue

- Can be considered for:
  - those who require assistance with insulin administration
  - those who experience problematic hypoglycaemia
- **Start/Titrate:** As for First Choice Insulins

- Consider starting with lower doses (6-10 units) in those who are frail/elderly or have renal complications

**Formulary Choices:** Semglee, Abasaglar, Leveimir (alternative choice)

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**If HbA1C Remains Above Target**

(depending on fasting blood glucose at individualised target level/adequately-titrated insulin):

- Consider adding prandial insulin

#### Prandial Insulin

- **Add:** 4 units once daily, at the same time as the meal with the largest post-prandial excursion
- **Titrate:** Increase by 2 units twice weekly until individualised post-prandial glucose target is reached; encourage self-titration

**Formulary Choices:** Analogue Insulin lispro Sanofi, Apidra, Novorapid (alternative choice)

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**If HbA1C Remains Above Target**

(depending on fasting blood glucose at individualised target level/adequately-titrated insulin):

- Consider stepwise addition of prandial insulin with other meals

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

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**If HbA1C and BMI are Decreasing:**

consider down-titrating insulin, based on blood glucose readings

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**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.

**Formulary Choices:** See **GMMMG Prescribing Aid: Profiles of Formulary Insulins in Adults with Type 2 Diabetes** for suitable preparations

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**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.

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**Insulin Should Always Be Prescribed by Brand, Using the Full Product Name**

See GMMMG **formulary** for further information.
## Profiles of Formulary Insulins in Adults with Type 2 Diabetes

<table>
<thead>
<tr>
<th>Formulary Choice</th>
<th>Insulin</th>
<th>Origin</th>
<th>Administration Time</th>
<th>Onset*</th>
<th>Peak*</th>
<th>Duration*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medium Acting/Isophane</strong>&lt;br&gt;<strong>First Choice(s)</strong>&lt;br&gt;Insuman Basal®</td>
<td>Human</td>
<td>45-60 mins before food</td>
<td>&lt;1 hour</td>
<td>3-4 hrs</td>
<td>11-20 hrs</td>
<td></td>
</tr>
<tr>
<td><strong>Alternative(s)</strong>&lt;br&gt;Insulatard®</td>
<td>Human</td>
<td>Once or twice daily; not food dependent</td>
<td>&lt;1.5 hrs</td>
<td>2-18 hrs</td>
<td>24 hrs</td>
<td></td>
</tr>
<tr>
<td>Humulin I®</td>
<td>Human</td>
<td>Once or twice daily; not food dependent</td>
<td>30-60 mins</td>
<td>6.5 hrs</td>
<td>22 hrs</td>
<td></td>
</tr>
</tbody>
</table>

| Long Acting<br>**First Choice(s)**<br>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)**<br>Levemir® | Analogue | Once daily at the same time or twice daily 12 hrs apart; not food dependent | 30-60 mins | No peak | 24 hrs |

| Rapid Acting/Prandial<br>**First Choice(s)**<br>Apidra® | Analogue | Just before/with/just after food | 10-20 mins | 1 hr | 3-5 hrs |
| Insulin Lispro Sanofi® | Analogue | Just before/with/just after food | 15 mins | 30-70 mins | 2-5 hrs |
| **Alternative(s)**<br>Novorapid® | Analogue | Just before/with/just after food | 10-20 mins | 40-60 mins | 3-5 hrs |

| Biphasic/Mixed<br>**First Choice(s)**<br>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)**<br>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 |

Longer acting and high strength insulins such as Toujeo® and Insulin Degludec are **NOT RECOMMENDED FOR ROUTINE USE** in people with T2D and should only be considered in line with GMMMG recommendations.

*Onset, peak and duration are interpreted from individual product SPC/ 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. SEEK ADVICE WHERE NECESSARY.

**Insulin should always be prescribed by brand, using the full product name.** See GMMMG [formulary](#) for further information.
**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

<table>
<thead>
<tr>
<th>CBG (mmol/L)</th>
<th>&lt; 4</th>
<th>4 to 7</th>
<th>7.1 to 14</th>
<th>14.1 to 20</th>
<th>&gt; 20</th>
</tr>
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<tbody>
<tr>
<td>Pre-breakfast</td>
<td>Reduce basal insulin by 10%</td>
<td>No change</td>
<td>Increase basal insulin by 5-10%</td>
<td>Increase basal insulin by 15-20%</td>
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<tr>
<td>Pre-lunch</td>
<td>Reduce breakfast insulin by 10%</td>
<td>No change</td>
<td>Increase breakfast insulin by 5-10%</td>
<td>Increase breakfast insulin by 15-20%</td>
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<tr>
<td>Pre-tea</td>
<td>Reduce lunch insulin by 10%</td>
<td>No change</td>
<td>Increase lunch insulin by 5-10%</td>
<td>Increase lunch insulin by 15-20%</td>
<td>Increase lunch insulin by 15-20%</td>
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<tr>
<td>Pre-bed</td>
<td>Reduce teatime insulin 10%</td>
<td>No change</td>
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### BASAL BOLUS

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### TWICE DAILY

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<th>CBG (mmol/L)</th>
<th>&lt; 4</th>
<th>4 to 7</th>
<th>7.1 to 14</th>
<th>14.1 to 20</th>
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**INSULIN SHOULD ALWAYS BE PRESCRIBED BY BRAND, USING THE FULL PRODUCT NAME**

See GMMMGG formulary for further information.
REFERENCES:


Correspondence from Eli Lilly and Company Ltd Medical Information department. Received 15/10/2018.