

Insulin Substitution for Adult Inpatients

The following list is intended as a guide for when a patient's usual insulin is unavailable to prevent a missed dose.

IMPORTANT:

Insulins presented in *italics* are **biosimilars** and are directly interchangeable with their substitute insulin (presented in the same colour). The patient must be appropriately counselled if a supply of a different biosimilar is made. Permanently switching to a biosimilar where appropriate can be cost-effective for the Trust.

For **all other insulins**, substitution should only be done on a temporary basis until a supply of the patient's usual insulin can be obtained.

Rapid-acting insulins:

Novorapid
Humalog
Apidra
Fiasp (ultra-rapid acting)
Lyumjev (ultra-rapid acting)

Substitute dose for dose with:

Trurapi

Short-acting insulins:

Humulin S

Substitute dose for dose with:

Trurapi

Intermediate-acting insulins

Insulatard

Substitute dose for dose with:

Humulin I

Long-acting insulins:

Abasaglar
Lantus
Tresiba
Toujeo

Substitute dose for dose with:

Semglee

For **Toujeo®** and **Tresiba®**, be aware substitute may appear to be a bigger volume as these products are available as 300units/ml and 200units/ml respectively (Tresiba is also available as 100units/ml in which case substitute volume would appear equal).

Biphasic/Mixed insulins:

Novomix 30
Humulin M3
Humalog Mix25
Humalog Mix50

Substitute dose for dose with:

Humulin M3

Animal to Human Insulin Substitution

In the unlikely event that a patient is admitted taking animal insulin, use human equivalent but reduce dose by around 30%, e.g:

Hypurin® porcine 30/70 Mix → use Humulin M3 and reduce dose by around 30%

Hypurin® porcine neutral → use Trurapi and reduce dose by around 30%

Hypurin® porcine isophane → use Humulin I and reduce dose by around 30%

Advice should be sought from the inpatient diabetes team as soon as possible.

Reference:

1. Personal communication with Dr Alison Evans (Consultant Endocrinologist) 23/01/23
2. Personal communication with Dr Sally Thrower (Consultant Endocrinologist) 12/11/20

Class	Examples	Types of insulin	Onset (approx.)	Time to peak (approx.)	Duration (approx.)	Use
Soluble/ short-acting insulin	Actrapid®	Soluble human insulin ¹	Within 30 minutes ¹	1.5 – 3.5 hours ¹	7-8 hours ¹	Up to 30 minutes before meals ¹
	Humulin® S	Soluble human insulin ²	Within 30 minutes ²	2-4 hours ²	9-12 hours ²	15 to 30 minutes before meals
	Insuman® Rapid	Soluble human insulin ²²	Within 30 minutes ²²	1-4 hours ²²	7-9 hours ²²	15 to 20 minutes before meals ²²
Rapid-Acting Insulin	Apidra®	Insulin glulisine ³	10-20 minutes ³	1 hour ³	4-6 hours ³	Shortly before (up to 15 minutes) or just after a meal ³⁻⁴
	Humalog®	Insulin lispro ⁴ Caution: available both as 100units/ml and 200units/ml pens	15 minutes ⁴	30 minutes – 1 hour ⁴	2-5 hours ⁴	
	Insulin Lispro Sanofi®	Insulin lispro				
	Novorapid®	Insulin aspart ⁵	10-20 minutes ⁵	1-3 hours ⁵	3-5 hours ⁵	Immediately before or just after a meal ⁵
	Trurapi®					
Ultra Rapid-acting Insulin	Fiasp®	Insulin aspart ⁶	Within 4 minutes ⁶	30 – 40 minutes ⁶	3-5 hours ⁵	Up to 2 minutes before or up to 20 minutes after a meal ⁶
	Lyumjev®	Insulin lispro ²³	1 minute ²³	1 hour ²³	3.5 hours ²³	0-2 minutes before or up to 20 minutes after a meal ²³
Biphasic Insulin – NPH or isophane mixes	Humulin® M3	30% soluble insulin and 70% isophane insulin ⁷	Within 30 minutes ⁷	First peak: 2-4 hours ⁷ Second (smaller) peak: 10-12 hours ⁷	14-24 hours ⁷	Twice daily usually, up to 30 minutes before meals ⁷ .
	Insuman® Comb 15	15% dissolved insulin and 85% crystalline protamine insulin ⁸	30-60 minutes ⁸	2-4 hours ⁸	11-20 hours ⁸	30-45 minutes before a meal ⁸⁻⁹
	Insuman® Comb 25	25% dissolved insulin and 75% crystalline protamine insulin ⁹			12-19 hours ⁸	
	Insuman® Comb 50	50% dissolved insulin and 50% crystalline protamine insulin ¹⁰	Within 30 minutes ¹⁰	1.5-4 hours ¹⁰	12-16 hours ¹⁰	20-30 minutes before a meal ¹⁰ .
Biphasic Insulin – analogue mixes	Humalog® Mix 25	25% insulin lispro and 75% insulin lispro protamine ¹¹	15 minutes ¹¹	30 minutes – 1 hour ¹¹	Up to 24 hours ¹¹	Shortly before meals ¹¹⁻¹² , usually twice daily
	Humalog® Mix 50	50% insulin lispro and 50% insulin lispro protamine ¹²	15 minutes ¹²	30 minutes – 1 hour ¹² (sharper peak than mix 25)	Up to 24 hours ¹²	
	Novomix® 30	30% soluble insulin aspart and 70% protamine-crystallised	10-20 minutes ¹³	1-4 hours ¹³	Up to 24 hours ¹³	Immediately before or soon after a meal ¹³ ,

		insulin aspart ¹³				usually twice daily
Isophane (NPH) Insulin	Insuman® Basal	Isophane insulin ¹⁴	Within 1 hour ¹⁴	3-4 hours ¹⁴	11-20 hours ¹⁴	45-60 minutes before a meal ¹⁴ , usually once or twice a day
	Humulin® I	Isophane insulin ¹⁵	30mins – 1 hour ¹⁵	4-7 hours ¹⁵	14-24 hours ¹⁵	Do not need to be given with meals, but keep to same time of day.
	Insulatard®	Isophane insulin ¹⁶	Within 90 minutes ¹⁶	4-12 hours ¹⁶	24 hours ¹⁶	
Long-Acting Insulins	Semglee®	Insulin glargine ¹⁷⁻¹⁸	2-4 hours ¹⁷⁻¹⁸	No peak ¹⁷⁻¹⁸	24 hours ¹⁷⁻¹⁸	Usually once daily (any time)
	Abasaglar®					
	Lantus®					
	Levemir®	Insulin detemir ¹⁹	2 hours ¹⁹	6-8 hours ¹⁹	Up to 24 hours ¹⁹	Once or twice daily (anytime)
	Toujeo®	Insulin glargine 300 units/ml ²⁰	3-4 hours ²⁰	No peak ²⁰	Up to 36 hours ²⁰	Usually once daily
	Tresiba®	Insulin deludec ²¹ Caution: available both as 100units/ml and 200units/ml pens	-	No peak ²¹	At least 42 hours ²¹	Usually once daily

References

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