

## Emergency Insulin Compatible Substitutions

In an emergency situation where a patient's usual insulin is not available, NHS diabetes<sup>1</sup> recommend within their national guideline on the "safe and effective management of insulin" that all NHS Trust should have in place a clear and robust system for therapeutic substitution of insulin until a patient's usual insulin can be supplied. The NPSA has also identified insulin as one of the high risk medicine where delay or omission can cause serious harm or even death<sup>2</sup>.

Wherever possible every effort should be made to continue the usual type of insulin patients are admitted on. A change in insulin should only be made if it is deemed clinically necessary. However, if patients are admitted out of pharmacy hours without their own supply of insulin and the relevant insulin is not stocked in all clinical areas or the emergency cupboard and, it becomes necessary that a compatible alternative is needed to avoid delay or omission of insulin, then a substitution can be made adhering to the following as outlined.

When substituting insulin products, doctors should prescribe the same units of insulin the patients are admitted on. As the same glycaemic control cannot be guaranteed with different brand of insulin, blood glucose should be monitored more frequently.

### Instructions on substituting insulin brands in an emergency

*Insulin must **not** be omitted in Type 1 diabetics*

1. Contact a doctor to prescribe substitute insulin brand in the same number of units as the patients usual insulin
2. When substituting **human insulin** for **animal insulin** you should contact the diabetes team for specialist advice. There have been reported cases problematic hypoglycaemias when patients on animal insulin are given human insulin
3. When using emergency insulin for a patient please contact pharmacy the next working day to supply patients regular insulin, and ensure that the drug chart is changed accordingly
4. Regular blood glucose monitoring should be performed during any substitution

Please note

- Basal insulin (Detemir, Tresiba, or Lantus) should be prescribed and continued if the patient is on an intravenous insulin sliding scale
- Actrapid and Humulin M3 should be given 30mins pre-meal where possible
- Always check with your patient if they have had a problem with human insulin in the past. Problematic hypoglycaemia has been observed in the past when patients who usually take animal insulin are given 'human' insulin.

## Emergency insulin compatible substitution table

### Rapid-acting Human Insulin Analogues

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
NovoRapid	10-20	Novorapid, Humalog & Apidra are interchangeable	Novorapid → EMC
Humalog	15		Humalog → EMC
Apidra	10-20		Apidra → EMC

### Short-acting human insulin

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Actrapid	<30	Actrapid, Humulin S & Insuman Rapid are interchangeable	Actrapid → EMC
Humulin S	30-60		
Insuman Rapid	< 30		

### Biphasic Human Insulin

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Humulin M3	*30-60	Novomix 30 or Insuman Comb 25	Novomix 30 → Easthorpe & EMC Humulin M3 → EMC Humalog Mix 25 & 50 → EMC  *Please note the onset times regarding mealtime
Humalog Mix 25	15	Novomix 30 or Humulin M3 or Insuman Comb 25	
Humalog Mix 50	15	Humalog Mix 25	
NovoMix 30	*10-20	Humulin M3 or Insuman Comb 25	
Insuman Comb 15	30-60	Humulin M3	Humulin M3 → EMC
Insuman Comb 25	30-60		
Insuman Comb 50	<30		

### Intermediate- acting Human Insulin

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Insulatard	<90	Insulatard, Humulin I & Insuman Basal are interchangeable	Insulatard → EAU
Humulin I	30-60		Humulin I → EMC
Insuman Basal	<60		

### Long – acting Human Insulin Analogues

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Lantus (glargine)	150	Lantus, Levemir and Tresiba are all interchangeable	Lantus → EAU
Levemir (detemir)	150		Levemir → EMC
Tresiba (degludec)	30-90 (Duration>42hr)		

### Short-acting Animal Insulin

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Hypurin Bovine Neutral	30-60	Actrapid	Actrapid → EMC
Hypurin Porcine Neutral	30-60		

### Biphasic Animal Insulin

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Hypurin Porcine 30/70	<2hours	Humulin M3 or Insuman Comb 25	Humulin M3 → EMC

### Intermediate animal insulin

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Hypurin Bovine Isophane	<2hours	Humulin I or Insuman Basal	Humulin I → EMC
Hypurin Porcine Isophane	<2hours		




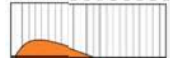
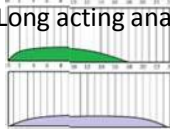
### Long acting animal insulin

Insulin Brands	Approximate Onset (minutes)	Substitute Insulin Brands	Location out of hours
Hypurin Bovine Lente	120	Lantus	Lantus → EAU
Hypurin Bovine Protamine Zinc	4-6hours		

### Reference

1. NHS Diabetes -Safe and Effective Use of Insulin in Hospitalised Patients.
2. National Patient Safety Agency. Reducing harm from omitted and delayed medicines in hospital NPSA/2010/RRR009; <http://www.nrls.npsa.nhs.uk>.
3. BNF NO. 68 (September 2014-March 2015)
4. Martindale: The Complete Drug Reference
5. Mims Insulin Preparations; <http://www.mims.co.uk/insulin-preparations/diabetes/article/1096962>
6. Rapid response report – Safer administration of insulin, 2010; <http://www.nrls.npsa.nhs.uk/alerts/?entryid45=74287>
7. NHS Diabetes – Safe use of insulin, 2010; [http://www.diabetes.nhs.uk/safe\\_use\\_of\\_insulin](http://www.diabetes.nhs.uk/safe_use_of_insulin)
8. Insulin profile; <http://www.mydiabetesmyway.scot.nhs.uk/resources/leaflets/Insulin.asp?ID=579&thesection=insulin&thetitle=Insulin%20Action%20Profiles&thetype=leaflet>

Appendix 1

<p>Rapid Analogue</p> 	<ol style="list-style-type: none"> <li>Humalog (Lispro)</li> <li>Novorapid (Aspart)</li> <li>Apidra (Glulisine)</li> </ol>	<ol style="list-style-type: none"> <li>Lilly</li> <li>Novo Nordisk</li> <li>Sanofi-Aventis</li> </ol>	<p>Up to 15 mins before, during or just after meals</p>	<p>Action onset 15 mins Peak 2 hours Duration up to 5 hours</p>
<p>Short Soluble</p> 	<ol style="list-style-type: none"> <li>Humulin S</li> <li>Act apid (sliding scal )</li> <li>Insuman Rapid</li> </ol>	<ol style="list-style-type: none"> <li>Lilly</li> <li>Novo Nordisk</li> <li>Sanofi-Aventis</li> </ol>	<p>15-30 mins prior to meals</p>	<p>Action onset 30-60mins Peak 2-4 hours Duration up to 12 hours</p>
<p>Mixed Analogue (rapid and protamine suspension)</p>	<ol style="list-style-type: none"> <li>Humalog Mix 25 or 50</li> <li>Novomix 30</li> <li>N/A</li> </ol>	<ol style="list-style-type: none"> <li>Lilly</li> <li>Novo Nordisk</li> <li>N/A</li> </ol>	<p>Up to 15 mins before, during or just after breakfast and evening meal</p>	<p>Action onset 10-20mins Peak 1-4 hours Duration up to 24 hours</p>
<p>Mixed soluble &amp; Isophane</p> 	<ol style="list-style-type: none"> <li>Humulin M3</li> <li>N/A</li> <li>Insuman Comb 15, 25 or 50</li> </ol>	<ol style="list-style-type: none"> <li>Lilly</li> <li>Novo Nordisk</li> <li>Sanofi-Aventis</li> </ol>	<p>15-30 mins prior to breakfast and evening meal</p>	<p>Action onset &lt;30-60 mins Peak 1.5-4 hours Duration up to 20 hours</p>
<p>Intermediate Isophane</p> 	<ol style="list-style-type: none"> <li>Humulin I</li> <li>Insulatard</li> <li>Insuman basal</li> </ol>	<ol style="list-style-type: none"> <li>Lilly</li> <li>Novo Nordisk</li> <li>Sanofi-Aventis</li> </ol>	<p>Early morning and / or late evening May be administered without food</p>	<p>Action onset 60-90 mins Peak 4-12 hours Duration up to 24 hours</p>
<p>Long acting analogue</p> 	<ol style="list-style-type: none"> <li>N/A</li> <li>Levemir (Detemir)</li> <li>Lantus (Glargine)</li> </ol>	<ol style="list-style-type: none"> <li>Lilly</li> <li>Novo Nordisk</li> <li>Sanofi-Aventis</li> </ol>	<p>Usually – early morning or late evening at a set time. May be administered without food</p>	<p>Action onset 3-4 hours Peak up to 14 hours Duration up to 24 hours</p>