

Intravenous - CHILD

Insulin (soluble) human

Medicine name

Insulin (soluble) human

Trade name(s)

Humulin S[®] , Actrapid[®]

Overdose of insulin due to abbreviations or incorrect device is a **Medication Never Event**.

To reduce the risk of giving an incorrect dose always write the word 'units' in full next to the dose of insulin, do not use abbreviations such as 'U' or 'IU'
Withdraw insulin from vials **ONLY** and always use an insulin syringe (graduated in units)

Risk of severe harm and death due to withdrawing insulin from pen devices; Patient safety alert 11/2016


Preparation and Administration

Summary

IV infusion, Continuous IV infusion

[See the BNFC link](#)

Before treatment

Click the  icon above to view checks that should be made before giving the medicine.

Preparation (5,6a,6b,10,121,3,17)

Diabetic ketoacidosis, Hyperglycaemia during illness, Diabetes during surgery:

Draw up required amount of soluble insulin using an insulin syringe and dilute with sodium chloride 0.9%.

If available follow local guidelines, otherwise use one of the following recommended concentrations:

NPPG/RCPCH recommended 'standard' infusion concentrations:

Usual patient weight groups:

2 - 5kg: 20units diluted to 20mL (1unit in 1mL)

Over 5kg: 50units diluted to 50mL (1unit in 1mL)

(In special circumstances such as fluid restriction or weaning, any of the infusion concentrations/volumes listed above may be used regardless of patient weight)

Alternative concentrations currently used in some organisations:

For patients over 2kg, organisations are encouraged to phase out use of the following concentrations and adopt the NPPG/RCPCH recommended concentrations above.

Fixed dilutions:

- 0.1unit in 1mL
- 0.2unit in 1mL
- 1unit in 1mL

Weight based dilutions in neonatal un

[Use of glucose 10% as a diluent](#)

Expiry time to write on label of continuous infusion ⁽¹⁾

24 hours.

Administration ^(6,8,17)

Diabetic ketoacidosis, Hyperglycaemia during illness, Diabetes during surgery

Continuous IV infusion: Give using an infusion pump. Prime the line as described below.

Acute severe hyperkalaemia (unlicensed).

IV infusion: Give using an infusion pump.

Ensure sufficient glucose is given alongside insulin.

If diluted in glucose 12.5% or higher preferably give via a central venous access device as venous irritation and tissue damage may occur in cases of extravasation. If a central venous access device is unavailable administer via a large peripheral vein monitoring injection site closely using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation.

Priming the line before continuous IV infusion

Insulin may be adsorbed by plastics. In neonates and infants prime the administration line with diluted insulin solution and leave for 10 minutes then flush the line through with 5-20mL insulin solution before connecting to the patient. Repeat procedure when lines are

Example calculations

Infusion rate: can be calculated from the following equation:

$$\text{Insulin infusion rate (mL/hour)} = \frac{\text{Dose (units/kg/hour)} \times \text{patient weight (kg)}}{\text{Concentration (units/mL)}}$$

For example (the figures used are for illustration only):

To administer a dose of 0.1unit/kg/hour of insulin to a 10kg child using a solution of 1unit/mL, the calculation is:

$$\text{Insulin infusion rate} = \frac{0.1\text{unit/kg/hour} \times 10\text{kg}}{1\text{unit/mL}} = 1\text{mL/hour}$$

Example calculation: Insulin infusion rate required for different patient weights and doses of insulin using a 1unit in 1mL solution

Flushing

Flush with sodium chloride 0.9%. Follow local guidelines.

Adverse effects and suggested monitoring ^(1,11)

Acute reactions:

- hypoglycaemia
- anaphylaxis
- redness, swelling and itching at injection site.

Monitor: blood glucose, blood pressure; potassium and other electrolytes; blood ketones, bicarbonate and venous pH in DKA.

Extravasation

Extravasation is likely to cause tissue damage when diluted in glucose due to low pH and high osmolarity of the diluent. If extravasation occurs follow local policies

[Infiltration and Extravasation: A toolkit to improve practice. \(NIVAS 2024\)](#)

Other comments ⁽¹⁾

- Store unopened vials at 2-8°C and protect from light. Do not freeze.
- Actrapid®: Once in use vials may be used for up to 6 weeks; store below 25°C and do not refrigerate.
- Humulin S®: Once in use vials may be used for up to 28 days; store below 30°C.
- Vials contain glycerol and m-cresol as preservatives.
- The monograph does not cover Insuman Rapid® (Sanofi Aventis)

[Cambridge Diabetes Education Programme \(CDEP\): Safe use of insulin in hospital.](#)

Compatibility ⁽⁴⁾

The compatibility information is based on the concentrations recommended in the preparation section of the monographs and relates to two drug combinations only.

Compatible infusions (it is assumed that medicines meet close to the vascular access device):

- acetylcysteine, adrenaline, alfentanil, aminophylline, amiodarone, aprotinin, atracurium,
- caspofungin, clarithromycin, clonidine
- dobutamine, dopexamine
- esmolol
- fentanyl, furosemide
- gentamicin, glucose 5%, glucose 10%, glucose with potassium chloride, glucose 4% sodium chloride 0.18%, glyceryl trinitrate,
- heparin
- isosorbide dinitrate
- labetalol
- magnesium sulfate, meropenem, midazolam, milrinone, morphine,
- pantoprazole potassium chloride propofol,
- remifentanil,
- sodium chloride 0.9%, sodium nitroprusside,
- tacrolim

Medicines and infusions which are always incompatible

Preparations available and suppliers

Presentation of medicine ⁽¹⁾

Insulin (soluble) human solution
Available as: 1,000units in 10mL (100units per mL) vials.

A 'ready-diluted' 50units in 50mL sodium chloride 0.9% preparation is available in some hospitals.

Version: Version 9

Status: