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Regular U-500 insulin is a High-Alert Medicine

which may cause serious harm if not used correctly

High-Alert Medications are associated with the highest risk of injury when used in error.

Insulin has long been identified as a High-Alert Medication according to the Institute for Safe Medication Practices (ISMP).[1] A 2014 ISMP survey of pharmacists and nurses revealed that subcutaneous insulin ranked 9th among nearly 40 drugs and drug classes identified as high-alert medications that concerned practitioners.[2]

Because Regular U-500 insulin (500 units/mL) is 5 times more concentrated than Regular U-100 insulin (100 units/mL), it presents as especially dangerous if used incorrectly.

The primary potential errors with the use of concentrated Regular U-500 insulin are:

1. Risk of a mix-up between the U-100 and U-500 versions of insulin.
2. Risk of incorrectly administering the dose of U-500 as ordered.
3. Confusion related to appropriate dosing of the U-500 concentration

Depending on the type of error, dangerously low or dangerously high blood glucose levels can result!

To minimize errors please be aware of these U-500 Insulin facts:

- U-500 insulin is used to improve blood glucose control for diabetics who have significant daily insulin needs (i.e., more than 200 units per day). The different concentrations of Regular insulin are NOT interchangeable.
- Regular U-500 insulin is available as HUMULIN R U-500 and comes in single-patient-use prefilled 3 mL HUMULIN R U-500 KwikPen (1,500 units of insulin per 3 mL) and a 20 mL multiple dose vial (10,000 units of insulin per vial). After first use, KwikPens should be stored at room temperature and discarded after 28 days. In-use vials may be refrigerated or stored at room temperature and discarded after 40 days of use.
- HUMULIN R U-500 KwikPen (Pen) works differently than other pens. It dials 5 insulin units with each click of the Dose Knob. To dose – turn the dose knob clockwise until the correct dose is displayed in the dose window. ***Do not select the dose by counting clicks!***
- The Pen can accommodate doses from 5 to 300 units in a single injection. For doses more than 300 units, you will need to give more than 1 injection. The Pen will not let you dial more than the number of units left in the Pen. If the dose is more than the number of units left in the Pen:
  - Inject the amount left in the Pen and then use a new Pen to give the rest of the dose, or
  - Use a new Pen and inject the full dose.

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REMEMBER: HUMULIN R U-500 is a concentrated insulin. Do not transfer HUMULIN R U-500 insulin from a Pen into a syringe. A severe overdose may occur, causing blood glucose to drop to dangerously low levels. **NEVER** use an insulin pen cartridge as a vial to administer insulin using a conventional syringe as this practice could introduce air into the cartridge or reservoir, leading to subsequent insulin under-doses and subcutaneous injection of air.

To avoid serious patient harm and/or survey citations (F-760):

- **ALWAYS** transcribe orders clearly avoiding use of abbreviations and include insulin concentration (U-500) and dose (in Units).
- **ALWAYS** verify insulin is in-date prior to preparing the dose.
- **ALWAYS** verify that the type of insulin, the concentration and the dose prepared for administration match the current prescriber order before administration.
- **NEVER** use an insulin pen cartridge as a vial to administer insulin using a conventional needle and syringe.
- **NEVER** use insulin syringes calibrated in units only for use with U-100 insulin products with a U-500 insulin to avoid significant medication errors and resident harm.
- **NEVER** use an individual insulin pen for more than one patient.

References:

1. Cohen MR, Proulx SM, Crawford SY. Survey of hospital systems and common serious medication errors. J Healthc Risk Manag. 1998 Winter;18(1):16-27.
2. ISMP. Survey suggests possible downward trend in identifying key drugs/drug classes as high-alert medications. ISMP Medication Safety Alert! 2014;19(13):1-3,5-6