Institute for Safe Medication Practices
1800 Byberry Road, Suite 810, Huntingdon Valley, PA 19006
www.ismp.org

May 3, 2007
Revised June 14, 2007

****** ERROR ALERT ON HEPARIN-INSULIN CONFUSION ******

Dear Member of the Media:

The New Jersey (NJ) Department of Health and Senior Services' Patient Safety Initiative recently received a report of a premature baby in the neonatal intensive care unit receiving a bag of total parenteral nutrition (TPN) that contained insulin instead of heparin. The long-term impact on the neonate has yet to be determined. The hospital receives its TPN from a contracted national vendor and an investigation into the event is underway. The NJ Department of Health and Senior Services has issued a safety alert to state hospitals.

The Institute for Safe Medication Practices (ISMP) has received multiple other reports of mix-ups between heparin and insulin. Similar to the NJ incident, insulin has been added to infant TPN solutions in two other states, each with a fatal outcome.

A more complete discussion of this error hazard, along with other case examples in both adult and pediatric patients, is published in the May 3, 2007 issue of the *ISMP Medication Safety Alert!* newsletter (visit www.ismp.org/Newsletters/acutecare/currentissue.asp).

The most common factors associated with these mix-ups seem to be: 1) **mental slips** leading to confusion between heparin and insulin, especially since both drugs are dosed in units; 2) **similar packaging** of insulin and heparin in 10 mL vials; and placement of insulin and heparin vials, both typically used each shift/day, next to each other on a counter, drug cart, or under a pharmacy IV admixture hood.

The NJ Department of Health and ISMP strongly recommend that healthcare professionals check with suppliers, whether their own pharmacy or an outside vendor, to inquire about steps being taken to prevent similar errors. In addition, if cases of unexpected and unexplained hypoglycemia occur, the possibility of a medication error should be considered as part of the differential diagnosis, and the following steps should be taken:

- Discontinue all current infusions and hang new solutions
- Treat the patient as necessary with dextrose
- Check for unintended additives by sending the bag(s) for analysis

Early identification and treatment of hypoglycemia induced by insulin administration (or an oral hypoglycemic) can provide a window of opportunity to mitigate patient harm.

Institute for Safe Medication Practices

1800 Byberry Road, Suite 810, Huntingdon Valley, PA 19006

www.ismp.org

ISMP Safe Practice Recommendations

ISMP recommends the following additional strategies to reduce the risk of potentially harmful mix-ups between heparin and insulin:

To prevent errors caused by heparin and insulin vials during drug preparation:

- Do not keep insulin and heparin vials alongside one another on top of counters or drug carts on the nursing unit or under the laminar flow IV admixture hood in the pharmacy. Many organizations do not allow insulin near the location where TPN is being prepared, as they administer all insulin separately.

- To avoid similar vials, heparin bags of 100 unit/mL are available from IV solution vendors. Heparin prefilled syringes also could be made available for admixture use.
- Consider providing insulin to patient care units in pen devices rather than vials.
- When insulin is needed for an IV, it should be retrieved and added separately from other ingredients and returned to the appropriate storage area immediately after use. All insulin added to IV solutions should occur in the pharmacy.
- Require an independent double-check of IV insulin and IV heparin doses/infusions.
- Require an independent check of all TPN solutions, including an initial independent check of the vials gathered for all additives that must be added manually, another check of the vials and syringes pulled back to the volumes of drug actually added to the solution, and an independent check of the finished solution comparing the label and the original order. This double-check process should occur even if the TPN is prepared by a pharmacist.
- Use bar-code scanning for drug selection. If an automated compounder is used to add heparin or insulin to a solution, bar-code scanning should be required during set-up of the compounder.

To detect errors between heparin and insulin at the point of administration before they reach the patient:

- Always compare the indication for heparin or insulin with the patient's diagnoses/condition to ensure they match before dispensing or administering insulin or heparin.
- Write verbal orders directly on order forms and read back the orders to verify understanding and accuracy.
- Require an independent double check of IV insulin and IV heparin before administration.

About ISMP: *The Institute for Safe Medication Practices (ISMP) is a 501c(3) nonprofit organization that works closely with healthcare practitioners and institutions, regulatory agencies, consumers, and professional organizations to provide education about medication errors and their prevention. ISMP represents more than 30 years of experience in helping healthcare practitioners keep patients safe, and continues to lead efforts to improve the medication use process.*

***