ASHP Foundation Releases Insulin-Use Safety Recommendations
An interprofessional expert consensus panel developed ten recommendations to improve safety

BETHESDA, Md. (June 21, 2013) — Safe insulin-use recommendations from the American Society of Health-System Pharmacists (ASHP) Research and Education Foundation have been published electronically in advance of an August 15, 2013, print publication in the American Journal of Health-System Pharmacy.

The Institute for Safe Medication Practices identifies insulin as an inpatient high-alert medication. Insulin is frequently cited as one of the medications commonly implicated in medication errors in hospitals, and insulin-related medication errors have the potential to result in serious harm, including death. For example, “Insulin, Hospitals and Harm: A Review of Patient Safety Incidents Reported to the National Patient Safety Agency” stated that in a review of 16,600 patient safety incidents involving insulin, 24 percent resulted in patient harm. “A Systems Approach to Reducing Errors in Insulin Therapy in the Inpatient Setting,” which appeared in Endocrine Practice, reported that insulin was implicated in 33 percent of medication error-related deaths.

Insulin errors have been reported across each step of the medication-use process, most frequently occurring during prescribing and administration. Insulin-related medication errors occur in all hospital settings, including the emergency department (ED), critical care units, medical/surgical units and perioperative settings. Additionally, insulin is frequently implicated in adverse drug events detected in ED patients.

Because of the high incidence of insulin-related medication errors in hospitals, the ASHP Foundation convened an interprofessional expert consensus panel to develop recommendations to promote the safe use of insulin in the inpatient setting. The panel included pharmacists; physicians, including an anesthesiologist, endocrinologists, an emergency physician, hospitalists, and a pediatrician; nurses; and consumer and safety advocates.

“Among the error reports we receive at the Institute for Safe Medication Practices [ISMP], insulin consistently tops the list of medications that can cause harmful medication errors,” says panel member and ISMP President Michael Cohen, R.Ph., M.S., Sc.D. “The recommendations in this document are based upon the input from an interdisciplinary group of clinicians and medication safety experts who probed the various system issues and developed prevention strategies that will benefit the patients we serve. We are delighted with the outcome.”

The panel made 10 recommendations that address the areas of prescribing, dispensing and storage, administering, monitoring, evaluating and planning. They are as follows:
**Prescribing**
1. Develop protocol-driven and evidence-based order sets for specific uses of insulin such as transition of administration route from intravenous to subcutaneous, administration via implantable insulin pumps, post-discharge dosing, diabetic ketoacidosis, hyperosmolar states, hyperkalemia, and post-cardiac surgery care. These order sets should include orders for glucose monitoring and decision support capabilities that guide insulin use based on the patients’ nutrition status. In addition, protocol-driven and evidence-based order sets for the management of hypoglycemia should be developed and integrated into the care of all hospitalized patients who receive insulin.
2. Eliminate the routine administration of correction/sliding scale insulin doses as a primary strategy to treat hyperglycemia.
3. Eliminate the use of “free text” insulin orders in electronic and paper medical records and replace them with protocol-driven and evidence-based order sets that allow for the prescribing of complex insulin regimens.

**Dispensing and Storage**
4. Store only U100 concentration insulin and U100 administration devices (e.g., syringes, pens) in patient care areas and ensure that they are stored in a secure fashion and segregated from other medications.
5. Develop hospital-wide standard concentrations for insulin infusions to be adopted and used in all patient care areas.

**Administering**
6. Limit preparation, including for procedural areas, of all intravenous bolus insulin doses and intravenous insulin infusions to the pharmacy department.
7. Hospitals must develop policies and procedures to ensure that insulin pens are used for individual patients only. In addition, hospitals must establish policies and educational programs to ensure the safe use of insulin pens and disposable needle tips.

**Monitoring**
8. Ensure that insulin use is linked directly to patients’ nutrition status. Meal delivery, point-of-care glucose testing and insulin administration should be well-coordinated and standardized. Patients and their family caregivers should be educated to request administration of rapid-acting insulin when the patient begins her/his meal. In patients with variable nutritional intake, insulin administration should be delayed until completion of the meal. Protocol-driven and evidence-based order sets should be developed for insulin use and blood glucose monitoring during planned and unplanned interruption of enteral nutrition or total parenteral nutrition.

**Evaluating**
9. Every hospital should prospectively monitor/measure rates of hypoglycemia and hyperglycemia; insulin use; and coordination of insulin administration, glucose testing and nutrition delivery. Real-time, institution-wide glucose reports should be provided to health care team members to ensure appropriate surveillance and management of patients with unexpected hypoglycemia and hyperglycemia.

**Planning**
10. Provide standardized education, including competency assessment, to all hospital-based health professionals who are responsible for the use (e.g., prescribing, compounding, dispensing, administering, monitoring) of insulin.
These recommendations have been endorsed by the American Academy of Pediatrics, the American Association of Clinical Endocrinologists, the American Association of Nurse Anesthetists and The Endocrine Society. They are supported by the American College of Clinical Toxicology, the American College of Emergency Physicians, ISMP and the Society of Hospital Medicine.

“These recommendations will play an important role in preventing medication errors from insulin, says ASHP Foundation CEO Stephen J. Allen, M.S. “I hope that the panel’s efforts to develop practical recommendations that can be implemented with relative ease will make it easier for hospitals to adopt them quickly. The ASHP Foundation plans to work with the endorsing and supporting organizations to drive dissemination of these important recommendations.”

The ASHP Foundation also encourages professional organizations, accrediting bodies and other patient safety stakeholders to support the translation of these recommendations into practice, to incorporate them into their existing strategies for promoting insulin-use safety, and to engage in or support further research related to the recommendations.

“Hospitalists manage a large number of inpatients with hyperglycemia and diabetes,” says panel member Gregory Maynard, M.D., M.Sc., health sciences professor of medicine and director, UC San Diego Center for Innovation and Improvement Science, University of California, San Diego, Division of Hospital Medicine. Dr. Maynard also serves as senior vice president of the Society of Hospital Medicine’s Center for Hospital Innovation and Improvement. “The interdisciplinary rigorous methodology ensured a thorough review of the evidence, and all team member viewpoints were heard. The Society of Hospital Medicine has a long history of fostering improvement in this area, including providing assistance with protocol and order set development, high-quality metrics to track hypoglycemia rates and educational tools. We join the ASHP Foundation and the other organizations on the panel in encouraging medical centers to evaluate their own performance carefully against the standards depicted here, and implement the recommended practices where they find opportunities to improve.”


This project was sponsored by Sanofi.

**About the ASHP Foundation**
The ASHP Research and Education Foundation ([www.ashpfoundation.org](http://www.ashpfoundation.org)) was established in 1968 by the American Society of Health-System Pharmacists (ASHP) ([www.ashp.org](http://www.ashp.org)) as a nonprofit, tax-exempt organization. As the philanthropic arm of ASHP, our vision is that patient outcomes improve because of the leadership and clinical skills of pharmacists, as vital members of the health care team, accountable for safe and effective medication use. Our mission is to improve the health and well-being of patients in health systems through appropriate, safe and effective medication use.

**Contact Information**
Daniel J. Cobaugh, Pharm.D.
Vice President
ASHP Foundation