

SUPPLEMENTARY ADVISORY

Overdoses Caused by Confusion Between Insulin and Tuberculin Syringes

PA-PSRS Patient Safety Advisory is issued quarterly. However, the PA-PSRS clinical staff may periodically identify a situation that warrants more immediate communication with facilities to advise them of changes they can take to reduce Serious Events and Incidents. In those cases, the Patient Safety Authority will issue a *Supplementary Advisory*.

PA-PSRS has received several reports describing errors in which tuberculin (TB) syringes (with affixed 25-gauge needles) were used in place of insulin syringes. In one report, a nurse selected a TB syringe instead of an insulin syringe and administered 0.9 mL (90 units) of insulin, which resulted in a ten-fold overdose. Two additional reports described errors with using TB syringes in place of insulin syringes. In these cases, one patient received 60 units of insulin instead of 6 units, and another patient received 40 units of insulin instead of 4 units.

One reason for the error may have been the resemblance in packaging of the TB syringe and the insulin syringe. The TB syringe is packaged in a white wrapper with black and orange print with an orange plunger tip—the same color used for many years on insulin syringes. Previously, the TB syringe, typically used for subcutaneous injections, had a blue needle hub and label.

The Institute for Safe Medication Practices (ISMP) has previously reported cases of mix-ups that occurred when both the TB and insulin syringes were accidentally mixed together in the same storage compartment.¹⁻⁴ One contributing factor was the similarity between the outer boxes that contained either the TB or insulin syringes, which con-

tributed to a re-stocking error. For example, in one case a nurse selected the syringe from its usual storage area, saw the orange color on the plunger tip of the TB syringe and thought it was an insulin syringe. Believing she was using an insulin syringe, she then thought the “.5” mL marker represented 5 units, when that volume actually represents 50 units. Unfortunately, some TB syringe manufacturers do not include a leading zero on the syringe scale (0.5 mL)—something that might have helped prevent confusion. A similar “near miss” occurred when the syringes seen in Figure 1 below were confused. Due to the similar packaging and orange color coding a nurse mistakenly used a TB syringe to draw up an insulin dose. Fortunately, the error was caught during a standard double-check process for insulin before it was administered to the patient.

Situations such as these occur because the International Organization for Standardization (ISO) has



Figure 1. Tuberculin and Insulin Syringes from One Manufacturer. The TB syringe appears at the top of the photo, the insulin syringe at the bottom. The vertical orange stripes on both products contribute to the confusion.

Overdoses Caused by Confusion Between Insulin and Tuberculin Syringes (Continued)

mandated use of orange color coding for all safety-engineered syringes with 25-gauge needles. If manufacturers wish to export and import their products globally, they must conform to this standard. For this reason, most 25-gauge needles or syringe/needle combinations in clinical use are now being produced using this orange color coding. According to one syringe manufacturer, Becton, Dickinson and Company, the change does not yet impact the base or core hypodermic product line—only the safety-engineered products. However, they do plan to convert the conventional products within the next 1-2 years. The company has been trying to notify all customers about the change, but the message has not reached everyone and thus may not suffice in preventing future errors from occurring. The company is also working to improve syringe labeling to minimize the potential for error, with some changes expected soon.

Strategies that may help limit the potential for error until relabeling occurs include the following:

- Informing staff (both inpatient and outpatient) that are responsible for ordering and restocking syringes to the potential for error with these products. Pharmacies that supply these products to other facilities (physician offices, clinics, long-term care facilities) could notify the appropriate staff members at those sites to raise awareness about the potential for error.

- Storing insulin syringes separately from all other syringes and switching to TB syringes with 26-gauge (brown) or 27-gauge (gray) needles so that orange-colored syringe caps will appear only on insulin syringes. If no alternative exists and the syringes must be stored near each other, consider placing a prominent warning on the storage container for each syringe.
- Evaluating whether tuberculin syringes are needed in patient care units. Except in pediatric units, the syringes often are used primarily for skin tests or small subcutaneous doses that could be dispensed by the pharmacy.
- Exploring alternate suppliers (or alternate vendors, if necessary) for TB syringes made by manufacturers who have made changes to the labeling of their packaging to differentiate them from insulin syringes.

Notes

1. Institute for Safe Medication Practices. Medication Safety Alert! 13 Nov 2002;(7)23.
2. Cohen, MR. Hospital Pharmacy. May 2003 (38) 5; 412–5.
3. Institute for Safe Medication Practices. Medication Safety Alert! 6 Mar 2003;(8)5.
4. Institute for Safe Medication Practices. Medication Safety Alert! Community/Ambulatory Care Edition. Nov 2003;(2)11.

The Patient Safety Authority is an independent state agency created by Act 13 of 2002, the Medical Care Availability and Reduction of Error (“Mcare”) Act. The *Patient Safety Advisory* (ISSN 1552-8596) is published quarterly, with periodic supplements, for the Pennsylvania Patient Safety Reporting System (PA-PSRS) to advise medical facilities of immediate changes that can be instituted to reduce serious events and incidents. This publication can be reprinted and distributed without restriction, provided it is printed or distributed in its entirety and without alteration. Individual articles may be reprinted in their entirety and without alteration provided the source is clearly attributed. Copyright 2004 by the Pennsylvania Patient Safety Authority.

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