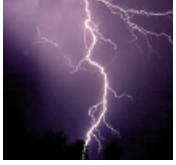
NANALERT



This alert is based on information from the National Medication Errors Reporting Program operated by the Institute for Safe Medication Practices.

January 23, 2013

WARNING! Severe burns and permanent scarring after glacial acetic acid (≥ 99.5%) mistakenly applied topically

Healthcare organizations should take immediate steps to ensure that only diluted acetic acid solutions are used in patient care. Eliminate the use and purchase of glacial acetic acid.

The Institute for Safe Medication Practices (ISMP), which operates the National Medication Errors Reporting Program, is warning healthcare providers about repeated incidents of accidental application of "glacial" acetic acid (≥ 99.5%) to skin or mucous membranes instead of a much more diluted form. **Glacial acetic acid is the most concentrated form of acetic acid available**. Inadvertent application of this corrosive chemical has led to severe burns, scarring, and other permanent damage to skin or mucous membranes. The following are among the cases reported to ISMP:

- A patient sustained severe burns and permanent scarring after glacial acetic acid (≥ 99.5%) was applied to her skin instead of a 5% acetic acid solution during a surgical procedure. The pharmacist was initially uncertain about dispensing the solution given that the label stated "Acetic Acid USP (Glacial)," but he later dispensed it without further dilution.

- A nurse called the pharmacy for "acetic acid for irrigation" for a young woman with paraplegia, osteomyelitis, and bilateral greater trochanter wounds. An experienced pharmacist, yet new to the institution, placed glacial acetic acid at the window for pickup. This was used for 2 days instead of a diluted form. The undiluted solution resulted in burns to the extent that the wounds would not heal, necessitating disarticulation at the hips.

- A physician in an ambulatory surgical center requested 4% acetic acid for use during anoscopy (similar to acetic acid use during a cervical colposcopy). Unit staff inadvertently purchased a bottle of glacial acetic acid directly from a medical supplier instead of the 4% solution. Although labeled "glacial acetic acid," the solution was not further diluted. The patient suffered severe anal burns.

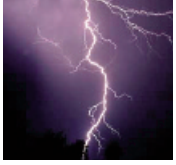
- A nurse received glacial acetic acid from a pharmacy technician and poured the undiluted solution into a bowl on the sterile field in the operating room (OR). The surgeon was using acetic acid to identify rectal condyloma. He soaked a gauze pad and placed it in the patient's rectum. The patient required extensive treatment and prolonged hospitalization due to tissue damage caused by the undiluted solution.

Diluted forms of acetic acid are used to treat certain infections of the outer ear and ear canal (2% solution), or to identify cervical dysplasia during colposcopy or dysplasia of other mucous membranes (3-5% solution; e.g., table vinegar is often used). A 0.25% sterile solution is commercially available and used for its antimicrobial properties as a premixed irrigation, primarily for bladder installation or wounds.

A common factor in each case has been staff unfamiliarity with the term "glacial," which refers to the fact that, at its freezing point, pure acetic acid forms crystals that look like a glacier. Unfamiliarity with "glacial" has led staff to order the wrong product from a supplier or use the product without knowledge that further dilution is required.

Glacial acetic acid is a chemical, which means it is not regulated by the US Food and Drug Administration (FDA). Thus, label warnings

continued on page 2—Glacial acetic acid



This alert is based on information from the National Medication Errors Reporting Program operated by the Institute for Safe Medication Practices.

January 23, 2013

Glacial acetic acid

continued from page 1

are not standardized. While some containers have no warnings at all (**Figure 1**), other container labels carry a skull and crossbones with warnings about the product's corrosiveness on the side or back panel. Although the strength of the solution is generally listed on the label, it is easy to miss or can be misunderstood. For example, with the product in **Figure 1**, "99.5%" is hidden on the back panel and has not been understood as the concentration because it is preceded by the word "assay."



Figure 1. Label on glacial acetic acid bottle, front (L) and back label panels (R).

Take these steps to prevent this painful and harmful event:

Remove from stock. Remove glacial acetic acid from the pharmacy, discard it safely, and replace it with vinegar (5% solution) or commercially available diluted acetic acid 0.25% (for irrigation) or 2% (for otic use). Limit availability to these concentrations only. Ensure that the acid is not stored in clinical areas such as the OR, clinics, physician practice sites, ambulatory surgical centers, and other procedural areas. **Glacial acetic acid has no use in its current form in clinical medicine**.

Restrict purchasing. Rely on pharmacy to purchase acetic acid solutions for all procedural areas.

Restrict choices when purchasing. If using purchasing software, investigate the possibility of restricting access to glacial acetic acid by creating approved "favorites" listings and/or making it invisible to purchasers so it is not selected by mistake.

Ensure correct strength is ordered. Verify that the correct strength has been requested from the vendor and received in the pharmacy.

Educate staff. Ensure that all medical, pharmacy, nursing, and technical staff who prescribe, dispense, use, or purchase products are aware of the differences between glacial acetic acid and diluted forms of acetic acid.

Order 5% as "vinegar." Physicians who perform colposcopy or anoscopy with 4% or 5% acetic acid can order it as "vinegar," which may be used for this purpose. Ordering "vinegar" reduces the potential for confusion with glacial acetic acid. If vinegar will not suffice, it may be possible to purchase pre-diluted forms of acetic acid, which should then be diluted by pharmacy to the needed concentration and labeled.

Verify product. Require an independent double-check of acetic acid solutions before dispensing or applying the product.

As noted, product label shortcomings have contributed to the harm reported with glacial acetic acid. Current warnings may be totally absent, or inconsistent and inconspicuous. ISMP has contacted chemistry organizations to discuss these contributing factors in the hope that improved warning systems can be developed by the chemical industry.

The National Alert Network **(NAN)** is a coalition of members of the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). The network, in cooperation with the Institute for Safe Medication Practices (ISMP) and the American Society of Health-System Pharmacists (ASHP), distributes NAN alerts to warn healthcare providers of the risk of medication errors that have caused or may cause serious harm or death. NCC MERP, ISMP, and ASHP encourage the sharing and reporting of medication errors both nationally and locally, so that lessons learned can be used to increase the safety of the medication use system.