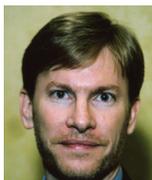


# End the “Ice Age” Is Glacial Acetic Acid Really Needed?

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*POISON! DANGER! CORROSIVE. Liquid And Mist Cause Severe Burns To All Body Tissue. May Be Fatal If Swallowed. Harmful If Inhaled. Inhalation May Cause Lung And Tooth Damage.*

**PROBLEM:** These words appear in the warning statements next to the red skull and crossbones image on the label of glacial (pure) acetic acid. Still, as strong as these warnings are, they haven't prevented accidents in which glacial acetic acid—instead of a diluted form—is dispensed from the pharmacy.

Diluted forms of acetic acid are used to treat some infections of the outer ear and the ear canal (e.g., Domeboro Otic is 2%), and to identify cervical dysplasia during colposcopy (in a 3% to 5% solution) after an abnormal Pap smear. Vinegar is 5% acetic acid; this concentration has also been used medically for irrigation. A 0.25% concentration of acetic acid is commercially available as a premixed irrigation, used primarily to treat the bladder and wounds.

In one case of dispensing an undiluted form, a nurse called the pharmacy for acetic acid for irrigation for a patient with paraplegia, osteomyelitis, and bilateral wounds of the greater trochanter. An experienced pharmacist, but one who was new to the institution, placed glacial acetic acid at the window for pickup. Instead of an appropriate diluted form, this product was used for two days. The undiluted solution resulted in burns to the extent that the patient's wounds did not heal, necessitating disarticulation at the hips.

In another hospital where the pharmacy routinely restocked automated dispensing cabinets for patient care areas, a refill request for the ambulatory surgery center called for 30 mL of a 5% acetic acid solution. A pharmacy technician obtained the bulk bottle of glacial acetic acid and poured 30 mL directly into a one-ounce

bottle. The technician was unaware that the product needed to be diluted to make a 5% solution. The technician labeled the bottle as “acetic acid—glacial.” The pharmacist who checked the technician's work knew about the need for dilution; even with the label, however, he assumed that the technician had already performed the required dilution.

The bottle was placed into stock in the ambulatory surgery department's automated dispensing cabinet and was later removed by the nursing staff to give to a patient. The nurses and physician assumed that the product had been diluted and did not notice that “5%” was not listed on the label. As a result, the physician used the glacial acetic acid during a colposcopy. The patient experienced immediate vaginal bleeding and blistering after the solution was applied and severe pain when she awoke. The physician did not immediately recognize the error, but he quickly realized that something was wrong as soon as he applied the acetic acid. The harm to the patient was temporary, but she required a week to recover.

In yet another case, a bottle of glacial acetic acid—which should have been 3% acetic acid—was sent to the operating room. One patient's skin was bathed with the solution, causing first-degree and second-degree burns.

**SAFE PRACTICE RECOMMENDATION:** It is obvious that health professionals are not always aware of the properties of glacial acetic acid. Some staff members might not recognize that the term glacial refers to the most concentrated form of acetic acid available. The warning on the bottle seems clear, but it is not always noticeable. It should be remembered that glacial acetic acid is packaged and labeled as a commercial chemical. It is not a drug, and the FDA's approval is not required. If glacial acetic acid must be maintained in inventory at all, it would be helpful if more prominent alert messages were placed on both the shelf and the bottle itself.

Another cause of the untoward events described previously is the lack of an independent double-checking system

when dangerous chemicals are handled. No matter who prepares a dilution using glacial acetic acid, the recipes (formulas) must be readily retrievable to detail how the dilutions should be made, and an independent double-check must be made of all materials, calculations and measurements, and labeling.

Some errors also appear to be related to the manner in which the drug is prescribed, such as when the necessary strength is not included or when glacial acetic acid is not mentioned in the order; for instance, “dilute glacial acetic acid” is one way of writing this product. In fact, in some cases, no order is even written; acetic acid is considered to be a chemical that can be requested without an order. Obviously, an order should be required, and the exact strength necessary must be included. Requests to dilute glacial acetic acid should be made at least one day before the chemical is needed in order to eliminate rushing while trying to comply with unfamiliar requests.

During our hospital consultations, we have strongly recommended that unnecessary chemicals be removed and discarded from the compounding area within the pharmacy, particularly chemicals that have not been used within the previous six months to a year. This is often the situation with glacial acetic acid. In many cases, one of the aforementioned commercial preparations can be used. Sometimes standard table vinegar (5% acetic acid) can also be substituted.

If bulk chemicals must remain in stock, they should be stored in a locked, sequestered section of the pharmacy.

Finally, the chemical can be diluted in the appropriate concentrations immediately after it is delivered so that no undiluted products are in stock.

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*The reports described in this column were received through the ISMP Medication Errors Reporting Program (MERP). Errors, close calls, or hazardous conditions may be reported on the ISMP Web site ([www.ismp.org](http://www.ismp.org)) or communicated directly to ISMP by calling 1-800-FAILSAFE or via e-mail at [ismpinfo@ismp.org](mailto:ismpinfo@ismp.org). ■*

