



# Nurse Advise-ERR™

Educating the healthcare community about safe medication practices

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## Are your patients receiving too much of a good thing?

According to studies, most patients who developed liver toxicity while taking acetaminophen received more than 4 g daily (references at: [www.ismp.org/MSAarticles/ref1.htm](http://www.ismp.org/MSAarticles/ref1.htm)). Healthcare providers need to keep track of patients' total daily doses to make sure they don't exceed safe limits for this commonly prescribed medication. But this is no easy task for several reasons.

There are many prescription analgesics on the market that contain acetaminophen as just one of its ingredients (e.g., **VICODIN**, **PERCOCET**). Because these combination products are often prescribed using brand names, nurses may overlook the fact that they contain acetaminophen. Pharmacists might have difficulty tracking the amount of acetaminophen consumed by patients since many of these products are floor stock. Physicians may fail to recognize that the various *prn* medications prescribed (often on standing orders) could cumulatively result in toxic amounts of acetaminophen. After all, it's not uncommon for physicians to prescribe acetaminophen for fever or mild pain, and a combination product with acetaminophen for moderate pain. Among 307 unintentional overdoses leading to hepatotoxicity reported to FDA between 1998-2001, 25% of patients were taking more than one acetaminophen-containing product!

**Nurses may not know exactly how much acetaminophen is contained in each tablet.**

Recently, one hospital printed usage reports from their automated dispensing cabinets each morning for all patients who exceeded 3 g of acetaminophen within the previous 24 hours. While a healthy patient with normal liver function can tolerate 6 g per day over a very short period without harm, the hospital was dismayed to learn that one patient had received 8 g of acetaminophen within a 24-hour period! Many others had received 6 g on several consecutive days. Overall, the review detected an average of one patient per day exceeding 4 g. Since then, other hospitals have reported similar experiences, and several have identified combination products containing hydrocodone 5 mg plus acetaminophen 500 mg (e.g., Vicodin) as a contributing factor.

Computerized prescribing systems with dose-checking capabilities can alert physicians to the potential to exceed the 4 g daily limit of acetaminophen. Likewise, the use of bar coding during drug administration can track the amount of acetaminophen administered within a 24-hour period and alert nurses if they are nearing or about to exceed that threshold. However, even without technology, nurses can play a vital role in preventing acetaminophen overdoses. See **Check it out!** (at right) for suggestions on how you can help reduce the risk of acetaminophen toxicity.

### check it out! ✓✓✓✓

To reduce the risk of acetaminophen overdoses, consider the following:

✓ **Track doses.** Ask pharmacy to create a list of combination products used in your hospital that contain acetaminophen, and include the amount in each tablet or dose. Post the list near medication administration records (MARs) for quick reference when tracking cumulative doses. If automated dispensing cabinets are used, create a special daily report to identify patients who have received 3 g or more, and alert unit nurses to the risk of exceeding safe doses with these patients.

✓ **Use reminders.** Print a cautionary note "do not exceed 4 grams of acetaminophen within a 24-hour period" on MARs for products containing acetaminophen. Post alerts (preferably electronic) on automated dispensing cabinet screens to remind nurses about potential overdoses for acetaminophen-containing products.

✓ **Alert patients.** Design a leaflet to warn patients about taking over-the-counter (OTC) medications along with prescription medications that may contain acetaminophen, and how to look for this drug on OTC product labels (visit [www.ismp.org/leaflet.doc](http://www.ismp.org/leaflet.doc) to view a leaflet example). Always list the amount of acetaminophen contained in applicable medications on the patient's discharge summary.

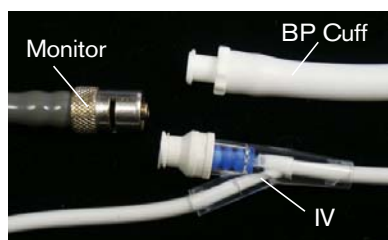
✓ **Limit use.** Review your standing orders to make sure that all possible acetaminophen doses will not exceed 4 g daily. When applicable, suggest that physicians prescribe combination products that contain less than 500 mg of acetaminophen (e.g., medications with 325 mg of acetaminophen) or analgesics without acetaminophen.

### safety wire

⚡ **Frankly my dear, I don't give a gram.** A new nurse was asked to "apply 1 inch of nitroglycerin paste" to a patient's chest. She obtained a unit-dose foil packet of **NITRO-BID** 1 g and squeezed an inch onto a paper measuring strip, intending to discard the remainder. A more experienced nurse realized that she was about to administer less than the ordered amount. The doctor had intended the 1 inch dose to be removed from the opening of a 30 g tube of nitroglycerin; the foil packet has a much smaller opening. The *entire* packet contains the equivalent of about a 1 inch ribbon (1 g). Adding to the confusion, paper applicators that accompany the foil packet are identical to those that come with the tube and measure the dose in inches. We've asked the manufacturer to provide paper applicators with better dosing instructions, without measurement in inches.

## Look what can be connected to needleless IV ports!

A patient who was connected to a portable blood pressure (BP) monitoring device was transported to radiology for an MRI. A length of tubing that led from the monitor's BP cuff inflator had a male Luer connector. This fit into a female connector on a shorter length of white tubing that was attached to a Critikon disposable BP cuff (see photo). The tubing and cuff were disconnected before the MRI since the Luer connector on the monitor's tubing was metal. After the test, a radiology employee reconnected the tubing and transported the patient back to his room. Upon arrival, a family member noticed that the tubing from the BP monitor was attached to a needleless Y-injection port on the patient's IV line. He immediately contacted a nurse, who disconnected the tubing.



Monitor tubing with male Luer connects easily to either BP cuff tubing or Y-site of IV tubing. Note similarities with propofol in IV tubing.

been infusing through the patient's IV line. Thus, the IV tubing and port looked very similar to the white length of tubing and connector on the BP cuff (see photo). An agitated patient died when he removed the tubing from his BP cuff and attached it to his IV line. These inadvertent connections are more likely to occur at the Y-sites of needleless IV tubing, but it's possible to connect BP monitor tubing to any other tubing with a Luer connector.

Although these might be rare occurrences, such hazards exist at many hospitals — and not just with BP monitoring devices. We also learned that a hospitalized patient was easily able to connect an air supply hose from an Albahealth sequential compression device (SCD, used to prevent deep vein thrombosis) to his needleless IV tubing. Fortunately, the device was turned off at the time and the connection was found before harm occurred.

Investigate whether similar risks exist with BP monitoring devices or SCDs in your hospital. ISMP has contacted FDA and several device manufacturers, all of whom agreed that requiring non-Luer connections would best solve this problem. Meanwhile, to protect patients, place BP cuffs on a different arm than the IV site, and keep SCD tubing away from needleless IV tubing. Remove IV catheters as soon as they are no longer needed. Labels on equipment and staff awareness might be helpful, but are unlikely to have a sustained effect.

Normally, the BP device cycles at preset intervals, inflating the cuff with more than 500 mL of air at pressures up to 300 mm Hg. If no resistance is met with an inflated cuff, two additional cycles quickly occur. Thus, more than 1,500 mL of air might have entered the patient's vascular system. Fortunately, the machine had not yet cycled to take a BP reading. Other patients have not been as lucky.

One patient died from an air embolism after a nurse mistakenly connected the BP monitor tubing to his IV line. Another nurse accidentally connected the BP monitor tubing to a needleless IV port. Propofol, which is white and opaque, had

## nicecatches



### Look-alike drug names.

Upon admission, a patient with genital herpes mistakenly told her doctor that she had been using **ZOSTRIX** (capsaicin) cream at home. So her physician ordered "Zostrix topically to affected areas three times daily" without specifying the drug's strength. The pharmacist dispensed Zostrix cream 0.025%, the only strength available in the hospital. The patient's nurse, who had used Zostrix herself for arthritis pain, thought that applying this topical anesthetic "hot pepper cream" to the genital area was unusual. Upon questioning, she learned that the patient actually used **ZOVIRAX** (acyclovir) 5% cream at home, but had confused the drug names. Both creams have names that sound somewhat similar, start with the letter "Z" and end with the letter "X," and are used to treat conditions related to herpes infections (herpes zoster for Zostrix, genital herpes for Zovirax).



### Look-alike drug packages.

Prefilled syringes from International Medication Systems (IMS) differentiate each emergency medication, but not each strength, with a unique color. But its highly stylized label design, depicting a star and a syringe, might hinder recognition of the product's strength during an



Graphics distract from label reading

emergency (see photo). Recently, a pharmacist purchased IMS syringes of atropine 0.5 mg/5 mL for a flight team. The syringes were supposed to be set aside when they arrived, but they were accidentally used to restock adult code carts, which typically held the 1 mg/10 mL IMS syringes. Later, during a code, a nurse discovered that the atropine was the wrong volume. Incorrect syringes were then found in the other code carts. If you use IMS syringes, affix auxiliary labels to avoid mix-ups.

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To report medication errors to ISMP, please call 1-800-FAIL-SAF(E).